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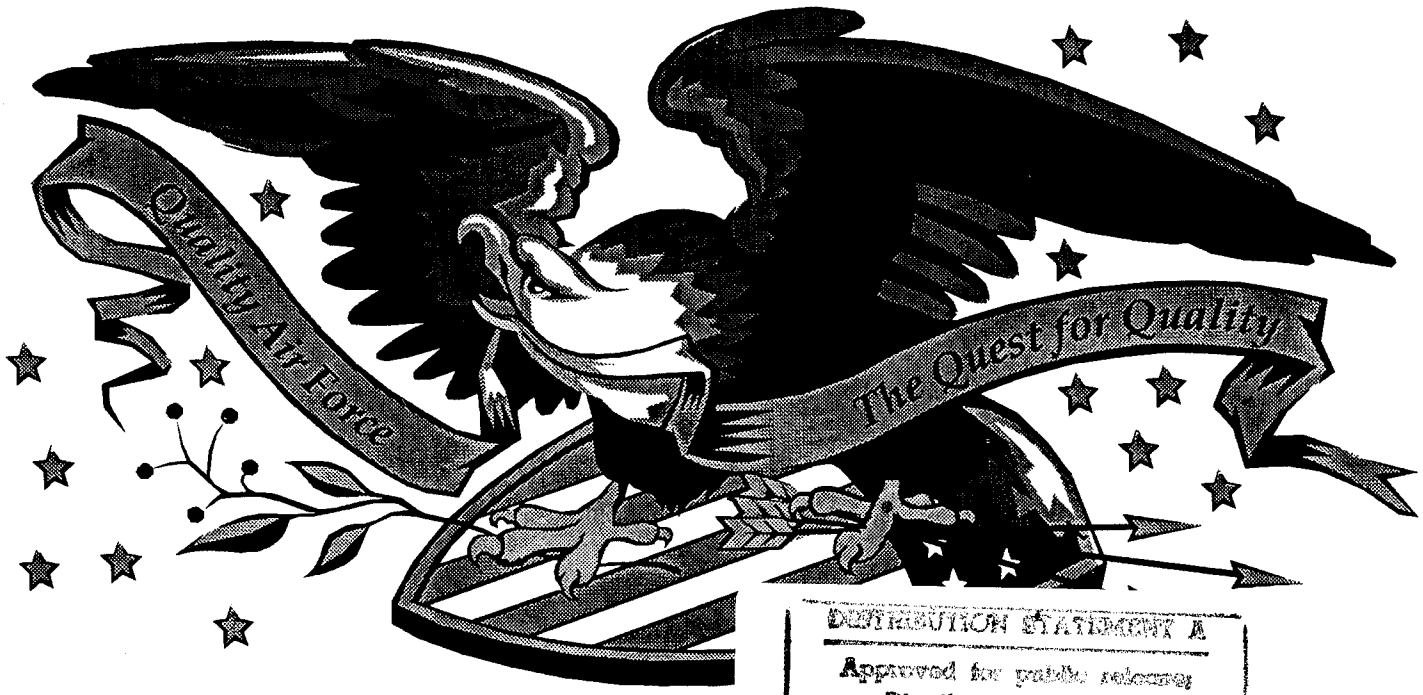

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Quality Air Force Symposium '93

The Quest for Quality

October 19-22, 1993

Montgomery Civic Center
Montgomery, Alabama

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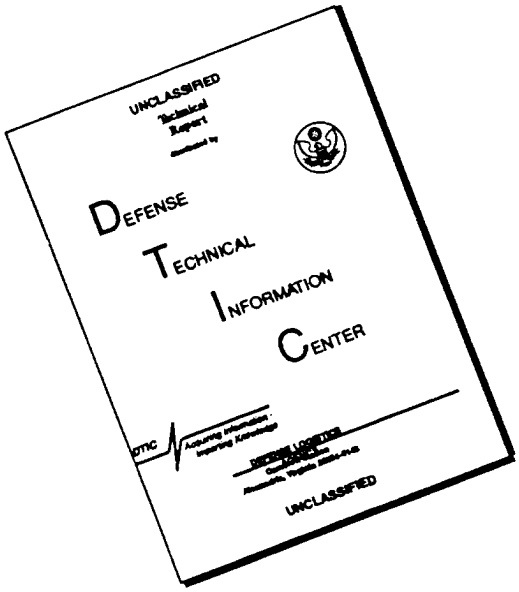

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Air Force Quality Institute

Air Force Quality Institute has been empowered by the Air Force Quality Council to implement quality across the Air Force. Created in 1991 as the Air Force Quality Center, the organization was designated as an Institute on October 1, 1993 in recognition of its academic mission and partnership in Air University. Since its inception, the Institute has nurtured the concept of Quality Air Force, bridging installation and command boundaries to help implement a quality-focused environment. From initial concept to final feedback, the Institute is an island of excellence, staffed by professionals committed to meeting the needs of the customer.

"The Quest for Quality"

Welcome to the First Quality Air Force Symposium

Two years ago, we developed the ***Quality Air Force Vision:*** AF people building the world's most respected air and space force...global power and reach for America. Furthermore, our ***Operating Style*** describes how we go about our daily business--to create a working climate that inspires trust, teamwork and pride while striving for continuous improvement. This gathering depicts our operating style in action.

The Air Force Quality Center has assembled a first-class symposium. We're pleased to offer you many different learning opportunities:

* *First AF-wide Quality meeting*
* *Displays by the best AF Quality teams*
* *Presentations by distinguished Quality leaders*
* *75 educational sessions*
* *Trade show exhibits from industry experts*
* *Many opportunities for networking*

These proceedings contain tools, techniques and methodologies to facilitate our cultural change. I encourage you to use them.

I commend the teamwork of all involved in our ***"Quest for Quality."*** Thank you--you've made a difference. Enjoy the symposium.

JAY W. KELLEY
Lieutenant General, USAF
Commander, Air University

Welcome to Montgomery, home to Air University and the Air Force Quality Center. Our team is proud to serve as your host for the Air Force's first quality symposium. The success of this year's event was made possible through the cooperation and advice of quality enthusiasts from across the Air Force.

The focus for this year's symposium is Air Force people. We will highlight a leadership style and a personal commitment of Air Force people to continuous improvement in their daily operations that will create a cultural change. I encourage each of you to visit the displays of twenty-four finalists for the Chief of Staff of the Air Force Team Quality Awards; their success stories and improvement ideas will be enlightening. You'll also have the opportunity to interact with our keynote speakers--all acknowledged experts--as they discuss quality principles and concepts.

The Air Force is at the forefront of Quality within the Department of Defense. The National Performance Review and the Defense Performance Review have heightened our awareness of the organizational impact of individuals working on teams with a unity of purpose. This, coupled with the commitment of our visionary leadership to quality, will ensure our continued success as we project ***global power and reach for America!***

Whether your organization is just starting or well along the quality journey, we hope this symposium will generate ideas, motivate people, and demonstrate the widespread support that continuous improvement enjoys in today's Quality Air Force.

We are delighted you chose to participate in ***Quest for Quality '93*** and we are proud to have you as our guests. During the symposium, please take a moment to complete the feedback forms; your comments can help us improve ***Quest for Quality '94***. Again, welcome and enjoy your "Quality Week!"

HANK FIUMARA
Colonel, USAF
Commander

QUALITY AIR FORCE SYMPOSIUM '93

Planning for and conducting the first Air Force-wide Quality Air Force symposium would never have happened had it not been for the sincere dedication of many people. Beyond the various individuals who played key roles--speakers, team participants, moderators, escort officers, etc., there was a select group of people who served on planning committees.

The planning committees began their efforts in October of 1991. An expert at conducting symposia for the American Society of Quality Control (ASQC), Mr. Jerry Whitson volunteered his services and provided the planning base from which all efforts were launched. Additionally, both ASQC and the Federal Quality Institute (FQI) provided opportunities to serve on key committees for their symposia to further benchmark requirements.

A solid macro-level process has now been documented and follows ASQC's recommended eighteen-month planning cycle. Additionally, many micro-level processes represent key committees efforts, from registration through final customer feedback.

Pulling together as a team, the committees on the following pages have brought you the "Quest for Quality". When you meet these people, please take a moment to personally thank them for the many hours of work that ensured your "Quest for Quality" was truly a ***quality*** event.

The professional expertise of CSERIAC (Crew System Ergonomics Information Analysis Center) and SatoTravel ensured all of the required sub-processes came together in the final quality show.

It was my honor to be selected as the General Chairperson for the first Quality Air Force Symposium.

Bryan Zak

Major Bryan Zak
Chief of Resources
General Symposium Chairman

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The 1993 **Quest for Quality** symposium is our first chance to share Air Force-wide what our organizations have done to achieve a Quality Air Force. If we examine the theme of this year's symposium, we will see a description of our journey.

Quest: Our pursuit of a Quality Air Force is more than a simple search for the right guru's philosophy to espouse or the right quality tool to exploit. Our quest is much larger than this. It is an endless search to obtain the right balance of policies and practices, tools and techniques, strategy and tactics. Given our ever-changing organizational climate, this quest is one that will never end.

Quality: As Aristotle said, "quality is a habit, not an act." For the Air Force, quality is our ability to consistently meet or exceed our customers' expectations. Although many members of our organization have not typically thought in terms of "customers," we now find that this attitude not only makes sense, it's the only way for us to maintain our readiness with fewer resources.

My thanks go out to all the individuals and organizations that helped make the 1993 **Quest for Quality** symposium possible. This includes the conference committee members as well as the conference speakers - both those who presented papers and the keynote speakers. Most of all, I would like to thank all of you who supported the symposium with your attendance. Hopefully the experience was worthwhile and you will be able to join us again next year.

MICHAEL D. MEYER, Lt Col, USAF
Program Chairman

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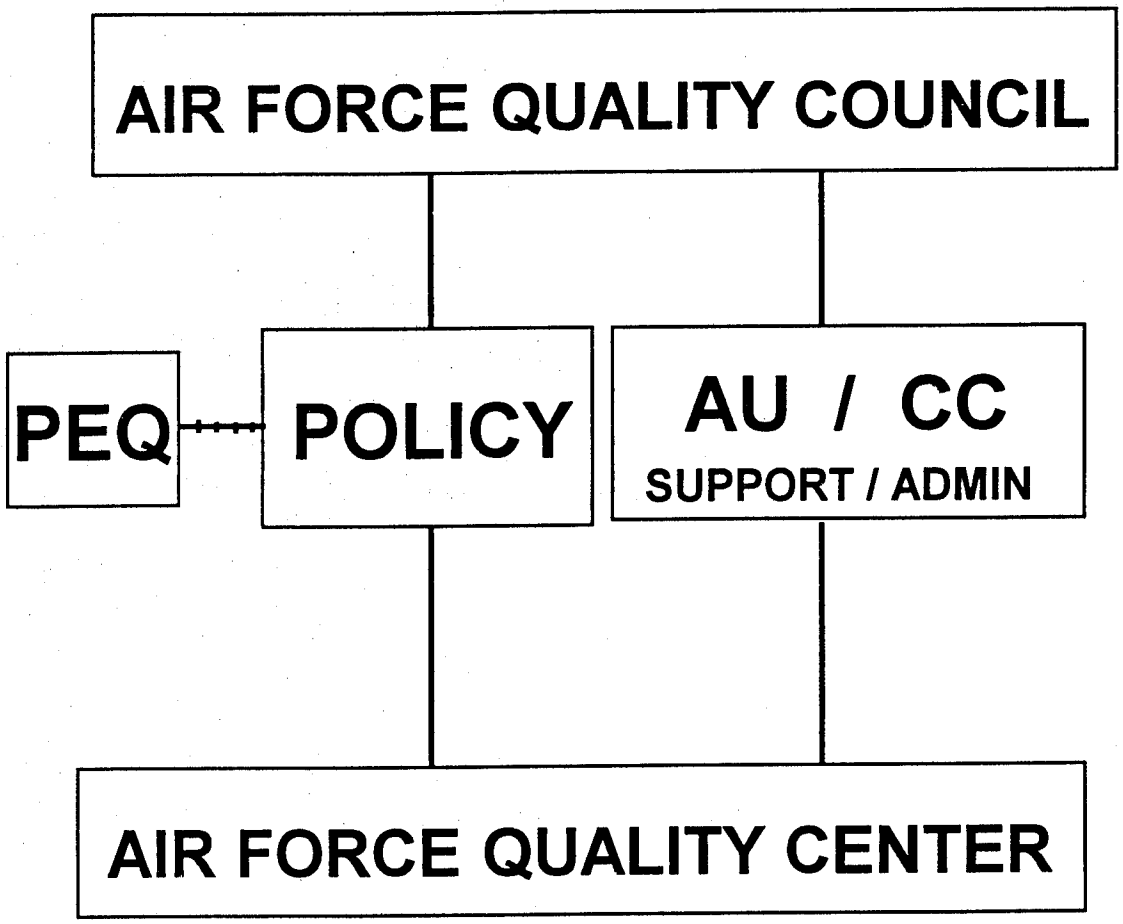
VISION

Air Force people building the world's most respected Air and Space Force...Global Power and Reach for America.

MISSION

Provide commanders and their organizations with advice, concepts, methods, educational resources, and a common frame of reference for attaining a Quality Air Force

QAF STRUCTURE



Team Quality Award Information

The Quest for Quality Symposium will also hallmark the first-ever Team Quality Award (TQA), created to recognize outstanding team performance, promote QAF awareness and implementation, emphasize teamwork, share best practices, and promote continuous process improvement and the appropriate use of metrics. The nominees come from units throughout the Air Force, Air Force Reserves, and the Air National Guard. Each team went through an intensive screening process before being selected as a TQA Finalist. As a finalist, each team submitted a nomination package to be scored by a panel of ten judges consisting of Air Force General Officers, equivalent grade civilians, and senior enlisted advisors who were also hand-picked because of their knowledge of Quality Air Force principles. The packages were scored against the following criteria

Teamwork

The ***Teamwork*** category examines the initial organization of the team concentrating on its purpose and membership, and on its group dynamics.

Process Selection Criteria

The ***Process Selection Criteria*** category examines the procedures/steps the team went through to identify and select the process to improve.

Analysis Techniques

The ***Analysis Techniques*** category examines how the team analyzed the specific process in order to set a target(s) for improvement, and to identify and verify possible root causes.

Solutions

The ***Solutions*** category examines the process the team went through to identify, select, plan, and implement the solution(s).

Results

The ***Results*** category examines quality improvement based upon objective measures derived from analysis of customer requirements and expectations.

Deployment

The ***Deployment*** category examines how the team standardized and communicated improvements to the process ensuring the increased level of performance is maintained, and shared where applicable.

Presentation

The ***Presentation*** category allows the team to internally and externally evaluate its' problem-solving skills and effectiveness, and publicize and celebrate its improvement effort.

The culmination of the Team Quality Award will occur this week during the Quest for Quality Symposium. Each team will present their stories to the panel of judges for a final determination of the top five teams--the Team Quality Award Champions. Symposium participants are welcome to watch the teams present their stories. Seating is limited to 100 people per session, so get your seat early.

In just over two years we have developed and delivered a myriad of Quality Air Force products and services that continue to delight our customers. Examples include centralized purchasing that has saved in excess of $1.3 million, trained hundreds of people in courses such as, Quality Air Force Instructor Course, Unit Self Assessment Course, and the Executive Quality Leadership Course just to mention a few. In addition, we are continually involved with clients in the field, conducting off-sites, facilitating planning sessions or assisting in translating and understanding surveys or research efforts. These successes were made possible in large part due to our senior leadership's deep sense of commitment and a clearly communicated vision, mission, and charter. With the continuous feedback from our customers and the cooperative spirit of quality experts from across the Air Force we hope to become *your* preferred source for QAF educational resources, training, and consultation.

We invite you to stop by the Quality Air Force Information booth in the display area or attend one of the Center's informational briefings listed in your program to learn more about *your* Air Force Quality Center.

"We're a world-class team embracing quality and communicating Quality Air Force"

Air Force Quality Center

" ...A clearinghouse for total quality management resource materials, a place that our folks can turn to for advice and consultation..." these were the words that our Chief of Staff, General Merrill A. "Tony" McPeak, used in the summer of 1990 to launch a conceptual study that would result in the creation of the Air Force Quality Center.

Since the Center's first day of operation, 21 April 1991, with four personnel, no telephones, supplies, budget or permanent facility the Center has grown to a staff of 80 highly motivated quality professionals. Today we are housed in a modern well-equipped facility at Air University's historical Maxwell Air Force Base in Montgomery, Alabama where we proudly serve our customers from around the world. We are excited by our *vision:*

> ***Air Force people building the world's most respected air and space force– global power and reach for America!***

And committed to the challenges of our *mission:*

> ***Provide Air Force commanders and their organizations with advice, concepts, methods, educational resources, and a common frame of reference for attaining a Quality Air Force.***

The Air Force Quality Council, our executive steering committee, provided further role clarification by creating our *charter:*

- ***Be a center of quality improvement expertise***
- ***Provide quality leadership consultation for Air Force commands & organizations***
- ***Be a distribution center for crosstell of quality improvement experiences, ideas, and information***
- ***Develop and promote commonality in quality language and methodology***
- ***Develop an architecture for integrating quality training and education Air Force - wide***

Quality in Daily Operations combines gains already achieved through process improvement with our daily responsibilities. It is applying the principles and practices of Quality Air Force to our daily activities, using tools and metrics as a part of our daily routine, working as a team, and making continuous improvement a part of the job.

The integration of these elements balances our organizational activities:

- Quality Focus identifies the priority issues;
- The Improvement Process focuses continuous improvement efforts on the priorities identified;
- Quality in Daily Operations applies Quality Air Force concepts to our areas of responsibility.

This combination allows us to effectively and efficiently accomplish our organization's mission and prepare for the future.

Quality Air Force Support Structure

The diversified mission of the Air Force requires specialized training, customized evaluation, and customer-focused education to meet the needs of the different commands. The Quality Air Force effort goes beyond installation or command boundaries; quality implementation needs a "commonality" that will benefit everyone.

The Air Force Quality Council

Air Force leaders recognize that a successful quality culture demands sustained senior leadership commitment and involvement. The Air Force Chief of Staff (CSAF) established the council in December 1991. Co-chaired by the Under Secretary of the Air Force and the CSAF, the council guides our progress toward establishing a quality culture. The council sends a strong message: our top leaders are personally and directly involved in Quality Air Force activities, including conducting training. It sets Quality Air Force

policy and strategy, reviews action plans and assesses progress. The council also guides the integration of quality into the curricula of all Air Force formal schools. The council has established and communicated its core values, principles, and operating style to the field. Reward, recognition, and assessment of Quality Air Force progress are also critical issues at the council level. A working group of the major command quality advisors meets regularly to assist in the preparation of issues that come before the council.

Education and Training Strategy

Education and training are mainstays of the Air Force career development system. We can best implement quality techniques by using the programs and systems already in use. During the course of military service, most of us will have the chance to function as a team member, leader, facilitator, or advisor. We may also deploy quality concepts as a mid-level manager, senior leader, or even as a quality council member. At key career transition points, personnel (civilian, enlisted, and officer) become eligible for education and training opportunities.

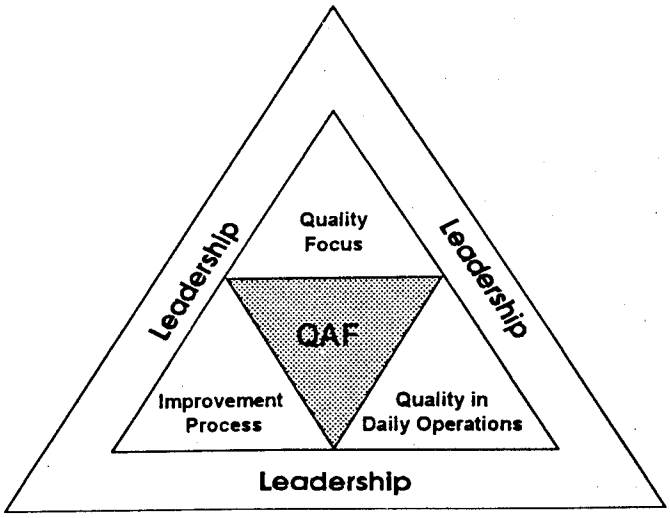
The architecture is a plan to integrate Quality Air Force subject areas into the curricula of existing Air Force courses. At entry level, all personnel receive introductory training. Civilians continue their quality education and training through Professional Continuing Education. Military members receive Quality Air Force training through both technical training and Professional Military Education. Specialized training with Quality Air Force courseware is offered by the Air Force Quality Center.

"Americans still care about quality. The country is full of intelligent, courageous people who would change if they only knew how." *W. Edwards Deming*

Quality Air Force System

Quality Air Force is an integrated system of three components built on Leadership. Quality Focus, the Improvement Process, and Quality in Daily Operations are the system elements.

Leadership is the foundation for the Quality Air Force system. Leaders set the vision, policies, priorities, and strategies. Their responsibility: foster an environment that inspires trust, teamwork, and pride. Leaders must maintain a customer focus as well as a systems perspective, and must not lose sight of their public responsibilities. Quality Air Force requires positive leadership actions, and it can't be delegated.



Quality Focus encompasses strategic planning, senior-level guidance, and a quality cultural implementation throughout the Air Force. Strategic planning is the process by which an organization envisions its future and develops special strategies and plans to achieve that future. It is a top-to-bottom alignment of goals and objectives; this is planning that involves leaders at all levels, as well as front-line individuals. Strategic quality focus--incorporating the ideas of people who best know the processes--generates "buy-in" and success. Everyone must know the organizational plans and strategies, and understand how those plans and strategies relate to the mission and individual jobs.

The ***Improvement Process*** uses a structured team environment and a disciplined approach, allowing Air Force members to work together toward a shared objective. This environment fosters empowerment and individual participation--that's crucial to achieving a Quality Air Force culture. This improvement process provides better products and services, stronger team and individual skills, teamwork, open communication, and a richer quality of life for us all.

QUALITY AIR FORCE

Quality Air Force is a leadership commitment and operating style that inspires trust, teamwork, and continuous improvement everywhere in the Air Force.

Why Quality Air Force?

A quality-focused organization recognizes the need for improvement and wisely adapts to meet changing demands. Faced with shrinking resources and a dynamic international environment, today's Air Force is undergoing fundamental structural changes. A quality approach provides a framework to help us get better as we become smaller. It's simply not logical to reshape the Air Force into a smaller version of the "Cold War" Air Force; we must find innovative ways to improve operations. Quality Air Force (QAF) allows us to better use our resources and improve our productivity through the ingenuity and collective strength of all Air Force members.

What is Quality Air Force?

Quality Air Force is a leadership commitment and operating style that inspires trust, teamwork, and continuous improvement everywhere in the Air Force. It's the way for us to control the shape and style of tomorrow's Air Force. As an institution, we must be receptive to new ideas. We believe there's always room for improvement in our operations. Quality Air Force principles and techniques provide us with the tools needed to make those improvements. The concepts in Quality Air Force have a proven track record in the Air Force and in world-class organizations around the globe. Simply stated, we need it--and it works!

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CREATIVE LEADERSHIP FOR TOTAL QUALITY

Dr. Richard Lester

CREATIVE LEADERSHIP FOR TOTAL QUALITY

BY

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Presentation at the First Annual Quality Air Force Symposium 1993

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Creative Leadership for Total Quality

There is a pressing need to sharpen the ability of leaders to lead more effectively in establishing and maintaining quality-driven organizations.

Take notice of the word "quality." You will probably see and hear this term more often in the coming months and years. Already we have been exposed to terms like "Quality Air Force," "Total Quality Management (TQM)," the "Quality Air Force Glossary," and the "Total Quality Awareness Course," to name just a few. The Air Force is giving top priority to the implementation of quality as the vehicle for attaining continuous improvement in its varied activities. Operationally, quality or the continuous search for excellence is at once both a philosophy of organizational life and a set of principles that establish and help organizations to continuously improve mission attainment. Well, you may say, that's all very interesting, but what's it got to do with leadership, creative or otherwise? Your topic was creative leadership, but you are talking about management.

Good question. Ideally, improvement efforts should start at the very top of your organization; that the higher in the organization you can begin implementing continuous improvement the greater your chances of success; and that top leadership support comprises your organization's most visible means to champion improved processes and increased productivity. Without the pillar of creative leadership, there can be no serious quality achievements.

Napoleon Bonaparte said it well: "Without leaders people do not have a future. The only way to lead people is to show them a future. Leaders are the dispensers of hope, they keep hope alive." The record is clear: We live in a changed and changing world. The only constant is change. Thus, there is a compelling need for leaders who can energize and create a realistic vision of change that people can eagerly and confidently embrace. Napoleon's insightful statement is as true today as it was when he said it. Unfortunately, almost two centuries later, an understanding of leadership is still an unresolved dilemma for many. Creative leadership is an unnatural act, and to do it right, one has to learn two concepts: one has to develop an understanding of what leadership really is and then recognize when you are leading and when you are not. How do you know when you are not leading? Remember that Air Force quality seeks to raise a collective vision of quality and is premised on continuous improvement, a never-ending process. Quite simply, this implies, if your quality is not improving, it's deteriorating; there is no standing still. If you observe a deterioration of quality in your area of responsibility, then you know you are not leading.

There are very few things more destructive to an organization than a non-leading leader. As Benjamin Franklin said, "You can't expect an empty bag to standup straight." In its broadest sense, quality is the continuous search for excellence. Within this context, creative leadership is the capacity to translate intentions into reality and sustain it. Creative leaders take charge. They work with their people to make quality happen. They influence others to create a new reality for the organizations they serve. In these highly competitive times, creative leadership means being out front, showing initiative, imagination, and innovation. This is especially necessary in the three distinct subsystems that comprise quality: intense customer focus, continuous improvement, and

ongoing personnel involvement. Regarding customer focus, Dr W. Edwards Deming, one of the founding fathers of the quality movement, said, "Quality has no meaning without reference to the customer." The creative quality leader must adopt excellence as a personal and organizational philosophy, value it, live and consistently communicate it. In essence, this leader must persistently "walk the talk" in order to forge and strengthen organizational quality. If this is not done, all our dreams, hopes, and aspirations for achieving quality will become just that . . . talk.

The creative leaders who espouses quality must learn to clearly communicate. They must have the capacity to set clear goals and objectives, and ensure that they are understood. Then they must put the right person in the right job, and instruct them to follow the same procedure in their respective units. This process then builds strong leaders throughout the organization. In other words, once the leader has started the improvement process at the highest possible level, it must be cascaded through the organization, layer by layer, to ensure complete and thorough adoption of the improvement process. Implementation does not have to be complete at one level before proceeding down to the next, but key people should be trained, goals determined, and improvement efforts begun before initiating the effort at the next level down. Skipping levels is a crucial mistake because of missed opportunities for improvement at those levels and especially because of the risk of alienating personnel at those levels and turning them against the improvement effort.

Creative leadership for total quality implies an understanding of strategic leadership skills, attitudes, and values as a core element in achieving sustaining results and competitive advantage. It suggests that the scope, complexity, and nature of creative leadership requires adjustments in the traditional leadership dimensions used in organizations. To achieve this required ingenuity, leadership dynamics, specific role behaviors, and leadership strategies and skills must be continually assessed and improved. This is essential for reshaping relevant leadership behavior in order to nurture and sustain continuous quality improvement. Key imperatives for creative leadership involve participative initiatives and team building including more flexible leadership styles. The creative leader must also be an institutional leader who promotes and protects organizational values. The plain fact is that there is a continuing need for leaders who can make a difference; who can transform organizations and create the kind of future necessary to meet the diverse and complex challenges of the 20th century.

The current one base, one wing, one boss concept is an excellent example to stimulate creative leadership for total quality within the Air Force. The very nature and structure of the objective wing provides opportunity for leadership to clarify, amplify, and seek agreement on common goals and objectives toward which wing units (operations group, logistics group, and support group) can work together. The leadership challenge is to stress wing interdependence rather than independence. What has recently been observed in the USAF Wing Commanders' Seminar and the Operations Squadron Commanders' Course is that creative leadership emphasizing conceptual problem-solving and team building skills should foster cross-functionalism and guard against stovepipe operations. In a recent interview with Professor Cy Barnes at the Harvard Business School, the professor, basing his observations on an examination and discussion of the objective wing, concluded that, executives (wing commanders) at this level must be primarily leaders. He maintained that the traditional command - and - control bureaucracy would not work effectively in

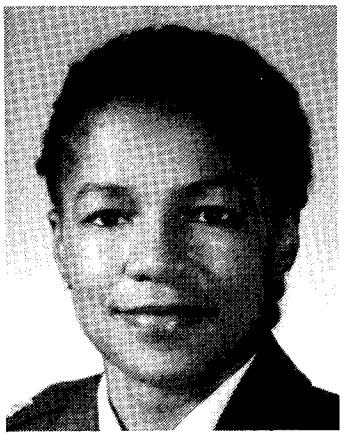
a complex objective wing and counseled that inventive executive skills were required to introduce multidimensions of leadership within the objective wing structure. Professor John Kotter, another member of the Harvard Business School, who was also recently interviewed, provided additional insight for achieving creative leadership. He advised that leadership is not as rare a quality as one might think. He stated that leadership does not reside only in charismatic larger-than-life personalities. Thus, a leader's key role, he thought, should be to recognize and inspire subordinate leaders and nurture leadership at all levels within an organization.

On balance, the ultimate act of the quality-driven creative leader is to create a culture dedicated to productive and effective change. A major step toward achieving this reality is for leaders at all levels to enhance their strategic decision-making ability and to provide an interdisciplinary perspective that considers major issues derived from a voice-of-the-customer, data-driven menu of concerns. It is essential that this leadership activity emphasize the critical areas that affect the leader's broad strategy, transformational leadership skills, and information and decision technology required to enable leaders to function effectively within their organizations. The creative quality leader of the future must be value-driven and have a restless imagination. It will be essential for these leaders to develop a keen sense of the importance of delegating and encouraging leadership throughout an organization. Creative leaders who are quality oriented are sensitive to the importance of an organizational vision. It is essential for this type of leader to ensure the development of a vision that motivates people to work toward a positive end. The truly creative leader involves all the people in the improvement process and empowers them to create ideas and make decisions within their area of expertise, not only to do the work but also to improve the entire system. The creative leader understands that the ultimate objective is to inspire the workforce to exercise self-direction while continuously pursuing improvement strategies in routine work as well as on special projects. As Dr Deming has said, "People are not an asset, not a resource. They are a treasure to be protected."

Without such a clear vision, institutions cannot galvanize the people to put forth their best efforts toward achieving compelling goals. The quality leader will caution against mixing a muddled stew of vision, values, goals, and mission statements. The creative leader will be more effective if mission, vision, values and goals are developed as separate stand-alone items, each related to one another for forceful effect . . . all in direct support of a reality-based strategic plan.

In summary, without creative leadership, total quality will not happen. Within the context of this paper, leaders must be totally involved in assuming responsibility for showing people and their organizations the way. The creative leader will always address what can be done to best achieve the mission and articulate how different elements within an organization can constructively contribute to achieving that mission, which is central to all that we do.

QUALITY LEADERSHIP



Maj Dianna Williams

Quality Leadership

Abstract

This paper proposes the spiritual qualities of a leader according to known source documents. The paper concludes that an authentic leader must have spiritual qualities and those qualities are discussed. Sources mentioned are well known books and other source documents. The author will describe certain threads of commonalty between these references in their quality assessment of a mature leader. In particular the criteria of assessment will include but not be limited to the leader's characteristics, values, foresight and plan of action.

In the beginning. . .

I was horrified by what I heard in a class of Air Force members and civilians. The one hour of discussion was on values and the prevailing pattern of thought was "values change as circumstances change." I was disappointed to find that moral absolutes were "something for the other guy" and since taking that class, I've wondered why.

It has taken me some time to figure out that "the why" is the decline of spiritual qualities in a leader. Over the years physical fitness and educational training have been popular and valued to the extent that Air Force members are tested on their physical abilities and mental skills. Conversely, forming and nurturing spiritual qualities are for the most part buried and left up to the individual members.

The spiritual side of mankind. . .

There is a spirit in man.[1] Man is a spiritual being encased in a physical body. That spiritual side of a human being has distinctive characteristics that should be given attention as well as the other parts of man. View man holistically. There are more dimensions to mankind than the overt ones: Spiritual, emotional, and social to name a few more.[2]

The spirit is an entity and has a will of its own.[3] This is the most critical characteristic. Beside having a will, there is a characteristic of choice[4]: A right (or wrong) spirit within us. A right spirit follows the direction of doing what is morally right, virtuous, fair and just, and is authentic. Choice is choice. It's hogwash to think one "can't help himself and is forced to make wrong decisions" in particular circumstances. Yes, we all make mistakes, but we all know whether it was because of immorality and/or ignorance. The turning point is when we roll up our sleeves and correct our wrongs.

The authentic leader has a clean heart which directs and guides toward morally right decisions and behaviors. . .

Moving toward morally right decisions is a spiritual quality of a leader who is beyond reproach.

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[1]Job 32:8. There is a spirit in man. . .

[2]Robbins. Anthony. Awaken the Giant Within. New York: Simon & Schuster. 1991.

[3]Matthew 26:47. The spirit indeed is willing but the flesh is weak.

[4]Psalm 51:10. Create in me a clean heart. O God. and renew a right spirit within me.

He or she personally cultivates legal and ethical standards in all that is accomplished. The Malcolm Baldrige Award Criteria and the Quality Air Force Criteria promote this public responsibility. This criteria is the United States Department of Commerce quality standard for businesses and Air Force units, as well.[5] Many organizations compete using this yardstick in the categories; one of which is Leadership. The definition of effective leadership lies in the degree to which the authentic leader is involved in the organization's quality culture. The leader has a public responsibility that directly impacts society to include business ethics, environment and safety as they relate to any aspect of risk or adverse effect, whether or not these are covered under law or regulation.

Beyond reproach is more than following the law and respecting regulations. . .
These leaders have a standard above and beyond regulatory mandates. They have a makeup, a conscience with a compulsion to meet certain personal moral absolutes, values, ethics, principles, and goals. They try to abstain even from the appearance of wrongdoing.[6] Their behavior is impeccable because their spirit within is constrained and molded to fit the definition of a good leader.[7] Having integrity, courage, competence, tenacity, service, and patriotism fits the characteristics of Air Force leaders according to the Air Force Chief of Staff, General McPeak.[8] These are codified by the following tenets: Leadership involvement, mission dedication, decentralized at the point of contact, management by fact, and respect for the individual. I wonder how many of us, leaders and followers, really know how to reach those attainable peaks.

A leader comes to serve. . .
"Servitude" is rather humbling. "Power" is the term most people relate to. It takes one of great courage to buy-in to an attitude of service.[9] Our former Commander in Chief, Dwight D. Eisenhower in his inaugural address in 1953 attested to leadership, "It (the abiding creed of our fathers) decrees that we, the people, elect leaders not to rule but to serve."[10] Executive leadership acts as a role model enforcing, but more importantly actively participating in, the values of the common good in their respective organization, agency, or corporate business. At the national level, former President Ford called on the American people to help him on "the priority business of the nation."[11] Leaders ask for help and want a "shared fate" leadership style with their employees and members . . .another sobering and humbling thought? Maybe so. Seek the pages again in the Malcolm Baldrige Award Criteria relating to the core values and concepts of leadership and the desired climate of the organization.[12]

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[5]Malcolm Baldrige Award Criteria. Managed by the United States Department of Commerce. Technology Administration. National Institute of Standards and Technology. 1993. 1.3 Public Responsibility and Corporate Citizenship. page 17. Public Law 100-107. August 20. 1987.
The Quality Air Force Criteria (draft) 1992. 1.3 Public Responsibility and Corporate Citizenship. page 10.
[6]1 Thessalonians 5:22. Abstain from all appearances of evil. AFR 30-30. Standards of Conduct. covers this as well.
[7]Job 32:10. This spirit within constrains me.
[8]McPeak. Gen. Chief of Staff. Air Force. 1993.
[9]Matthew 20:27. And whosoever will be chief among you. let him be your servant.
[10]Former President Eisenhower. Inaugural Address. January 20. 1953.
[11]Former President Ford. Inaugural Address. August 11. 1974.
[12]Malcolm Baldrige Award Criteria. Core Values and Concepts. page 4.

More requirements of a good leader. . .
An authentic leader knows what is required; he or she values wisdom and instruction to perceive the words of understanding.[13] In 1977, our nation's chief, President Carter, wanted us to remember the words of Micah[14] and renew our search for humility, mercy, and justice.[15]

What impacts the leader as well as those he or she affects?
Let me point to a complexity of mankind: The core belief system. The components of the belief system are ingrained principles, absolutes, and/or values. Mr. Stephen Covey states, "A personal mission statement based on correct principles becomes the same kind of standard for an individual. It becomes a personal constitution, the basis for making major, life-directing decisions, the basis for making daily decisions in the midst of the circumstances and emotions that affects our lives."[16] Personal mission statements are as numerous as opinions, but why can't we still agree on some concrete standards of morality? The answer is that seventy percent of Americans reject moral absolutes.[17] It is disheartening to think " there was a time when most Americans accepted absolute standards" . . .but it's different now. In the past, Americans might disagree on what those absolutes were, but they knew that some things are really right or wrong" (Colson, 1993). Within the past several decades important new interpretations have been given to the role of the family, the quality of life, the work ethic, the social responsibility of business, and many other values and institutions that were once thought to be enduring and permanent.[18] I renounce the "if-it-feels-good-then-do-it" attitude. I renounce the "values-change-as-circumstances-change" attitude. We are in the midst of change; however, the original traditional interpretations of sacred institutions are what this great country was founded on, and I hope that they continue.[19] Rushworth M. Kidder laments, "We will not survive the twenty-first century with the twentieth century ethics."[20] Let's arise and smell the coffee, "there's been a diminishing sense of concern for the common good. We have so elevated the value of individualism and liberty and freedom, that they have been detached from the sense of the common good."[21]

Examining why leaders want to do the right thing for the common good. . .
Philosophers and theologians might respond by saying that you should do the right thing for no other reason than its own sake--because living virtuously is its own reward.[22] They also might

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[13]Micah 6:8 and Proverbs 1:7.
[14]Micah 6:8. He has shown you O man, what is good and what does the Lord require of you.
But to do justly, to love mercy, and to walk humbly with your God?
[15]Former President Carter. Inaugural Address. January 21, 1977.
[16]Covey, Stephen R. The 7 Habits of Highly Effective People: Powerful Lessons in Personal Change. New York: Simon & Schuster, 1990. page 108.
[17]Colson, Charles. Reaching the Pagan Mind. Christianity Today, Vol. 36, Issue 13, November 9, 1992, page 112.
[18]Bennis, Warren and Nanus, Burt. Leaders: The Strategies for Taking Charge. New York: Haper and Row, 1985, page 93.
[19]The force that historically tethered the country to a sense of the common good no longer is first among the nation's political institutions. the French historian Alexis de Tocqueville referred to religion in his landmark study of America democracy in the 1800s. Briggs, David. Unholy Wars: Religion in Public Life.
[20]Kidder, Rushworth, M. Ethics: A Matter of Survival. Futurist, March/April 1992, pages 10-12.
[21]Briggs, David. Unholy Wars: Religion in Public Life, Part 1-4. News (Boca Raton, Fla., December 23-26, 1990). Quoting from Mr. Arthur Simon, head of the Christian hunger relief group, Bread for the World, pages 1A+.
[22]Houston, Patrick. The Trouble with Ethics. Sourcebook, Spring 1991, pages 22-29.

agree that the want of common good is consequential in nature. The result of selfish individualism will, in the short and long run, destroy the community. To wholeheartedly commit to do right is to succeed in establishing a personal and corporate conscience.

A personal conscience is like a regulator. It has a warning siren. . .
To sketch your personal conscience, ponder some sharp two-edged questions:

Who are you really accountable to?

Who are your "moral" heroes or heroines? Are you anyone's role model?

What wouldn't you trade in a world of barter?[23]

What would you cheerfully die for?

What decisions are you most proud of? Most ashamed of? If you had to tell your parents, subordinates, or children?

What promises do you keep?

In the Air Force, why are we regulated to accomplish a formal feedback session with our subordinates? Don't we normally talk and motivate them daily?

If "canned" software is purchased and computer games come with the package, is it legal to play the games since the needed software was purchased with government funds? Is it morally right if the entertainment games are played during non-duty or duty hours on a government computer if your boss allows you or your boss is not there?

Do the United States Air Force and United States businesses have more pressing problems than to focus their attention on moral standards and spiritual leadership?

If truthfully answered, the result would show an image of your ethical sovereign foundation. Augustine of Hippo called this image the "core of the soul"[24] whether fundamentally wrong, politically incorrect, spiritually motivated, and/or morally right.

Hope for the future. . .
I've walked you through my quest for man's destiny toward spiritual excellence. If mankind has a spirit of choice to do right for the common good, then leaders need to tap into that resource. Our personal mission statements affect everyone with whom we come in contact with. And in some cases, new interpretations of important institutions will come and go. We either dignify them or we don't. Remembering America's past leaders gives us a reflection of traditional standards and moral absolutes--something that is not popular in today's public and political opinion, and yet

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[23]Coats, Daniel R. Principles on a Collision Course. Christianity Today, Vol. 36, Issue 8, July 20, 1992, pages 27-28.
[24]Brown, Peter. Augustine of Hippo. Berkeley and Los Angeles: University of California Press, 1969, page 175.

leaders are charged with the burden of responsibility. Only the authentic leaders, those who exemplify spiritual qualities in their personal makeup and leadership style, can ever hope to make an ethical dent in the massive corporate infrastructure.

In my short life span I've seen my confidence level plummet observing some "leaders" in different walks of life: Outlandish acting Congressional figures, so-called religious leaders, two-faced political candidates and military personnel, and the list goes on. I don't put my trust and confidence in just mankind any more. My ultimate trust and focus is higher now, on Christ Jesus and God. . . just like it says on our money. Will some "leader" try to take that away with a new interpretation?

Nothing less than the survival of our national community is at stake. Quality spiritual leadership is the desperate need of our military and of our nation.

I am not a spokesperson for the members of the United States Air Force; I speak from my view point only. And speak I must.

EVOLUTION OF QUALITY LEADERSHIP: THE FIRST YEAR COMES FULL CIRCLE

Capt David Graser

Evolution of Quality Leadership:
The First Year Comes Full Circle

by

Captain David S. Graser

"There is nothing so captivating as new knowledge" - Peter Mere Latham

Captivating, seductive, enticing, the dawning of the age of TQM, the beginning of the end of our management problems...the 774 Medical Squadron was anxious to implement Quality Air Force. This paper discusses that implementation's first year, what went well and what didn't, the changes we experienced over the first year, and what lessons we learned.

Traditionally, Air Force medical treatment facilities have been led by a Commander and an Executive Committee made up of department heads such as the Physician in Charge of Medical Services, Chief Nurse, Dentist, Administrator, and other senior leaders depending on the size of the facility. This group is in charge of formulating policy, charting strategic direction, and monitoring the current state of affairs in the organization.

In January of 1992 the Executive Committee met and decided to embark on their implementation of, what was then, TQM. They decided to create a Quality Council to implement their vision of Quality and gave it the following charter:

To promote and establish Total Quality Management (TQM) within the organization, you are charged with the responsibility to:

a. Derive and publish an operational definition of quality for the organization

b. Create a "road map" for the implementation and monitoring of TQM

c. Determine what data should be collected for baseline analysis

d. Establish uniformity in the TQM process

e. Establish and monitor all facets of Process Action Teams (PATs):

(1) Standardize the selection process

(2) Approve their Opportunity Statements

(3) Conduct process review and coordination to include all data collection methods

(4) Make policy recommendations to the Executive Committee

f. Determine the educational and training needs of the organization for the ongoing TQM process

g. Devise recognition and reward systems based upon TQM principles.

Next this Quality Council needed members. The Executive Committee wanted to make a statement: this council represents the entire facility and all grade structures within it. To this end, using good brainstorming techniques, they came up with 12 members which encompassed all sections and was made up of individuals from Airmen to officers. Five of the members were also members of the Executive Committee, and one person who was purposely excluded was the Commander. The Commander felt he should not be a member for two reasons, first because by his presence he would exert too much influence over the working of the council, and second by not being a member he could have oversight and be objective in looking at their work. The members were sent copies of this charter and told that their first meeting was next month.

The next few months were spent figuring out what to do and how to do it. The roles of leader, timekeeper, and recorder were rotated at each meeting as they started to "dissect" the charter during their 4 hour meetings which were held once a month. These meetings were held away from the facility and in civilian clothes to help the council focus on their tasks and break down the barriers to communication that they thought uniforms would engender. Things were progressing well. They came up with the following definition of quality:

We have quality when we:

Achieve a good technical outcome

Meet our customer's needs, perceptions, and expectations

Deliver the right product at the right time

Make efficient use of our resources, time, and money

The council decided the next most important task on their road map would be education...primarily their own. Because of the method by which they were chosen, there was a significant difference in their backgrounds and exposure to TQM education. Some of the members were also members of the Executive Committee and were trained, at least to an elemental level, by Hq USAFE. The members with training came up with a 6 hour familiarization course, and the first students were the rest of the Quality Council.

The idea was to use cascading education. First the Quality Council would be trained, they they in turn would train the rest of the organization. This was when the first veneer of cohesion began to peel.

"Bodily exercise, when compulsory, does no harm to the body; but knowledge which is acquired under compulsion obtains no hold over the mind." - Plato

Some of the original members began to question their appointments to the council. There was some resentment that they had been appointed and not asked, some feelings that they were not the right people for the job, and some questioning of the validity of what they were chartered to do.

This was the first point of evolution, the first branch away from the trunk

of the tree. By identifying areas where people weren't comfortable, and having a few people with the fortitude to speak up, it set the stage to resolve other conflicts as well. Because these concerns were surfaced the meetings were changed to twice a month for two hours and civilian clothes changed to uniforms. The clothing changed for two reasons, first with the shorter meetings it was not felt worthwhile to change, but also it was felt that it made no difference. In a military organization people have rank. Wearing khaki pants and a golf shirt doesn't change someone's rank, and everyone was aware of that. The problems and processes we are tasked to deal with exist in a rank-wearing military environment and that needed to be acknowledged and reflected by the Quality Council. Wearing of civilian clothes had also not done what it was intended to do, people of lower ranks still did not seem to communicate freely and openly to superiors.

Another important change that was made was to continue to rotate the jobs of recorder and timekeeper, but not the leader. With the leadership position changing with each meeting, there was in effect no leader. This was the source of some conflict with some members vying for control and some members shunning those duties. A permanent leader gave the council an element of stability it had been lacking before.

"All the evolution we know proceeds from the vague to the definite" - Charles Sanders Peirce

With some of the "vague" elements of TQM out of the way, the council decided to concentrate on more definite items...Process Action Teams (PATs). This led to some interesting and sometimes derisive "turf wars."

Everyone has a favorite pet peeve that they would like to see fixed, and our council was no exception. The first opportunity statements were drafted by members who saw this as a way to address other people's problems. The Administrator wanted to form a PAT to look at the way the physicians scheduled patients, a physician wanted to form a PAT to look at the way administration ordered drugs for the pharmacy, and nobody could agree who was the owner of the processes, or where their boundaries were. Several meetings were consumed in thrashing all this out, and it served to illustrate three innate problems:

1. We as a council had expected people to act selflessly, and expose what had been their private domain to the scrutiny of outsiders, who could possibly criticize what they had done.

2. Because the dissention was between fairly senior personnel, lower ranking members of the council did not speak up, even when they had an opinion and were asked by the leader to express it.

3. We discovered that old paradigms die hard.

Two PATs were eventually chartered, and members assigned. Their work was autonomous, but were closely tracked because of overlapping membership with the Quality Council. This hurdle was over, but the council was somewhat in disarray and lacked focus.

To help refocus their efforts the council decided to look at the organization's mission statement, and decided that it didn't truly reflect what we do for a living, and should be re-written.

"Success comes from having the proper aim as well as the right ammunition." - Proverb

The "aim" of the council was right, but they found they didn't have the right "ammunition." They were dealing with issues that were relevant and important, but beyond their means. They were discussing which processes were the most important to the organization, and what it's mission should be, without the one person they needed to discuss these things with... the Commander.

This was the next major evolution of the Quality Council. It was a conscious decision initially not to include the Commander, but as the council matured, they decided they needed his input. This had several effects. The most immediate was to reinforce the importance of TQM within the facility. Without the Commanders presence this emphasis and priority was not as clearly stated. After his appointment people also began to act a little more selflessly, and put a little more effort in making sure they were on time and prepared for the meetings.

With the Commander on the Quality Council and on the Executive Committee, the lines began to blur. The Executive Committee was in charge of policy and strategic planning, but the Quality Council was overseeing PATs that were dealing with potential policy changes, resource allocation, and strategic direction. These aspects had to be briefed to the Quality Council as part of their oversight, and then briefed to the Executive Committee for approval. The Executive Committee was using the tools of TQM in some of their tasks, such as setting goals and objectives, and found them very useful. It didn't take very long to decide there was a considerable amount of redundancy in having two separate bodies, dealing with such similar components of the organization, and the Executive Committee became the Quality Council.

"The wheel is come full circle." - Shakespeare

Wouldn't it have been easier to just start there? Actually, if we had started there, I'm not sure we would have gotten where we are now. By having a separate body initially, it set certain precedents as to what to do and how to do it. If the traditional management group had initially been chartered as the Quality Council, the inertia of its past would have made the change more difficult. As it was, they had an example to follow and with several of its members in both groups, it had built in change agents. This made their transition easier than if it had been done a year earlier.

"All our knowledge brings us nearer to our ignorance" - T. S. Eliot

Lessons Learned:

- Ask first. People involved in the implementation of Quality Air Force have to believe in it, and want to work in the transformation.

- We are in the military, and need to deal with the problems caused by differing ranks and it doesn't help trying to hide this by wearing civilian clothes.

- Training has to come before implementation. We are a results oriented society and want things to happen quickly. We need to realize that not only do we need to know what we are doing, so does everyone else, and that takes

time. Corollary: Training is an ongoing process.

- Conflict can only be resolved by open communication. Corollary: Because of our environment there are times that lower ranking personnel are inhibited from speaking freely, despite good facilitation.

- People think it's OK to work on your problems, because they don't have any. Most people resist change, especially ones they see as potentially threatening.

- Transformation takes time - Paradigms change slowly.

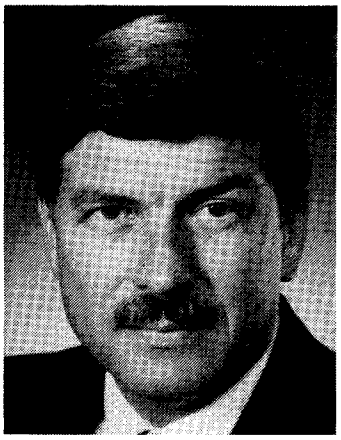
- Change has to start at the top, and everyone has to know the support is there.

- Having a separate Quality Council initially, broke ground that might not have otherwise been broken as quickly.

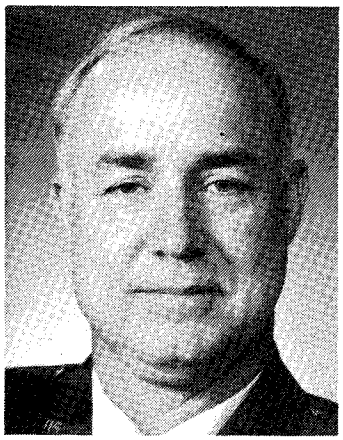
I feel the most important lesson we have learned over the past year is that the Quality Air Force isn't something that can be done for you, nor can it be done without you. It isn't a process that is done by a committee somewhere, it is the lifeblood of an organization, it is the way you look at everything you do.

"Evolution is not a force but a process; not a cause but a law" - John, Viscount Morley of Blackburn

INTRODUCING TQM IN A LARGE AIR FORCE RESEARCH AND DEVELOPMENT ORGANIZATION



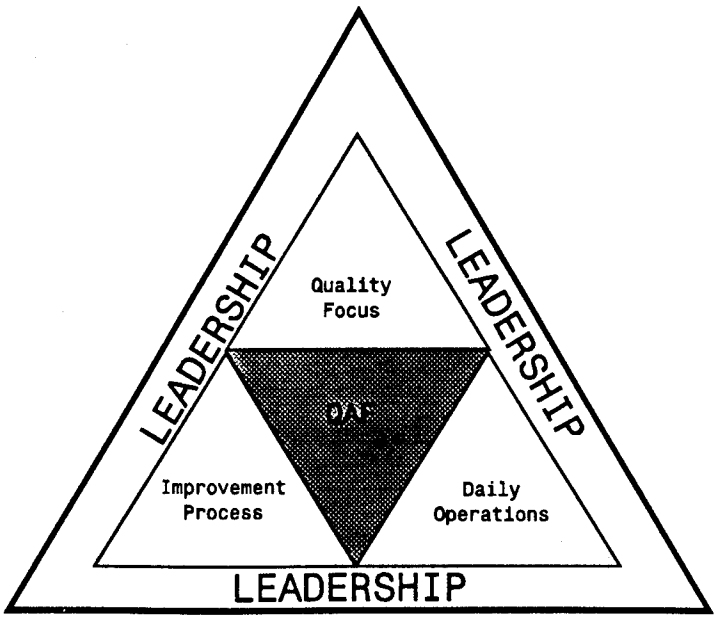
Dr. J. Daniel Stewart



Lt Col Kenneth Miller

INTRODUCING TQM IN A LARGE AIR FORCE RESEARCH AND DEVELOPMENT ORGANIZATION

J. Daniel Stewart, Air Force Development Test Center
LtCol Kenneth W. Miller, Air Force Development Test Center



ABSTRACT

This paper will look at a government organization's four-year effort in implementing Total Quality (TQ). It establishes AFDTC's background including the vision, mission, and guiding principals upon which it is structured and operates. It will show how AFDTC created and deployed an implementation strategy. It provides examples of the challenges of a large diverse organization in translating quality concepts into strategic and business process changes. The paper follows AFDTC from initial use of a consulting firm through it's transition to implementation sustained through an in-house capability. The purpose of the paper is to share lessons learned from this approach with other service or government organizations starting a quality journey and those who are questioning what the results of all the effort can bring.

INTRODUCTION AND BACKGROUND

Introduction. For large or small organizations starting out on the Total Quality journey is a major financial, manpower and time commitment that requires a well-defined approach. There will be successes and lessons learned. With a strong commitment and a comprehensive approach, the rewards will begin to decidely outweigh the investment costs. The following is one approach, taken by a large and diverse organization.

BACKGROUND

The Air Force Development Test Center (AFDTC) is located at Eglin Air Force Base in Florida, and Holloman Air Force Base, New Mexico. Its mission is to provide and support the test and evaluation of munitions, aviation and electronic systems. Our customers include other Air Force and DOD organizations as well as allied governments. With an annual budget of approximately $550 million, AFDTC employees over 7500 government and 1500 contractor personnel.

As a significant part of our mission, AFDTC operates the largest military base in the free world. We provide medical, hospital, civil engineering, personnel, logistics, communications and computer, security and many other basic services for a population of 70,000 civilian, active duty, and retired military personnel. It is equivalent to a good - sized city and when including the 724 square miles of land ranges, AFDTC is roughly two-thirds the size of Rhode Island.

Many of our customers are associate organizations also located at Eglin AFB, presenting unique quality challenges and opportunities. The full product development cycle is often completed completely within the Eglin complex. They are born in a laboratory, prototyped and tested by engineers on our ranges, and then tested again after production by operators within our land, air and electronic test ranges and environments.

A Look at the Future. In the 1990s national domestic priorities have taken the forefront and AFDTC has survived significant personnel cuts and endured through several reorganizations. Most likely, we have more cuts, more consolidation and reorganization and turbulence in our future. AFDTC will likely continue to survive, but as the military test budget shrinks, AFDTC must be competitive and show Congress and the taxpayer that we can give the best value for each defense dollar we receive.

Deciding for Total Quality. AFDTC must be a first-rate competitor to reduce the pain of military downsizing on our people and community. Quality is the key to survival. Our customers define that quality and we will have to continuously improve to earn their business. Much like a private sector business, we provide products and services to our customers: domestic and foreign weapons systems managers. These customers have alternatives, which include other test facilities. The dilemma we faced was how to improve and do more with less. Continually enhancing our customers' satisfaction with our products and services through continuous process improvement was an answer testers could grasp. Research and development itself is a continuous improvement process and testing is an integral part of that process.

AFDTC's EIGHT ELEMENTS OF TQM

Leadership. All levels of management are vigorously committed to quality, and their actions reflect this commitment.
The customer defines quality. Focus efforts on continuously improving AFDTC's ability to learn and satisfy customers' needs and expectations.
Process orientation. Improve work processes to provide the quality products and services customers expect.
Continuous improvement. Always looking for a better way to serve customers.
Long-term commitment. All levels of management understand that it may take several years to create a working environment focused on quality. The transition to TQM won't happen in just a few months. Change takes time.
Teamwork. Everyone at AFDTC must work together at all levels to improve work processes and overcome barriers to meeting customer expectations.
Training at all levels in the tools and techniques of process improvement is vital to the successful implementation of TQM.
Total employee involvement. Quality is everyone's job.

Figure 1

STARTUP

Choosing TQ as a competitive alternative was easy; the next step was not so obvious. What approach would work best for our organization? Intuitively, AFDTC's leadership believed in a top-down driven approach to quality management.

Lacking experience, we evaluated five quality consultants and chose one based on their experience with government partners and recommended implementation approaches. Our highest echelon of executives and the consultant met over several months to understand and develop a set of key elements to guide their TQM implementation strategy. They formed the list at Figure 1, which has been communicated to all AFDTC personnel. You don't implement these elements, the journey to quality is guided by them. These elements act as road signs for managers. Our journey began with the first element: leadership.

When they choose to embark on a journey to quality, leaders must choose a path. Figure 2 shows the AFDTC path.

THE PATH TO EXCELLENCE

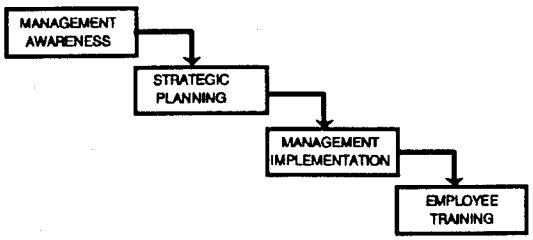


Figure 2

It started with management awareness, to give both leaders and managers an understanding of TQM, and their role in it. Next came *strategic planning*, to give direction to the journey. *Management implementation* is the next step, since managers must know how to practice TQM to properly guide and coach employees. *Employee training* comes last, once leaders, managers, and the organization are committed and aligned for improvement. Each step will be discussed in a moment.

Figure 2 shows how AFDTC is using the "cascading" method to roll down TQM in the organization. Cascading is the practice of having the highest echelons flow down the awareness, philosophy, and skills needed by all personnel to practice TQM. Cascading continues down to the grass roots level, with each supervisor actually going through TQM training twice: once as student, and again as in-

structor, as they give this training to their employees. This shows management commitment, and ensures understanding. Cascading also provides a linking pin for individuals and management to be team members at multiple levels of the organization. Figure 3 shows this relationship.

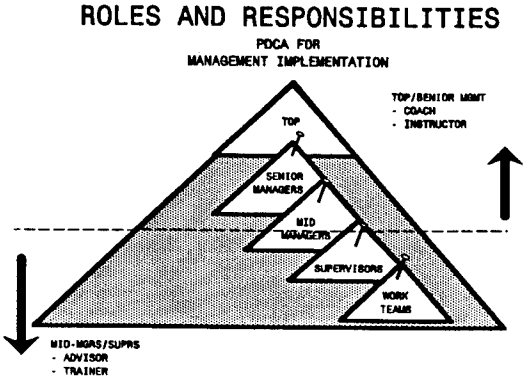


Figure 3

This has not always been the path chosen by other organizations. Too often, employee training comes first. The result is typically failure, since employee improvement efforts have little direction, or support from management.

Concurrent Strategy

AFDTC's is also a dual track approach. In the near term, top-down team-building is being used to create management commitment and ownership, which supports employee involvement. Also, in the near term AFDTC is using pilot projects to gain experience in team-based process improvement, and to address immediate and critical issues. This is depicted in Figure 4.

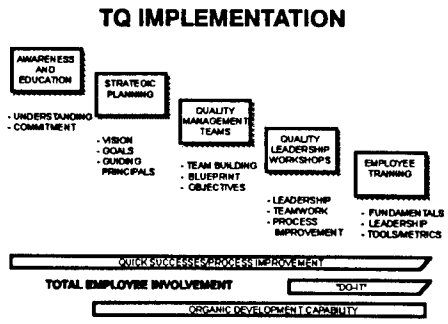


Figure 4

Early pilot project successes have helped everyone understand the power of process improvement and teamwork. Equally important in turbulent times, they show promise of quick pay back on the entire investment being made to introduce TQM at AFDTC. Since fully implementing TQM takes years, immediate victories like these help to convince leaders and employees to stay on the quality journey.

Long term work focuses on improving strategically important processes and systems necessary to achieve AFDTC's vision of excellence. This long term effort culminates, in one sense, with an organization totally structured around continuous improvement. In another, since the journey to quality never ends, neither does the work of implementing TQM.

Management Awareness

Management awareness started with TQM training for top leaders. It is being continued downward through the organization through Management Improvement Workshops for all managers. This is "cascade" training: top leaders received it first, then helped teach it to the next level down.

Strategic Planning

From the start of AFDTC's TQM effort, leaders saw strategic planning and organization alignment as their main responsibility. This gives direction to the quality journey, and assures organizational capability for employee involvement.

Does such long term planning make sense for military organizations? While many may plan a weapons system life cycle over several decades, few apply this long term view to the management of operations. Also, often large and diverse organizations like AFDTC lack cohesiveness and sub-optimize within each of its main organizations.

This was why AFDTC's strategic planning was "team-built" by both military and civilian executives from all major departments. Unless these leaders participated as a team in planning, they were less likely to agree on a common purpose or goals. And if they could not be a team, neither could the rest of AFDTC.

Their planning teamwork was conducted in a structured, multi-session format with facilitation by the industry consultant. In these sessions, they analyzed customer needs, scanned the current and future environment, and developed the core purpose of AFDTC. This core purpose is:

To provide a national capability for test and evaluation of defense weapons systems while satisfying diverse customer requirements with world class facilities and support resources.

From this work, they framed a vision of excellence: the "to-be" state of AFDTC, or the destination of the quality journey. This vision was consistent with the overall Air Force vision "Air Force people building the world's most respected Air and Space force...global power and reach for America." In defining our broad strategic goals to complement the vision, we used our parent organization, the Air Force Materiel Command (AFMC) goals as the framework for our own. This gave us milestones for the journey. Together, the vision, represented through our goals, is:

1. Modern Capability. AFDTC will have leading-edge test and evaluation capability to support future weapons systems requirements.

2. High Quality of Life. Our services, facilities, and working environment are unsurpassed.

3. Team Eglin. We are DOD partners committed to quality improvements.

4. Quality Work Force. Our work force is developed to reach our full potential and is recognized for quality performance.

5. Environmental Excellence. The standard for DOD.

More specific long term objectives were developed for each of the goals. For each of these objectives a specific strategy action plan addresses the short term actions to bring about specific change.

Preparing and reaching consensus on the strategic plan was not easy but was worth the effort. Each goal has a senior executive as Champion and Committees work actions and issues for each objective. For the first time, all leaders know and support AFDTC's purpose, strategic goals, and principles.

While direction is important, so is guidance. Figure 5 depicts AFDTC's guiding principles.

AFDTC GUIDING PRINCIPLES

- Customers are the focus of everything we do.
- We are responsible and accountable to the nation for our products, services, and integrity of our actions.
- We work as a team internally and with government and industry partners.
- We create an environment to train and motivate all team members to achieve their full potential and attain organizational excellence.
- We are a responsible member of the community where we live and work.
- We embrace change as a way of life and encourage it as an opportunity for continuous improvement.

Figure 5

IMPLEMENTATION

Management Implementation

This step in the journey is being taken by second and third echelon managers, through Management Implementation Workshops (MIWs). Participants in MIWs develop management action plans for specific tasks and process improvements needed to attain AFDTC's goals. Like the strategic plan, these are "team built" plans. To form a true team, managers must gain understanding of AFDTC's business, environment, key processes, and customers, and the leadership challenges they face.

The workshops place equal emphasis on the two aspects of TQM that must work to make this management philosophy effective. Shown in Figure 6, the *analytical* aspects are the methods of TQM: tools, procedures, statistics, and how to improve processes. The *behavior* aspects cover how individuals in the organization interact in process improvement, and in their daily work. As shown in the figure, it takes leadership to push together and integrate the two aspects into a holistic culture where employees are equally skilled and supported in both.

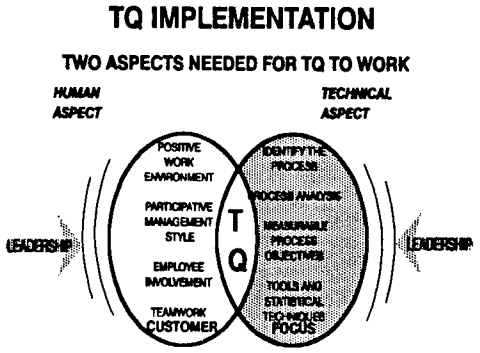


Figure 6

The MIWs also give managers the chance to ask two very important questions: "How is this different from earlier change efforts?" and " What's in it for me?" Most have appreciated the opportunity to work through the answers themselves as a team. Many have become strong advocates for TQM, especially those who have participated in process action teams.

Perhaps the most important benefit of this step is leadership roll down: it helps managers learn to become quality leaders. "Management" is the process of or-

ganizing things, and keeping them on track. "Leadership" is the process of recognizing the need for change, and giving direction and support to the change effort. If AFDTC is to succeed in TQM, we must use both quality leadership and quality management skills.

Employee Training

Initial employee training consisted of limited awareness and skill-building, to expose employees to TQM concepts, philosophy, methods and tools. AFDTC also provided "just-in-time" skills training as part of concurrently implementing process improvement teams. In implementing these teams both team leaders and employees get the same basic training. "Just-in-time" team training, or giving people the skills they need immediately before a project, is critically important for team projects and team building. Most organizations that try large scale employee TQM training, but do not have immediate and guided tasks for these skills, see them quickly erode.

Although not purely cascaded, our approach to training beyond the initial roll out is decentralized. Each organization at AFDTC provides part-time facilitators and instructors who train within their organization. The individuals chosen as these trainers are from middle management, which helps develop buy-in from that key group. The training is designed to quickly move the team from "thinking and talking about" process improvement, to "doing it." It focuses on the individual team's internal and external customers, and improving how work is done to meet those customers' expectations. Figure 7 shows our training road map.

COURSE	HOURS	AUDIENCE
AWARENESS	8	EMPLOYEE
QUALITY LEADERSHIP	16	EMPLOYEE
EXECUTIVE QUALITY LEADERSHIP	24	SENIOR MANAGERS
DO-IT TRAINING	8	ALL
QUALITY TOOLS	16	EMPLOYEE & MGT
FACILITATOR	40	SELECTED
PROCESS TEAM	16	TEAMS
STATISTICAL PROCESS CONTROL	40	SENIOR MANAGERS AND OTHERS
METRICS WORKSHOP	40	TEAMS
TEAM BUILDING	16	TEAMS
BENCH MARKING	TBD	SELECTED

Figure 7

A key element of the training road map was our decision to implement the Quality Leadership Workshop (QLW) and Executive Quality Leadership (EQL) courses. These courses give executives (EQL), managers and supervisors practical exercises in use of quality tools, and leadership skills. These courses have been so successful that we are providing the QLW or EQL to every individual in AFDTC. Initially, the industry consultant provided most of our courses and trained the facilitators and instructors while we "grew" our own train-the-trainers. Figure 8 shows our current status in implementing this in-house capability.

ORGANIC DEVELOPMENT

Courses in Development

COURSE	25	50	75	100
TQ TOOLS				
METRICS FACILITATOR				
METRICS WORKSHOP				
COACHES				
QLW/EQL				
QLW/EQL INSTRUCTOR				
TEAMBUILDING				
BENCHMARKING				

25% = COURSE DEFINED AND APPROVED BY QC 75% = PILOT CLASS COMPLETED
50% = COURSE MATERIAL COMPLETED 100% = FIRST ORGANIC COURSE/MET EXIT CRITERIA

Figure 8

How Long Does It Take

The entire process of cascading TQM to all parts of AFDTC is expected to take two to three years. For those who do not know much about TQM, this may seem a long time. But transforming the work culture of an organization the size of AFDTC is not something that can be measured in months.

Those who do know TQM may say it's an optimistic schedule. What will make this possible for AFDTC is not straying off the pathway to quality. There have been and will be barriers to implementation. AFDTC was deeply involved in supporting Operation Desert Storm, with several key units deployed. Also, the turnover among senior leadership, which often imperils a TQM initiative, has been over 75% since we started. Yet both past and present leaders of the organization were able to continue to support and focus on quality improvement efforts.

The reasons? First, the foundation had been created for quality management through strategic planning. Second, middle managers are gaining the leadership skills that help them see the need for change, and how to make it happen. Third, no separate structure (or "shadow government") was created for the TQM initiative. Instead, it has been integrated into the organization's structure through line management, and is becoming the "way we do business."

An important element of this third point is *time*--at AFDTC, managers and employees are given the time to work on process improvement. When people talk about empowering others to improve their processes, you will often hear about authority, resources, and management's willingness to act on employee ideas. Perhaps the most important resource you can give a manager or employee is well-guided time for improvement.

A Structure For Excellence

All this work is aimed at creating a new empowerment structure at AFDTC, shown in Figure 9.

EMPOWERMENT STRUCTURE

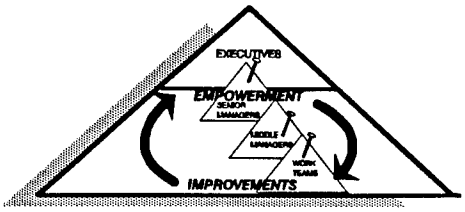


FIGURE 9

Every level of the organization is becoming interlinked, but not in the old ways. Instead, the link points are goals and objectives, common understanding of what quality means, and common methods to make it happen. Cascade training and leadership roll down are the means of forging these links. An additional feature we implemented to complement and reinforce this structure is Do-It teams. At the lowest levels of the organization, Do-It teams are natural work teams. The focus of Do-It teams is to improve the processes the team touches and has the ability to change. For those processes that involve a higher level of approval or resources outside of the natural team, the supervisor of the natural team is a member of the next Do-It team and champions the change at that level. This linking occurs to the executive level in the organization where

the broadest decisions are made. Management throughout the entire Do-It structure is required to maintain a "yes" bias to any Do-It idea. A "no" decision will always require the next higher level of review with some serious justification.

RESULTS

Initial Successes

Where has this approach gotten us? We have come a long way but the journey is long. We met with some quick and early success with our original process improvement teams (see Figure 10). We

QUICK SUCCESSES

30% Decrease in time to fill civilian personnel vacancies

70% Decrease in small computer acquisition time

20% Increase in telephone accessibility for hospital appointments

39% Reduction in pre-contract processing time

90% Reduction in interest paid for late payments

Figure 10

followed up the quick process team success with success from our empowerment program, Do-It. This program is where real process improvement through daily operations takes hold.

Not only has our rate of suggestions or ideas increased by as much as 20 times over the more conventional program, the rate of adoption of the ideas (as a percentage) has increased by thirty fold (see Figure 10). Some of the ideas were small work area improvements, but many were also complete, customer oriented re-design of the work process. By combining a strategic planning process which identifies critical processes for improvement and a daily operations approach through the Do-It initiative, we

TOTAL EMPLOYEE INVOLVEMENT

"DO IT" TEAMS

FIRST YEAR STATUS	NUMBER
TOTAL IDEAS	7378
TOTAL WORKING	3152
TOTAL IMPLEMENTED	2482

IMPACT

20X INCREASE IN IDEAS

30X INCREASE IN ADOPTION

FIGURE 10

are increasing customer satisfaction at all levels. Almost every work team has identified their customers and is showing progress in customer satisfaction surveys.

LESSONS LEARNED

We found that implementing takes commitment in a precious resource--senior leadership time. It is not a matter of setting aside time for quality; it is a matter of changing the way leadership spends all its time. We believe the following principles capture the best lessons learned (Figure 12).

MAJOR LESSONS LEARNED

- Maintaining constant leadership focus on an organization's quality strategy;
- Providing support and encouragement to those involved in the quality journey;
- Refusing to fall back into "business as usual" behavior such as fire fighting; and
- Empowerment starts with leadership direction

Figure12

Constancy of purpose through leadership focus is the driver. The journey to change to a quality culture is not overnight and will have barriers that only constancy in purpose can overcome. Also significant is that empowerment

must start with leadership giving direction, starting the course for improvement. Cascading starts at the top, with an organization's leaders, and is flowed down through line management to the entire organization. This unleashes the creative potential of all people in an organization. It focuses everyone on customer requirements, and leverages their ideas and ability to make improvement. It is what makes everyone at AFDTC "Champions of Quality."

Middle management buy-in is perhaps the beginning of the final leg of the initial trip on the TQ journey. We perhaps did not pay enough attention to checking for this buy-in in our initial cascading. We implemented the QLW as an attempt to gain buy-in by targeting training specifically at the "how to" of leading quality implementation as a supervisor. Middle management is where top-down driven implementation meets the bottom-up forces of empowerment. Communicating with this group tells a lot about what is or is not happening in TQ. We feel that training process improvement teams just in time is also a key element of success. The focus and skills from team training need immediate reinforcement. Associated with this is the fact that you must follow your initial awareness level training with some kind of "how to" training and opportunities to use their new knowledge. A final lesson learned is that culture changes aren't sprints. You can occasionally look back, even after a short time and see that you have come farther than you thought.

This paper is dedicated to, and acknowledges, the unselfish efforts of everyone involved in AFDTC's quality initiative.

Biographical Information

Dr. J. Stewart is the technical director of the Air Force Development Test Center (Air Force Materiel Command), at Eglin AFB, FL, and serves as its chief scientist for test and evaluation of weapons systems. He has been a manager and executive with the Air Force since 1974. He holds bachelors, masters, and doctors degrees in Aerospace Engineering from the Georgia Institute of Technology, and a masters in Management Science from Stanford University.

LtCol Ken Miller is the Director, Total Quality, at the Air Force Development Test Center (Air Force Materiel Command), at Eglin AFB, FL. He is principal advisor to the Commander for quality. He has over 20 years in the Air Force, the last six in positions associated with the quality movement in some aspect. He holds a bachelors degree in Statistics from Florida State University and a masters degree in Systems Management from the University of Southern California.

IMPLEMENTATION OF THE QUALITY AIR FORCE PHILOSOPHY AT PLATTSBURGH

Lt Col Kevin O'Callaghan, Ph.D.

IMPLEMENTATION OF THE QUALITY AIR FORCE PHILOSOPHY AT PLATTSBURGH

Lt. Colonel Kevin W. O'Callaghan, Ph.D.
Director of Wing Quality Management
Plattsburgh Air Force Base, New York

ABSTRACT

Recent changes in the world and our nation have resulted in dramatic reductions and downsizing of the military forces. A fundamental change in the way we conduct business known as the Quality Air Force (QAF) philosophy has been implemented throughout the United States Air Force. Based upon the principles of Dr. Edward Deming's Total Quality Management, the QAF process formally began at Plattsburgh Air Force Base, New York in May 1992. Current status of the QAF process, lessons learned in implementing QAF and the wing's future direction with QAF will be highlighted.

For the past ten years or so in the United States, there has been a revolutionary wave of new age thinking taking root in places from the factory floor to the corporate office. This new thinking views quality as achieving and exceeding customer expectations in order to provide business for the future. Management either embraces this thought as a reaction to competitive forces and threat or is visionary enough to put strategies in place to achieve continuous quality improvement. Today, the same quality principles that have taken a firm hold in the private sector are now being employed by the Federal government. How did we become involved in this new process? Today's Air Force is characterized by a rapidly new world order that presents an entirely new array of challenges. The current fundamental reshaping of the Air Force has touched every member of Team Plattsburgh in the way we conduct business. We are in the midst of the largest draw down of the military since World War II. To achieve this in an orderly and efficient manner we are building a new, smaller, "Quality Air Force" from the ground up.

In order to meet these future demands, we embarked on implementing a new philosophy within the wing known as Quality Air Force (QAF). Based on the principles of Total Quality Management (TQM) developed by Dr. Edward Deming, Team Plattsburgh initiated it's quality journey in May of 1992 with the establishment of the wing Quality Office. Their task was to develop a strategy for continuous improving outputs, processes, and performance at every level within the 380th ARW. In order to assess

continuous improvement within our wing, we adopted the key components and criteria used for the Malcolm Baldrige National Quality Award. Some of these components include: strong visible leadership from management, long-range strategic planning, quality training, quality assurance, quality results, customer focus and satisfaction, employee empowerment and teamwork, measurement and analysis, recognition and rewards.

The implementation of the QAF philosophy at Plattsburgh started with the development of the wing Strategic Quality Plan that incorporated six major steps. They were: (1) clarification of our QAF philosophy, (2) the role of senior leadership, (3) QAF education and training, (4) the use of metrics, (5) unit self-assessment and (6) quality benchmarking and comparisons. A brief description of each of these steps follows.

QAF PHILOSOPHY. The policy of the 380th ARW is to constantly strive for continuous improvement in the performance of our numerous missions. These include those that support our people and customers, as well as the direct support and performance of our flying missions. Simply stated, QAF is a participative management philosophy that focuses on teamwork, trust, empowerment, individual responsibility, accountability and pride in continually improving the way we conduct business. It was also here that we clarified the wing mission statement, wing goals and key result areas.

LEADERSHIP. In order for the QAF process to take root and flourish, it was critical that the support from the top be both verbal and demonstrated. Leadership at all levels must be willing to support the TQ initiatives from their people and assume a reasonable degree of risk when implementing change. Leadership must practice what they preach and feedback must be two-way to be effective. The formation of the Wing, Group and Squadron Quality Councils are some of the most visible avenues used in demonstrating this principle to wing members.

QAF EDUCATION AND TRAINING. The cornerstone for the successful implementation of the QAF process within the wing was the education and training phase. As an ancient Chinese proverb states, "The 1000 mile journey always starts with one solitary step." One must learn to walk before trying to run and the same is true for incorporating QAF. The successful training of all wing personnel in the QAF principles was crucial in making everyone cognizant with where we were going with quality. The training goal was to have all wing personnel receive awareness training and all key supervisors trained in Teams and Tools within 18 months.

METRICS. A significant element of our quality improvement process was the development of a strong, viable metric system. A metric is defined as a measurement made over time, which communicates vital information about the quality of a process, activity or resource. It drives the "appropriate action." Metrics need to be meaningful and must present data that allows us to take action. They must be customer-oriented and support the meaning of our organizational goals and objectives. Metrics, if done correctly, facilitates quality improvement, and helps us understand our processes and their capabilities so we can improve them.

SELF-ASSESSMENT. A dual self-assessment process using the Secretary of the Air Force Quality Award Criteria and locally developed Wing Capability Indicators are used to help identify specific areas that influence each organization's quality environment. The self-assessment process is an ongoing one that enables the senior leadership to monitor the health of the wing.

BENCHMARKING. The strategy of benchmarking recognizes the importance of identifying how similar organizations design, implement and improve a process. Benchmarking advocates the concept that any organization, military or civilian, can learn and benefit by contacting other organizations on how they work their Quality Programs. This technique also goes a long way in preventing organizations from reinventing the wheel. Benchmarking also allows for groups to compare alike processes to see how they compare to each other. The sharing of information can result in benefits to everyone.

To achieve these implementation strategies, a Plattsburgh QAF Milestone Chart was developed by the newly formed Wing Quality Management Office (QI). Five major areas of importance were developed. They were: (1) QAF organizational structure, (2) education and training programs, (3) ongoing QAF awareness, (4) Process Action Team implementation and (5) continuous improvement efforts.

QUALITY MANAGEMENT STRUCTURE

The following structure was implemented within the 380 ARW to support the practice of Quality Improvement. The structure included the following components: Quality Management Division, Wing Quality Council, Group Quality Councils, Squadron Quality Councils and Group Quality Support Sections.

Quality Management Division. The Quality Management Division (QI) are the coordinators, trainers and catalysts for the Quality Improvement process within the wing. Their primary responsibilities are: (a) to teach and promote quality fundamentals, problem-solving tools and techniques, and process analysis, (b) facilitate quality training, workshops and events, (c) mobilize and facilitate Quality Improvement, (d) serve as catalyst for cultural transformation to enhance trust, teamwork and continuous improvement, (e) to cross flow information, (f) serve as advisor on the Wing Quality Council, and (g) serve as the wing focal point for the HQ AMC Quality Visit.

Wing Quality Council. The Wing Quality Council (WQC) is comprised of the Wing Commander, Vice Wing Commander, Group Commanders, Director of Wing Quality Management, Civilian Personnel Officer, President of the local union, and the Senior Enlisted Advisor. The function of the WQC is to: (a) develop the vision, philosophy, constancy of purpose and establish the initial wing goals, (b) identify and find out what our customers need, (c) identify the critical processes that effect customer satisfaction and/or major cost waste, (d) establish Group Quality Councils to focus on functional and cross-functional improvement efforts, (e) provide review and oversight of wing processes, (f) take action on unresolved process problems and issues referred to

them by the Quality Councils and (g) identify and improve the macro-processes that are owned at the top management level.

Group Quality Councils. The Group Quality Councils (GQC) are comprised of all squadron commanders and other key Group staff and is chaired by the Group Commander or his/her Deputy. Their specific duties include: (a) conduct process analyses, (b) target specific processes that need improvement, (c) establish Process Action Teams comprised of employees with representative skills and functions to work specific processes, (d) work with QI to assign and train facilitators to aid Process Action Teams in their activities, (e) establish, maintain and follow-up a schedule of continuous process improvement, (f) implement policies of the WQC and (g) remove obstacles to continuous improvement.

Squadron Quality Councils. The Squadron Quality Councils (SQC) consist of members designated by the squadron commander. Their responsibilities include: (a) Implementing policies from the GQC, (b) prioritize QAF opportunities to the GQC, (c) facilitate the definitions of goals and the critical processes within their organizations and (d) support and charter internal Process Action Teams and/or Unit Quality Teams within their organizations.

Quality Support Sections. The Quality Support Sections (QSS) are located in each of the four groups and the wing Special Staff. Members work very closely with the wing QI office and serve as QAF focal points for their respective units or organizations. Their responsibilities include: (a) serve as QAF focal points for their Groups and/or units, (b) act as QAF information distribution points of contact for their organizations, (c) schedule assigned personnel for QAF Awareness and Teams and Tools Training classes, and (d) publish a monthly QAF newsletter to keep their people up to date on the latest success stories in the wing utilizing QAF principles.

QAF EDUCATION AND TRAINING

A well planned and thought out education and training plan is critical for successful implementation of QAF in any organization. During the Fall of 1992, all senior staff members attended a two-day TQ Awareness workshop conducted by HQ AMC/QI personnel. To implement TQ training wing-wide, the 380 ARW/QI, with the help of HQ AMC/QI, trained an initial instructor cadre of 40 wing personnel in three, five-day workshops covering TQ Awareness, Teams and Tools and Facilitator training between July - September 1992. After our initial cadre was trained, the next step was to educate our wing personnel as to what QAF was and how it would fit into their work environment. A 16 hour Quality Awareness class was developed and offered to all military and civilian employees at Plattsburgh Air Force Base as well as our two sister units at Griffiss and Loring Air Force Bases. In less than 10 months, over 3,000 of our personnel (95%) have taken this class thus far. Following the Awareness class, all key supervisors and personnel scheduled to participate in a Process Action Team, are offered a 36 hour Teams and Tools class. Here they learn the nuts and bolts of being able to flow

chart their work processes in order to streamline their procedures and eliminate non-value added steps. They also learn how to use valid measures to identify trends (both negative and positive) that will enable them to continually look for better ways of getting their jobs completed. With this knowledge of Teams and Tools, our people are better able to meet and satisfy our customers needs and desires. Thus far, over 800 wing personnel have taken the Teams and Tools class. Between these two classes, over 81,000 hours of QAF training has been conducted.

In addition to the basic QAF classes, the wing senior staff also took part in an Executive Quality Leadership/ Strategic Planning Workshop conducted by the Air Force Quality Center. This workshop provided basic awareness of Total Quality Management and the Air Force approach to this philosophy. Also covered were the criteria for the Secretary of the Air Force Award and implementation planning factors, focusing on specific behaviors and activities required of the senior team. Further QAF training is done for the senior staff on a continuous basis through the bi-monthly meeting of the Wing Quality Council.

ONGOING QAF AWARENESS

Besides the formalized QAF classes offered to personnel, numerous additional avenues are used to continually keep the wing focused on the quality process. Our senior leaders are eager to prove their commitment to quality. They set the example and challenge their subordinate managers to match their enthusiasm. The following chart vividly displays their involvement in communicating an environment of total quality excellence during the activities listed. Each value represents the number of times the senior leader has participated, either in writing or verbally, in each area since September 1992. Quarterly reviews allow for an evaluation of areas needing reinforcement or improvement.

	ARW/CC	ARW/CV	ARW/SEA	ST/CC	OG/CC	LG/CC	SG/CC
Newcomer's Welcome	42	24	10	30	165	25	
Quality Training/ Council Introduction	14	7		2	32	25	2
Quality/Customer Focus Articles		4	6	2		3	
Civilian Publications Articles	1						
Civilian Organizational Speeches	3	5		4	1	1	
Base Cable TV	1					1	
Quality "Walk Around"	20	22	16	80	130	80	36
Dial 7000 Responses		268		100	6	8	8
Staff Meetings	25	49	5	20	70	50	15
Recognition Ceremonies	18	17	9	25	50	20	25
Commanders Call	5	1		6	30	1	7

A genuine commitment by senior leadership has instilled, within the wing, a strong core value system that includes; responsiveness, mission orientation, loyalty, industriousness, teamwork, environmental concern, commitment and integrity. The majority of our senior leadership has accepted the responsibility to communicate quality values within the wing.

The base's multi-media services are also heavily capitalized on in providing the latest in QAF developments. At least one article dealing with quality is published in the weekly base newspaper. Also, the use of the on-base cable television station is another effective tool in presenting quality messages, videos and guest speakers to the base population.

Continuous awareness can come in many forms. The wing QI office sponsors a quarterly Quality Luncheon that includes a guest speaker who is associated with the quality arena. The base holds these events in conjunction with a "Quality Day" where booths are set-up throughout the base with quality brochures and other information. In-house workshops and presentations are also used to keep awareness levels high. For example, Federal Express, a recent Malcolm-Baldrige Award winning company, presented a superb quality management seminar to wing personnel that significantly enhanced their perceptions of quality in the workplace.

IMPLEMENTATION

Since QAF was implemented at Plattsburgh in 1992, personnel have become increasingly aware of quality management principles through training and reinforcement. Quality councils at the wing, group and squadron levels have resulted in an increased participation rate of personnel throughout the base. The heart of the implementation phase are the Process Action Teams or PATs. A PAT is a team of selected functional experts who use total quality methods to analyze and improve a target process. With the new QAF philosophy, the number of PATs has increased steadily. Results are briefed by the PAT members to the wing Quality Council. Both military and civilian personnel comprise the PATs. Furthermore, the Union is kept informed of current, ongoing and pending PATs and may participate in those of interest to the bargaining unit. Numerous small worker teams, which we call Unit Quality Teams, have sprung up throughout the base. These teams are empowered to make changes within their work centers if it will improve efficiency. The idea behind this is that who knows better how to get their job accomplished than the workers themselves? There is a new sense of pride and individual initiative in their everyday performance.

CONTINUOUS IMPROVEMENT

As Plattsburgh has traveled down the quality road, the importance of continuous improvement has been a major driver. Many pitfalls were encountered, some large, some small. A number of these hurdles included: the lack of top management/leadership committed to the quality effort, employees who didn't care, organization's where quality was not a priority and the "I don't feel special anymore" syndrome. Some of these problems, as well as other implementation issues, were faced at Plattsburgh. It is vitally important that organizations just getting involved with the Total Quality Management philosophy be prepared to take a slow, well-planned course of action. Too many organizations fail in their attempts at trying to make TQ work for many reasons. One of the worst can be jumping on the band-wagon late and playing catch-up. This usually results in leadership trying to fill the square and causing "Quality" to become a dirty word

with the people in the unit. If this approach is taken, your organization is doomed to fail in achieving quality. The men and women at Plattsburgh are ready for the new challenges. As we rapidly approach the 21st century, we look forward to making the Air Force an even better organization than it has been. The everyday use of QAF principles is the way to a successful future.

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TOTAL QUALITY MANAGEMENT: PERCEPTIONS AND ATTITUDES OF MILITARY PERSONNEL ASSIGNED TO POPE AIR FORCE BASE, NORTH CAROLINA

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TOTAL QUALITY MANAGEMENT: PERCEPTIONS AND ATTITUDES OF MILITARY PERSONNEL ASSIGNED TO POPE AIR FORCE BASE, NORTH CAROLINA

by

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Statement of the Problem

TQM has become a big issue for the military because the Department of Defense (DOD) has mandated the use of Total Quality Management across all branches of the armed forces. Implementation varies from branch to branch and even from location to location. Many individuals at Pope Air Force Base (AFB) have received some type of TQM training, and there have been several documented examples of successful applications of TQM. The failures are not as well documented or as accessible as the success accounts, but they do exist. TQM has been a reality at Pope AFB for 12-18 months. This study examined TQM principles and implementation strategies and then assessed the attitudes and perceptions of Pope AFB personnel toward TQM and its effects as well as its effectiveness.

Significance of the Study

In December 1992, the 317th Airlift Wing at Pope AFB will be visited by the Headquarters Air Mobility Command (HQAMC) Quality Office to assess the quality (TQM) programs set up and used by the wing. This study identifies the quality training the respondents have received and shows how many individuals are participating in and practicing TQM in their daily activities. Essentially, this study provides the baseline data concerning the perceptions of and attitudes toward quality of Pope personnel [officers, senior noncommissioned officers (SNCOs), and all other enlisted personnel assigned].

Data from the survey are presented question-by-question to provide a means to pinpoint areas where further training is required. These data will also provide feedback to the 23rd Wing and 317th Airlift Wing Commanders and Quality offices. Knowledge gained in this study can be used to further promote Pope AFB's continuous improvement efforts in its pursuit of Total Quality.

Note: There is usually one wing on each base, but at Pope, there are currently two wings. All squadrons either belong to a wing or are tenant organizations. Approximately 70% of the base population is personnel assigned to the 23rd wing.

Hypothesis

The hypothesis tested in this study is as follows:

A significant difference exists in the perceptions and attitudes of three groups of Pope AFB personnel: officers, senior noncommissioned officers (SNCOs), and all other enlisted personnel.

This hypothesis has three subhypotheses:

H_1 Officer perceptions and attitudes are more favorable as a whole than those of either of the other two groups.

H_2 The SNCO perceptions and attitudes are split between favorable and unfavorable responses.

H_3 The lower-ranking enlisted personnel (all others), as a group, respond least favorably to the perceptions and attitude survey.

Assumptions and Limitations

1. Participation in the TQM survey was highly encouraged by the 23rd Wing Vice Commander in the cover letter; participation was voluntary.
2. Some Commanders support quality efforts more enthusiastically than others.
3. Several hundred personnel were on temporary duty at other locations during the entire survey period.
4. A follow-up article in the base paper was published to encourage a higher return rate.
5. Surveys were distributed and collected by each squadron and then mailed to the researcher.
6. Completed surveys from at least two squadrons sent through the base distribution system never arrived at the researcher's office.
7. This study applies only to the Air Force personnel stationed at Pope AFB, NC. It does not include personnel from any other base or branch of service.
8. Members getting out of the service may have refused or been reluctant to participate.
9. The survey forms were distributed after the reorganization of Pope AFB; however, the manning documents (personnel authorizations) did not arrive on base for another 60 to 90 days. Consequently, many squadrons may not have known to whom they were to distribute survey forms.

Methodology

Recently, the movement to pursue Total Quality Management as an overriding management approach has been adopted by segments of the Federal Government with spectacular market share, profitability, productivity, and worker involvement results. Therefore, an effort has been launched to encourage its adoption throughout the Government (Federal TQM Handbook 3, 1992). The Department of Defense, as previously mentioned, has mandated the use of quality initiatives in all branches of the service. There is no specific guidance as to how each branch of service is to implement quality programs or what type of training is to be given.

In July 1992 after almost 18 months of training selected personnel, it was considered time to assess how many individuals had received some type of quality training and whether or not they were practicing what they learned. A new set of baseline data was needed if Pope AFB was to continue to move forward with more complex quality improvement efforts.

Subjects

The purpose of this study was to identify and compare the perceptions of and attitudes toward TQM of three groups of participants on active duty assigned to Pope Air Force Base, North Carolina. For those not familiar with the military rank structure, there are ten officer ranks; the lowest seven are represented at Pope AFB. These commissioned officers must possess at least a bachelor's degree. Officers equate to upper-middle and upper management in civilian companies. There are also nine enlisted ranks or grades. The top three enlisted grades are called senior non-commissioned officers, or SNCOs. They are equivalent to middle management and function as the linking pins between the workers and upper management. The other six enlisted ranks comprise the third group in the sample--all other enlisted personnel. These are the workers. Members of the first six enlisted ranks have been in the service anywhere from two months to 20 years. All active duty Air Force members on the base were given the opportunity to respond to the TQM survey.

In July-August 1992, there were approximately 4,425 individuals assigned to Pope AFB. This number fluctuates almost daily. By 15 September 1992, the number had increased to 4,499. Since this census-type

survey was conducted in July and August, 4,424 questionnaires were distributed to base organizations.

In the Air Force, most squadrons have a number and two four-letter designations (there are some exceptions). These signify a separate entity. The meanings of the letter designations are not relevant to understanding the concept of distribution to a number of distinct organizations. The squadrons on the base can be compared to all the divisions of a corporation or many franchises of a chain.

The following organizations were provided with the specified number of questionnaires:

Squadron	Number of Questionnaires
317 ALCE	26
317 OSS	100
624 ALSG	7
3 APS	256
624 MS	55
624 CCS	85
624 CCS E Flight	25
USAFMC	60
40 ALS	360
41 ALS	400
2d ALS	400
23 OG	5
23 LSS	100

23 MSS	125
23 MNRS	75
23 Med Gp	175
23 CS	100
23 OSS	70
23 CES	175
23 Sup	250
23 Trans	125
23 SPS	125
23 LG (includes 23 MS)	850
75 FS	200
1 AAES	100
Oct 2, 507 TAIRCW	50
24 STS	100
Oct 2 AFSOC	25
Total	4,424

Completed questionnaires were returned by 112 Officers, 128 SNCOs, and 1061 other enlisted personnel. An additional 54 forms without identifying information or with one long oval drawn the length of a complete column of answers were received. Also, 34 civilians elected to respond to the survey, so their responses have been incorporated into the data analysis. Approximately 200 unused questionnaires were also returned.

Instrument

A 25-item questionnaire measuring perceptions and attitudes about Total Quality Management was distributed to all of the organizations previously listed. All 25 items were measured on a 5-point Likert Scale: Strongly Agree, Agree, Don't Know (didn't have enough knowledge to answer), Disagree, and Strongly Disagree. Each of the 25 items is now presented along with its origination.

1. In my squadron, TQM gets a lot of lip service, but not too much action. This item was developed by the 317 Airlift Wing Quality Office. It is based on the idea that to promote quality, you must walk the talk. If actions are not congruent with words, subordinates will lose faith in the leaders.

2. TQM is a real priority in my squadron. (Same source and justification as Item 1.)

3. I have participated in TQM activities other than training. This statement was developed by the researcher to determine whether or not TQM is applied in the workcenter after it is taught in the classroom.

4. I practice TQM principles while performing my duties. This is based on Deming's (1986) second point, "adopt the new philosophy," and his 14th point, "put everybody in the company to work to accomplish the transformation."

5. I am comfortable sharing my improvement ideas with others. This statement is also based on two of Deming's points: "drive out fear" and "break down barriers between staff areas."

6. My job satisfaction has increased during the last year. The previous commander-in-chief of Air Mobility Command (CINCAMC) has been quoted numerous times in both newspaper and magazine articles stating that quality improvement efforts should lead to an increase in job satisfaction.

7. My job frustration has increased during the last year. An article written by Major General Stephen B. Crocker (1992), Commander, Air Combat Command (ACC), states you will see a quality organization producing the following: "a happier, more highly motivated workforce, increased job satisfaction (see #6). . ."

8. I am expected to do more with less. The researcher attended a briefing at which General Johnson, the former CINCAMC, stated, we will not ask you to do more with less; we will only ask you to do less with less. Although not a direct quote, these words accurately convey the content of his speech.

9. I know how and where I fit into my squadron's mission. Deming's (1986) first point is "create constancy of purpose for improvement of product and service." If a constant purpose is communicated

throughout each squadron in the form of a mission statement, then each individual should know how his/her position contributes to mission accomplishment.

10. and 11. The OPR/EPR System fairly represents my performance, and OPR/EPR ratings deal more with politics than performance. These two items were derived from Deming's (1986) twelfth point and one of the Seven Deadly Diseases: "remove barriers that rob people of pride of workmanship." Eliminate the annual rating or merit system. Driving out fear is also a factor here.

12. and 13. Hot, priority projects continually interrupt my scheduled projects, and I am given conflicting priority projects by those in my chain of command. The researcher has personally witnessed both of these types of occurrences on several different occasions. If an organization has clear-cut goals and a solid mission statement, then workers should not be spending all their time "putting out fires." When these "fires" become the rule rather than the exception, the day-to-day tasks don't get completed. Work starts to pile higher and higher.

14. and 15. I provide quality products/service to my internal customers, and I provide quality products/ service to my external customers. The Awareness course stresses the difference between internal and external customers. These items also relate to instituting a

vigorous program of education and self-improvement for everyone, Deming's (1986) 13th point.

16. I believe TQM is worth my time and effort. This item tests the adoption of the new philosophy and the commitment of the individual toward accomplishing the transformation to a quality organization.

17. and 18. My supervisor really believes in TQM, and my Commander really believes in TQM. Both of these statements are from the worker's point of view. Applicable points from Deming (1986) include "adopt and institute leadership, break down barriers between staff areas, and put everybody in the company to work to accomplish the transformation."

19. Quality grows from open communication. This came from an advertisement for a consulting group in Training magazine. Break down barriers between staff areas and create constancy of purpose for improvement of product and service underlie this item.

20. TQM is a fad that will pass in time. Many programs are born in the military. A year or two later, many of these same programs are nothing more than a distant memory. Both the CINCAMC and CINCACC have acknowledged the existence of faddish attitudes, and both still maintain quality improvement efforts, no matter what they are called, are here to stay.

21. TQM works in the Air Force. This statement is one the researcher wanted to include to aid in the assessment of the quality climate and culture operating on Pope AFB.

22. TQM could work in the Air Force if some modifications were made. Lt. Col. Morra from the 317 Airlift Wing Quality Office devised this statement. Favorable responses to this question indicate that TQM is a good thing, but the implementation needed some improvement.

23. TQM is good, but I (we) don't have time for it now. This is another item that was developed by the 317 Airlift Wing's Quality Office. "TQM is good" is a given. That is the intent of this statement. The issue here is time. Not enough time is a commonly echoed excuse, especially with the cutbacks of personnel.

24. The military rank structure inhibits TQM applications. This statement reflects the researcher's personal observations. For years, military leaders have been taught to be authoritarian and to command with tight control. Now, with the quality movement, these same leaders are supposed to use participative management and delegate. Empowerment of the workers can't take place unless supervisors at all levels are able to relinquish some of their power and control.

25. The reorganization of Pope AFB is consistent with TQM principles. This is one of the most controversial issues the personnel of Pope AFB have experienced in a long time.

In addition to the 25 statements, the questionnaire contains spaces for rank, squadron, and command. To aid in obtaining the baseline data on TQM training, a section is included to check any and all types of TQM training received. After the last item, there is space for additional comments, followed by instructions for returning the survey form.

All 25 items are measured on a 5-point Likert Scale. The choices are: Strongly Agree, Agree, Don't Know (don't possess enough knowledge about the item to answer), Disagree, and Strongly Disagree. Sixteen of the 25 items are scored 4, 3, 0, 2, 1. The other nine items are reverse scored 1, 2, 0, 3, 4. These items are numbers 1, 7, 8, 11, 12, 13, 20, 23, and 24. "Don't Know" responses always receive 0 points. Total scores on the questionnaire can range from 0-100. Higher scores represent more favorable perceptions of and attitudes toward Total Quality Management.

Procedures

Originally, a 20-item survey was constructed to measure TQM perceptions and attitudes. The survey was taken to the Pope AFB Quality Office to be reviewed. The survey was then modified to 25 questions to incorporate items the Quality Officer thought were important to assess.

Next, an appointment was made with Lt Col Lunan, the Vice Base Commander, to get permission to carry out the proposed survey on Pope AFB. Subsequently, Capt Wilkinson from the Base Legal Office was consulted. He advised that as long as personal funds were to be used to make the copies, it is legal to distribute the questionnaire as written. After receiving confirmation of legality and approval to distribute the questionnaire, 5,000 copies were made.

The questionnaires (4,424 of them) were distributed to all orderly rooms (administrative sections of each squadron) with a cover letter from the 23d Wing Vice Commander, Col Smith. The cover letter asked Commanders and First Sergeants to become personally involved in the distribution and recollection of questionnaires within their squadrons. It also encouraged 100% participation.

The questionnaires were delivered by the researcher the second week of July and were due back by the 15th of August. Notice that this deadline was extended to the

31st of August and made through an article run in the base paper. The article was phrased as a reminder to respond.

Questionnaires were sent to the researcher's office through the base distribution system, in accordance with the instructions on the cover letter.

The returned questionnaires were separated into three groups--officers, SNCOs, and all other enlisted personnel--and scored. Individual answers to each question/item were tallied using check sheets. (Copies are available from the researcher upon request.) The data from the check sheets were analyzed, and the results for each item and the overall survey results are presented in bar graph and run chart form with some narrative interpretations.

Subsequently, 150 nonrespondents (about 5% of approximately 2800) were sampled to determine whether the results could be generalized to the total military population of Pope AFB.

Additionally, nine in-depth interviews were conducted with three members from each of the three groups studied to provide further insight into the perceptions of and attitudes toward TQM of Pope personnel. This information is also reported in Chapter 4.

Results and Analysis of Data

Organization of Data

The TQM Perceptions and Attitudes Survey contained four classification questions. The nominal data from these questions will be presented first. Then each question from the survey will be presented, along with the number of respondents who chose each of the five possible answers. These representations will be in bar graph form, a TQM Metrics Tool. This part of the analysis will point out some areas needing improvement.

The third set of data provides the comparison of the officers', SNCOs', and all other enlisted personnel's total scores for the survey. Higher scores represent more favorable perceptions of and attitudes toward TQM.

Results from the subsequent sample of 150 first-time respondents are then reported in tabular form.

The chapter concludes with results of the in-depth interviews. These interviews were unstructured conversations during which the members candidly spoke of their particular interpretations of and concerns about quality.

Statistical Analysis

A total of 4,424 surveys were distributed to squadrons on the base. Two squadrons, 1st AES and Det 1, 507 TAIRCW, returned surveys through the base distribution system. These surveys never arrived at the researcher's office. Therefore, the 150 surveys distributed to these two squadrons were subtracted from the total number distributed to calculate the percent returned. The 125 survey forms distributed to the 24 STS and Det 2, AFSOC, were also subtracted, based on the fact that these organizations are physically separated from Pope AFB and should not be included in this study. This leaves a total of 4,149 distributed questionnaires of which 1,355 were returned. Additionally, 34 civilians also returned completed forms. Approximately 200 unused forms were also returned. This is approximately a 33% return rate.

Table 4-1. Classifications of Respondents

Rank:	Officers	SNCOs	All Other Enlisted	Civilian	None Given
	112	128	1061	34	54
*Squadron:	317 ALCE	8	23 MSS		37
	317 OSS	34	23 MWRS		17
	624 ALSG	3	23 Med Gp		85
	3 APS	83	23 CS		37
	624 MS	30	23 OSS		32
	624 CCS	39	23 CES		44
	USATMC	24	23 Sup		129
	40 ALS	92	23 Trans		33
	41 ALS	6	23 SPS		24
	2 ALS	59	23 LG (MS)		338
	23 OG		75 FS		64
	23 LSS	51	317 MS		10
	317 OG	6	317 Wing		3
	317 LG	1	23 Wing		3
	624	6	317		1
	23d	13	Undeterminable		3
	None Given	12			
*Command:	ACC prior TAC	153			
	ACC prior MAC	770			
	AMC	320			
	Other	20			
	None Given	68			
*Training:	None	521			
	PIT Member	171			
	PIT Leader	35			
	PIT Facilitator	10			
	TQM Instructor	22			
	Other	180			
	Unanswered	441			

*The 54 unclassifiable surveys are not represented in these numbers.

Table 4-2. Civilian Total Scores*

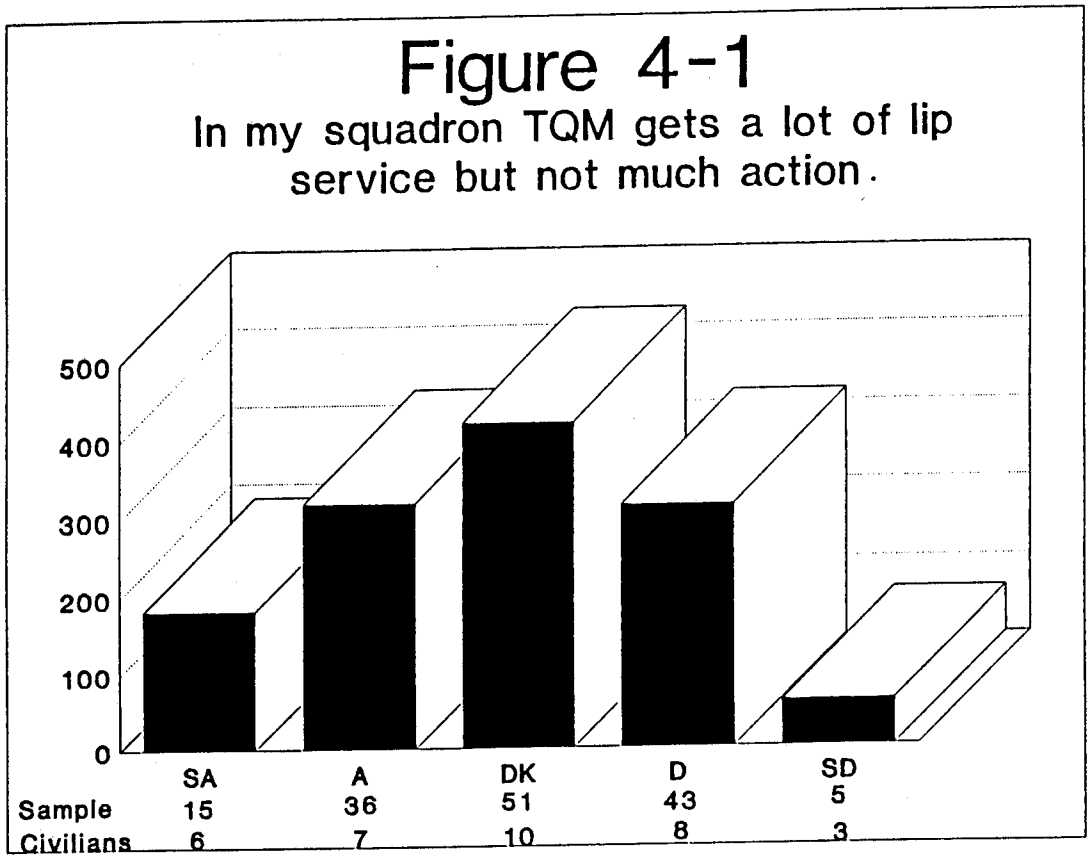
Score	Frequency	Score	Frequency	Score	Frequency
0	1	50	5	60	2
24	1	52	1	61	2
26	1	53	1	63	2
33	1	54	1	65	1
35	1	55	1	68	2
38	1	56	2	72	1
40	1	57	1	74	1
48	3	58	1		

*These 34 individuals responded without being solicited to do so. Their responses are included as supplementary information at the bottom of each bar graph.

Table 4-3. Supplemental Sample Total Scores

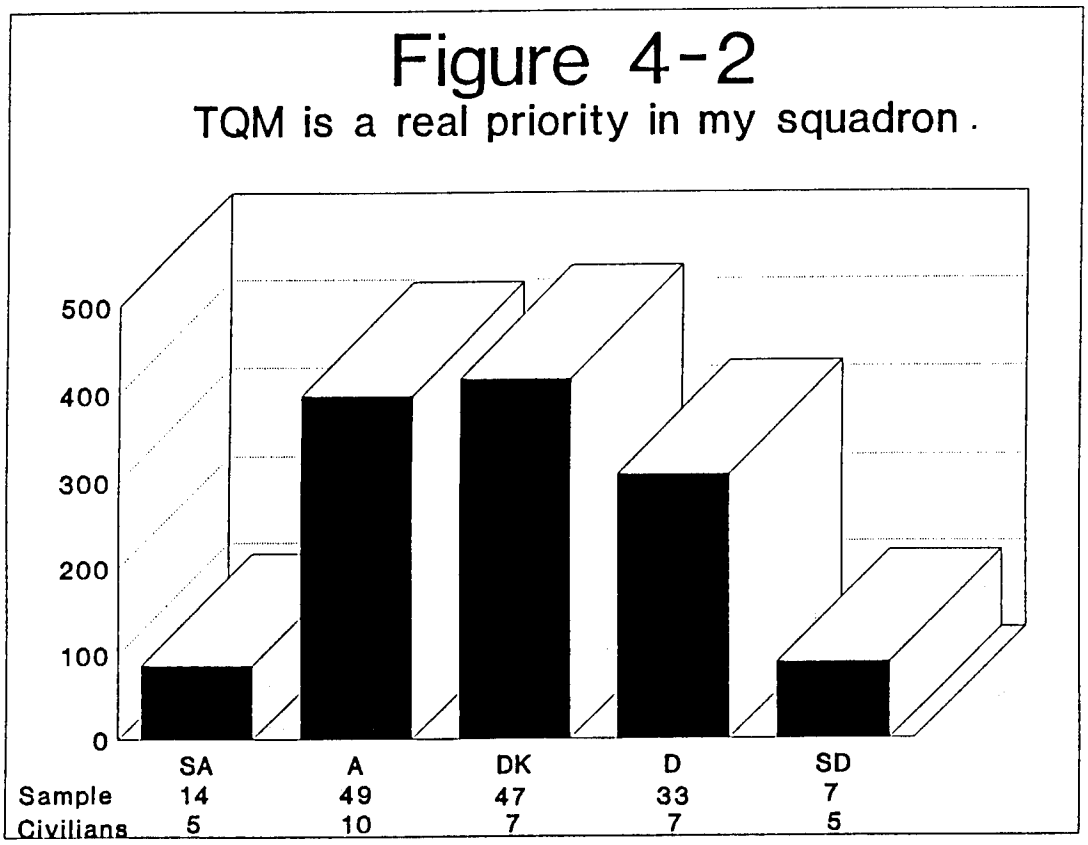
Score	No.	Score	No.	Score	No.
0	1	42	3	60	5
3	1	44	3	61	1
7	1	45	2	62	2
17	1	46	6	64	7
23	2	47	5	65	3
24	1	48	6	66	10
25	2	49	3	68	1
28	6	50	4	69	1
29	1	51	1	70	1
32	1	52	4	71	2
33	3	53	5	72	1
34	2	54	5	73	6
35	2	55	3	75	2
36	3	56	1	76	2
37	4	57	4	80	2
39	2	58	4	81	1
41	3	59	5		

The next 35 pages graphically represent the responses to each of the twenty-five questions followed by the total scores for each group. The bars represent responses from the original sample. The subsequent sample and civilian replies are presented under each graph.



ANALYSIS

Many individuals feel TQM is talked about quite a bit, but little follow-through action is taken. The largest group of participants answered "Don't Know." This indicates a lack of lip service as well as action.

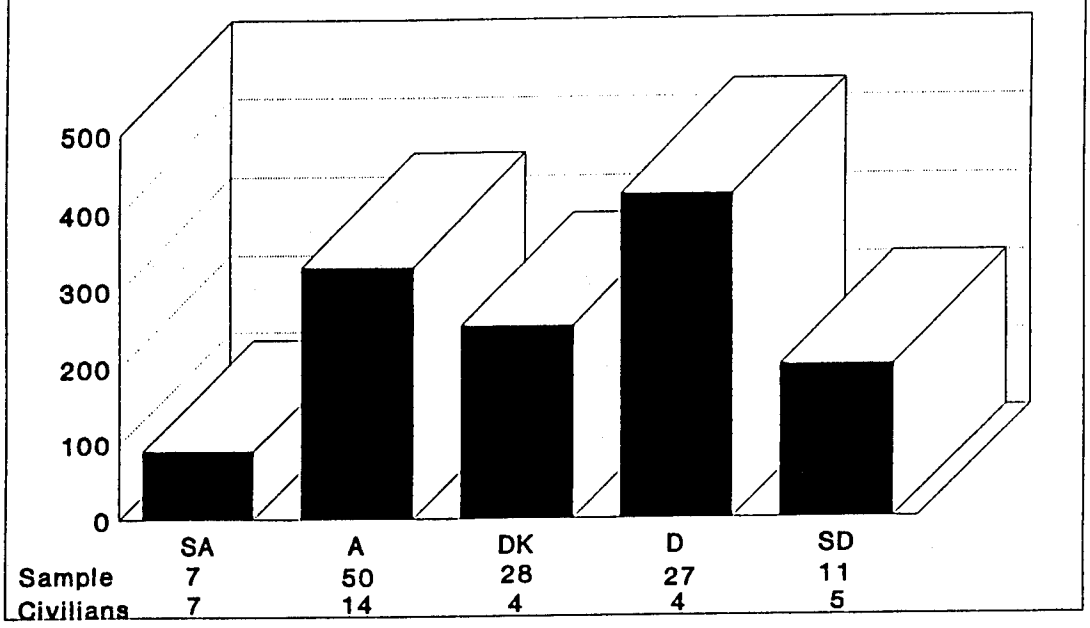


ANALYSIS

Although almost 400 people agreed with this statement, over 400 didn't know, and another 300 disagreed. These results indicate a lack of emphasis and action regarding TQM implementation.

Figure 4-3

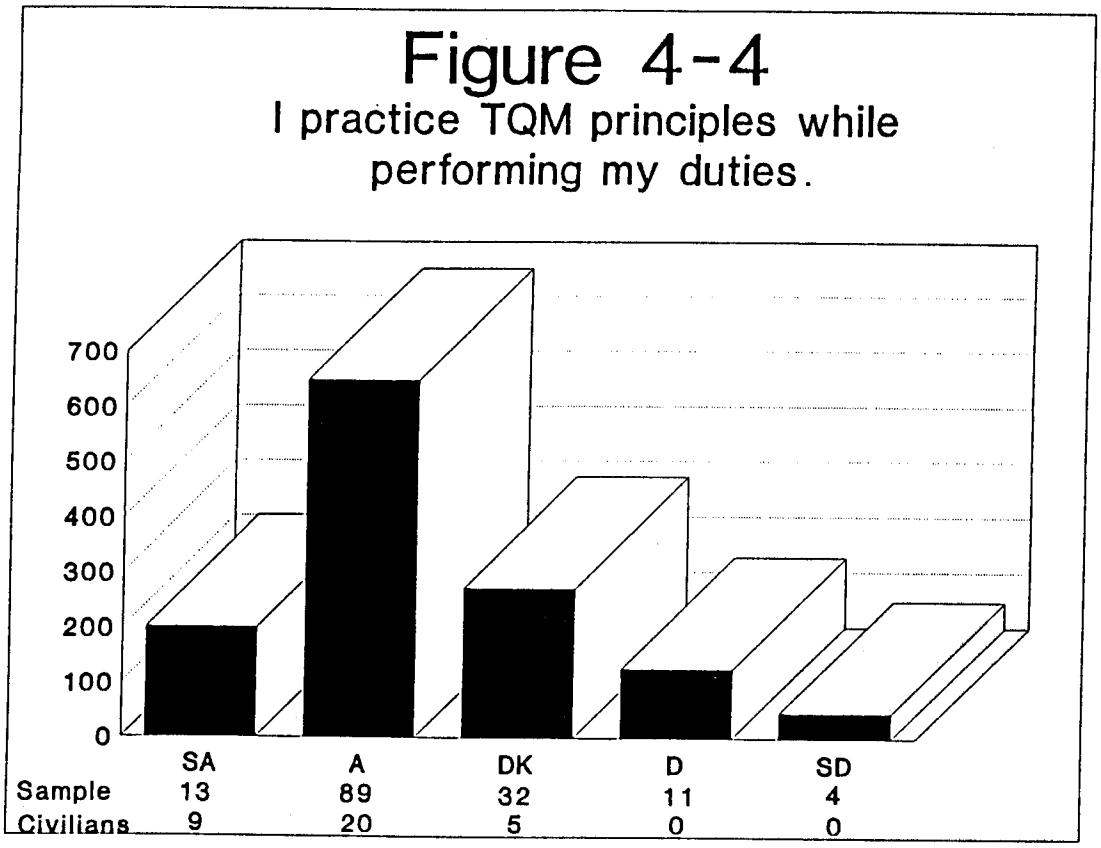
I have participated in TQM activities, other than training.



	SA	A	DK	D	SD
Sample	7	50	28	27	11
Civilians	7	14	4	4	5

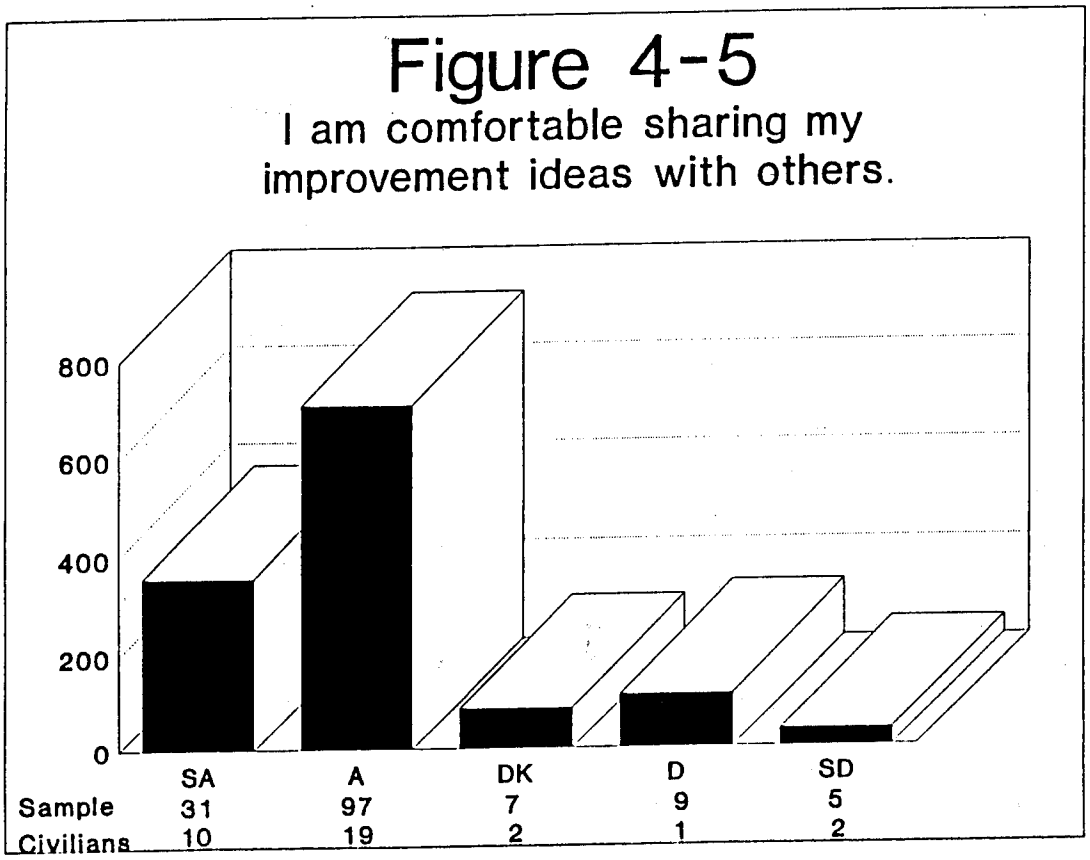
ANALYSIS

Almost 50 percent of the respondents have not participated in TQM activities other than training, and an additional 20 percent don't know if they have participated. These numbers reinforce the analysis of 4-1 and 4-2.



ANALYSIS

Most respondents agree that they practice TQM principles while performing their duties. Several of the additional comments allude to the idea that the Air Force has always used TQM but just called it something else.

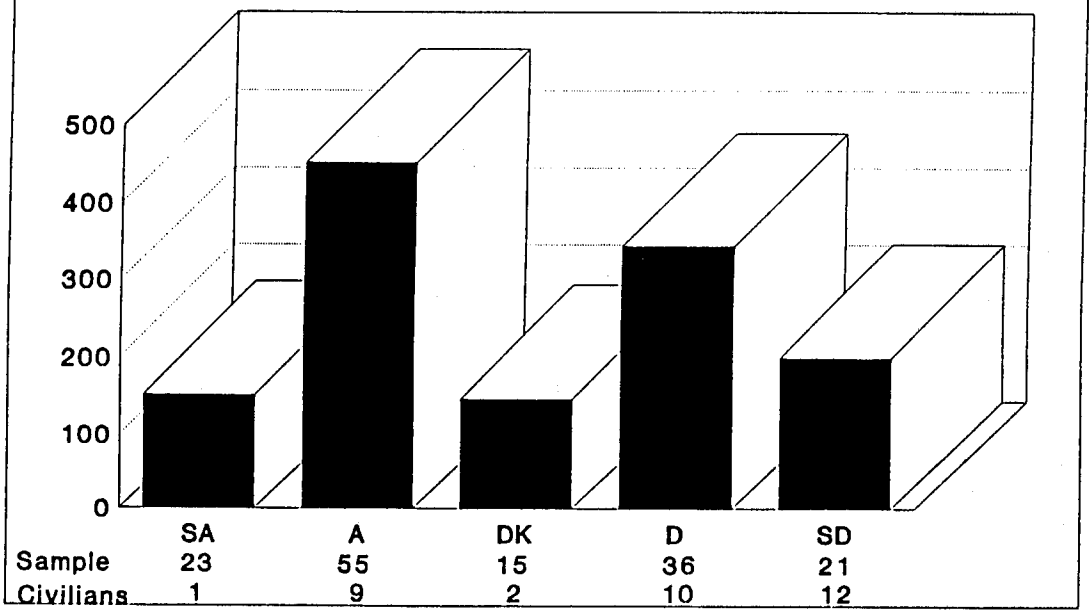


ANALYSIS

The responses to this question were overwhelmingly positive and illustrate a lack of fear when sharing improvement ideas.

Figure 4-6

My job satisfaction has increased during the last year.

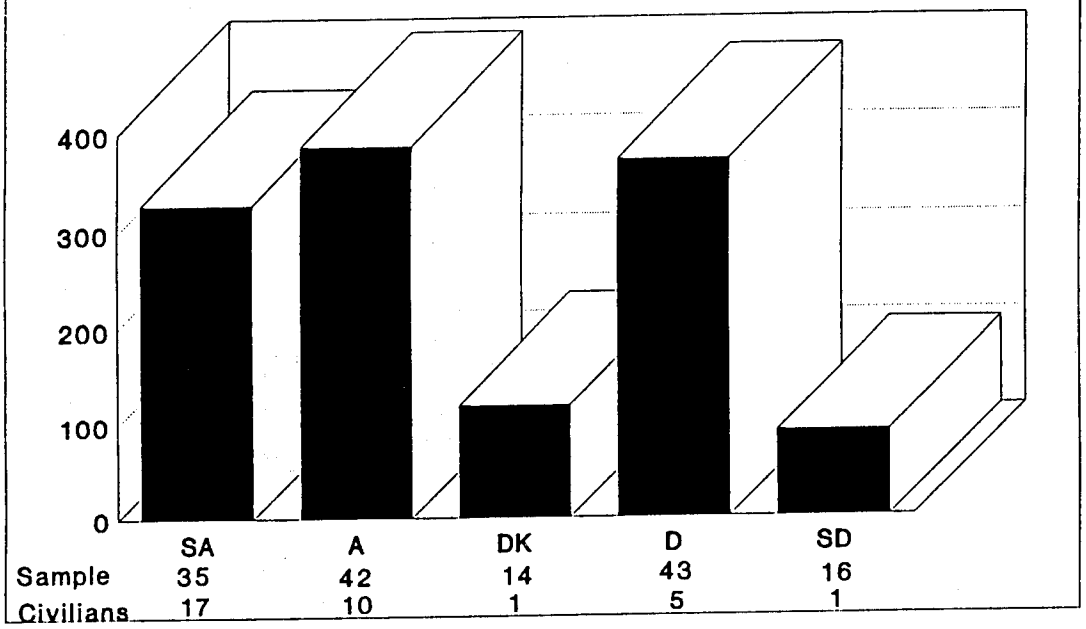


ANALYSIS

Almost an equal number of respondents were on each side of the "Don't Know" response. An increase in job satisfaction is one of the expected results of implementing TQM in the Air Force. This shows progress toward that expectation.

Figure 4-7

My job frustration has increased during the last year.



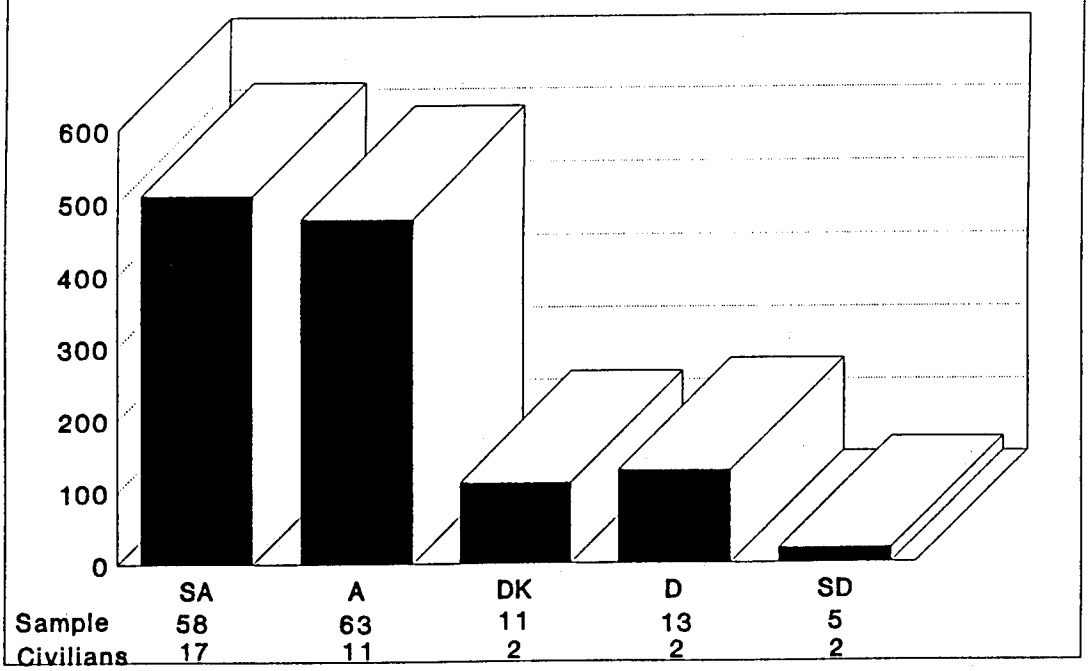
	SA	A	DK	D	SD
Sample	35	42	14	43	16
Civilians	17	10	1	5	1

ANALYSIS

Another expectation of Air Force TQM is decreased job frustration. This graph shows just the opposite trend, probably as a result of the drawdown. The military no longer offers the job security it once did. Members are worried about their futures and having to do more with less.

Figure 4-8

I am expected to do more with less.

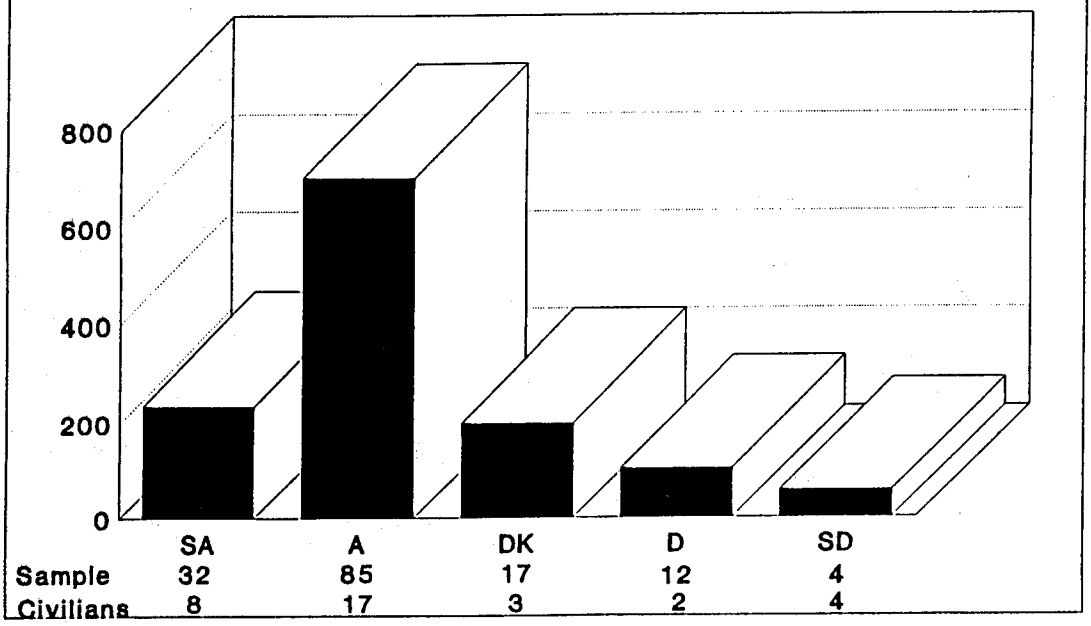


ANALYSIS

The personnel cuts have hurt most organizations. The workers are fewer in number, but the tasks have not decreased.

Figure 4-9

I know how and where I fit into my squadron's mission.

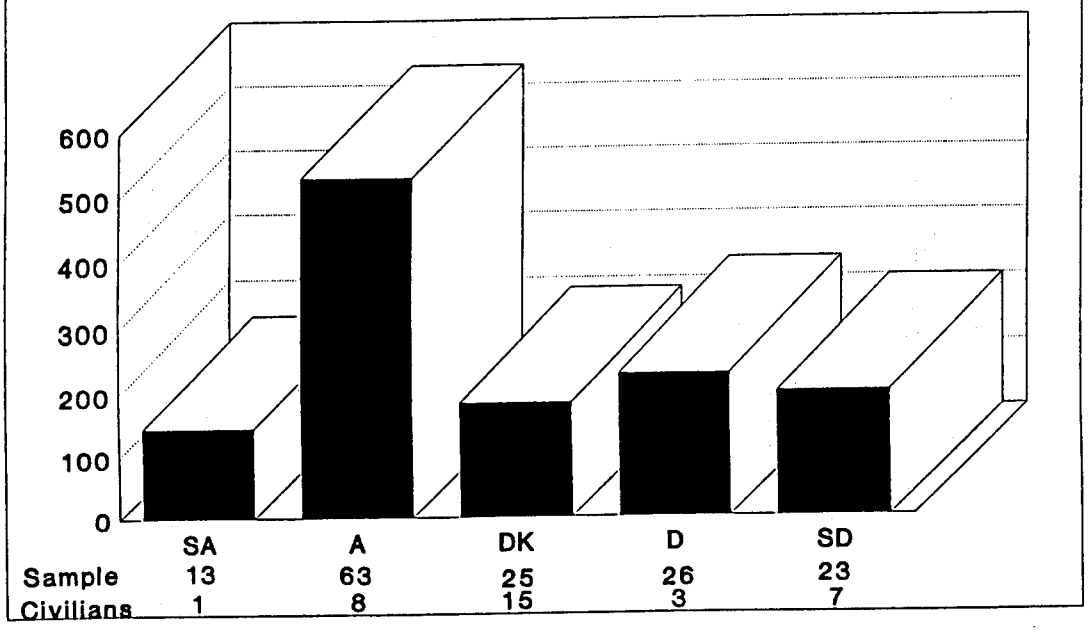


ANALYSIS

The results from this item are very positive. They support Deming's (1980) first point: "create a constancy of purpose." Most members know how and where they fit into their squadrons' missions.

Figure 4-10

The OPR/EPR system fairly represents my performance.



ANALYSIS

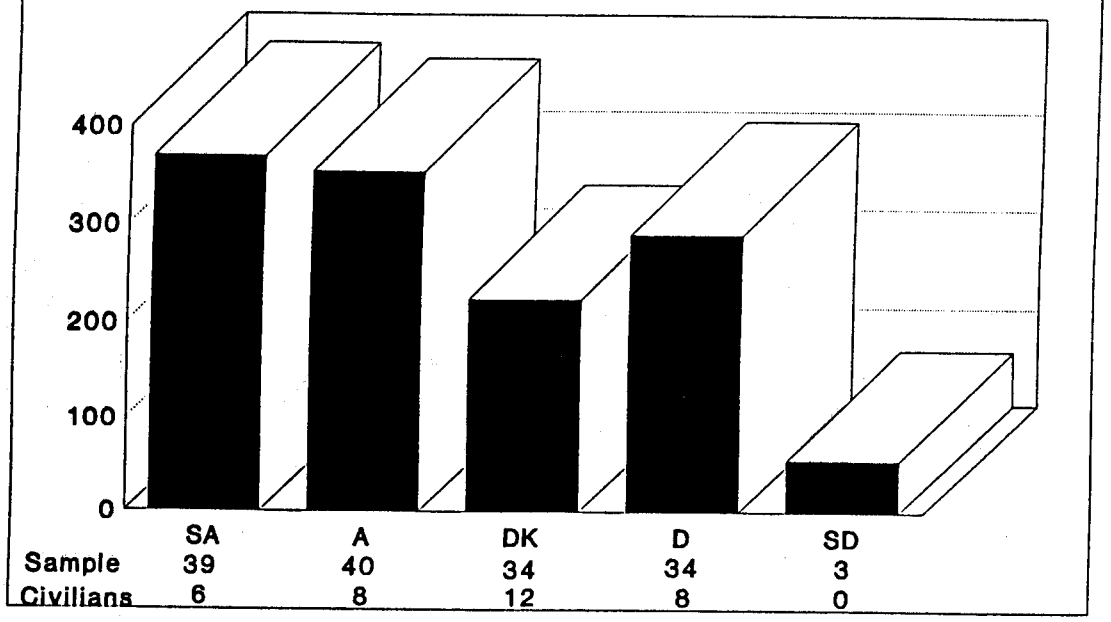
This graph is surprising, especially when compared to the next one. (See next page.)

* OPR: Officer Performance Report

EPR: Enlisted Performance Report

Figure 4-11

OPR/EPR ratings deal more with politics than performance.

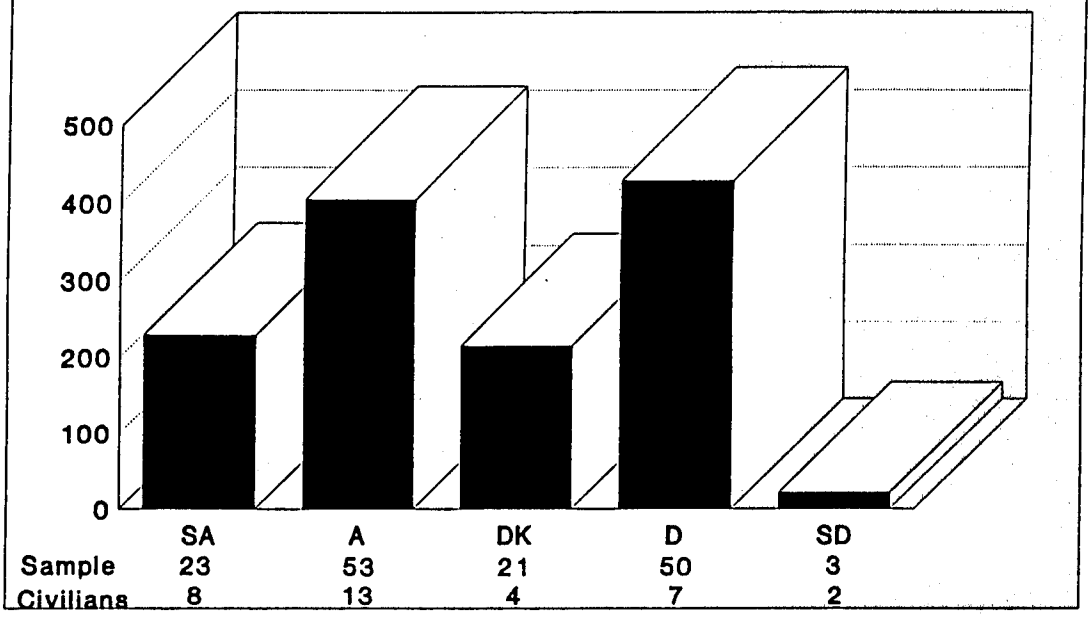


ANALYSIS

More than half (56%) of all the respondents feel that the OPR/EPR ratings deal more with politics than performance, yet 52% agreed that the same system fairly represents their performance.

Figure 4-12

Hot, Priority projects continually interrupt my scheduled projects.

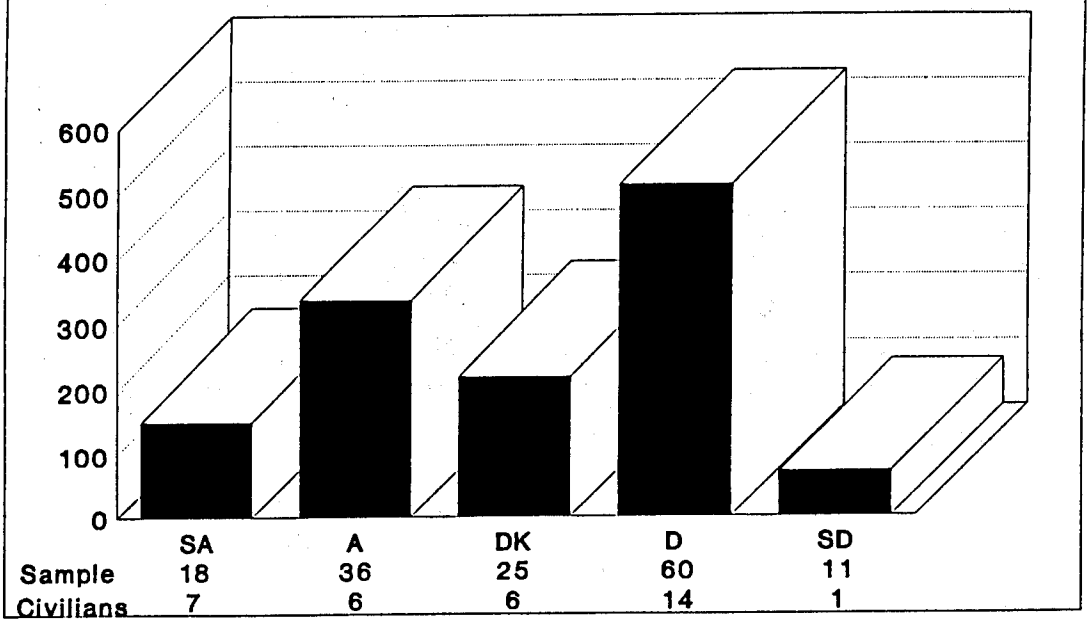


ANALYSIS

The answers to this item indicate a planning problem exists. Priority projects replace scheduled work activities with the result that scheduled activities become overdue, thus producing more job frustration.

Figure 4-13

I am given conflicting priority projects by those in my chain of command.



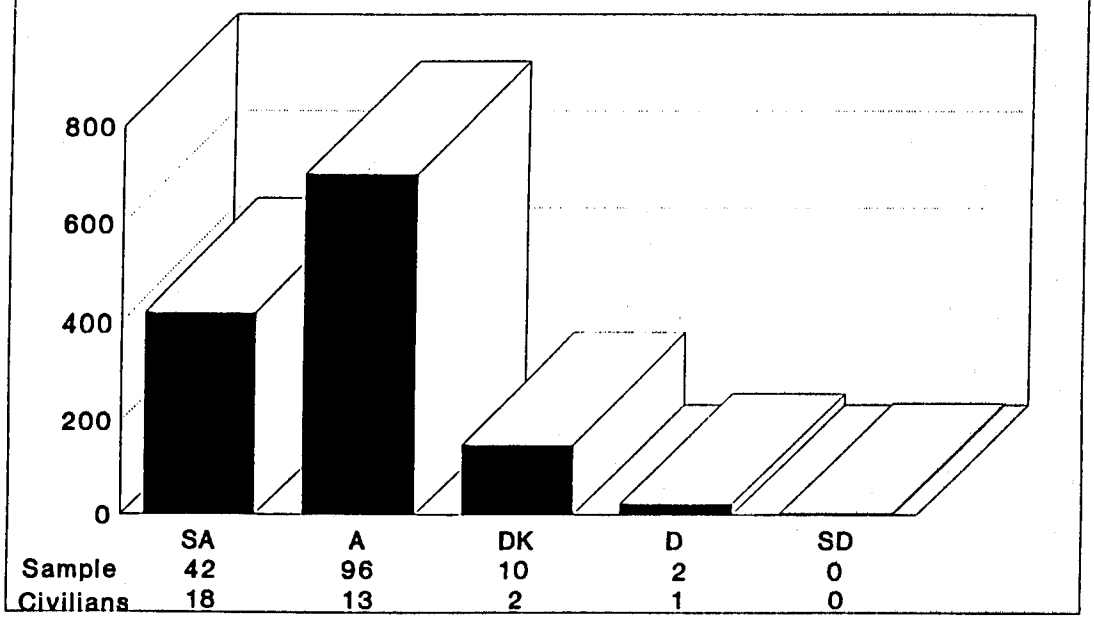
	SA	A	DK	D	SD
Sample	18	36	25	60	11
Civilians	7	6	6	14	1

ANALYSIS

This item identifies a communications problem. Military members expect occasional short-notice projects to require immediate action. These should be the exception rather than the rule. When they do occur, everyone up the chain of command needs to agree on, or at least be aware of, the order of priorities.

Figure 4-14

I provide quality products to my internal customers.



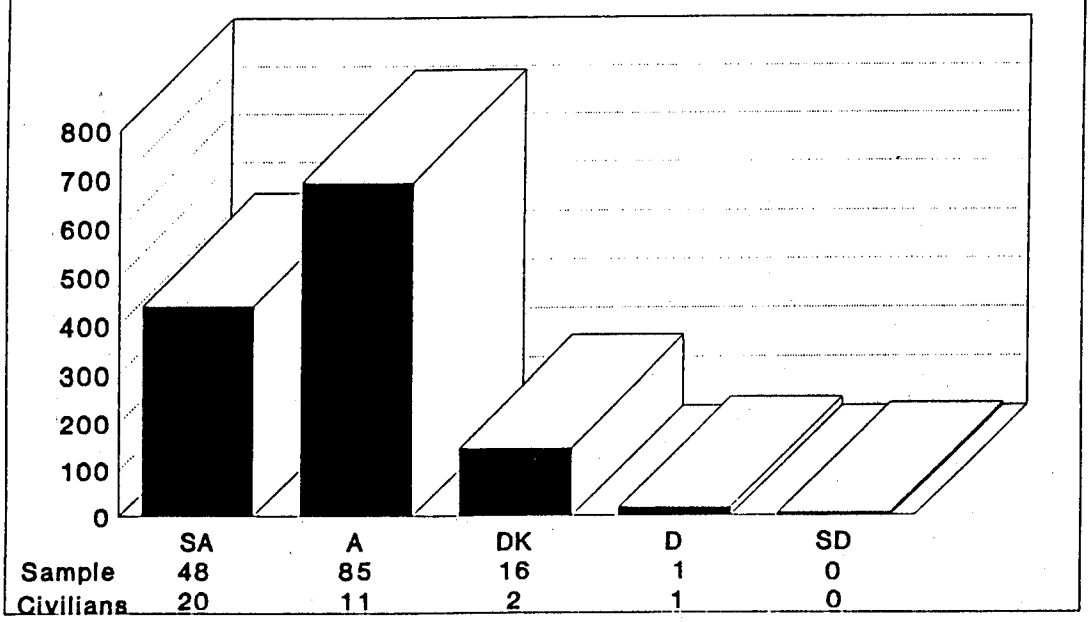
	SA	A	DK	D	SD
Sample	42	96	10	2	0
Civilians	18	13	2	1	0

ANALYSIS

Since most respondents feel they practice TQM principles while performing their duties, the strong positive response to this item is no surprise.

Figure 4-15

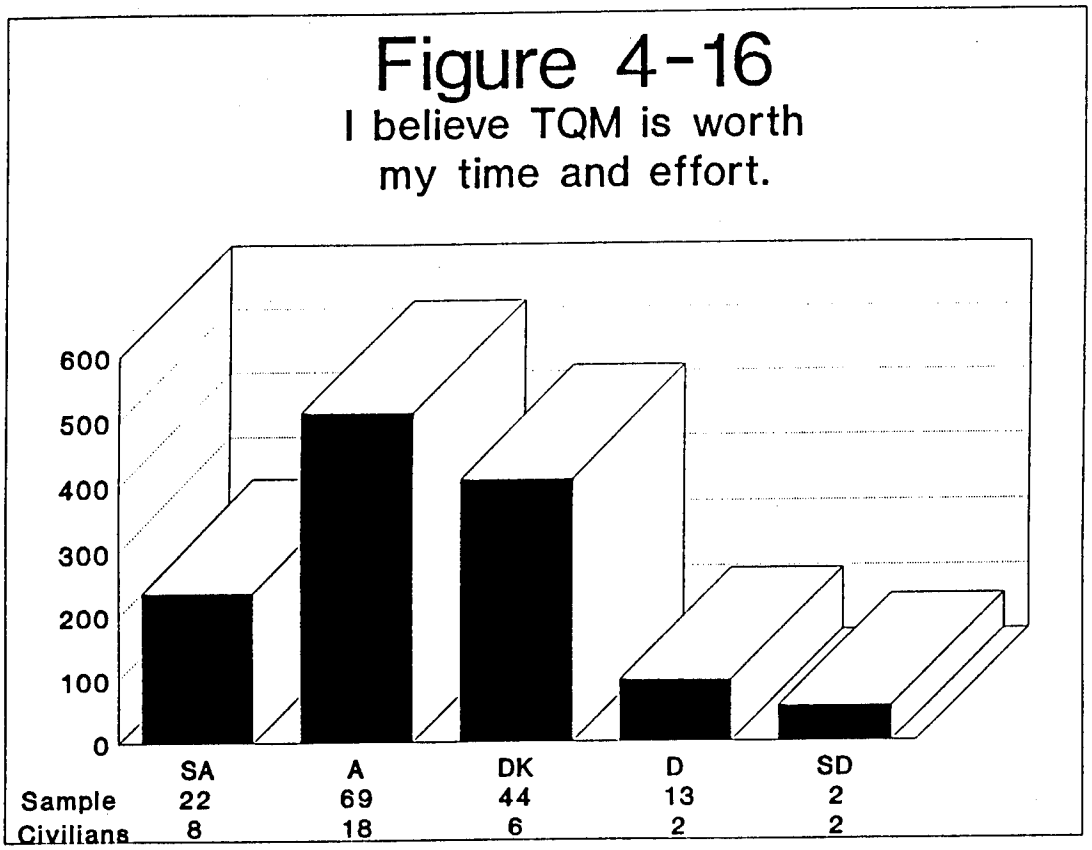
I provide quality products/service to my external customers.



	SA	A	DK	D	SD
Sample	48	85	16	1	0
Civilians	20	11	2	1	0

ANALYSIS

Same as 4-14. (See previous page.)

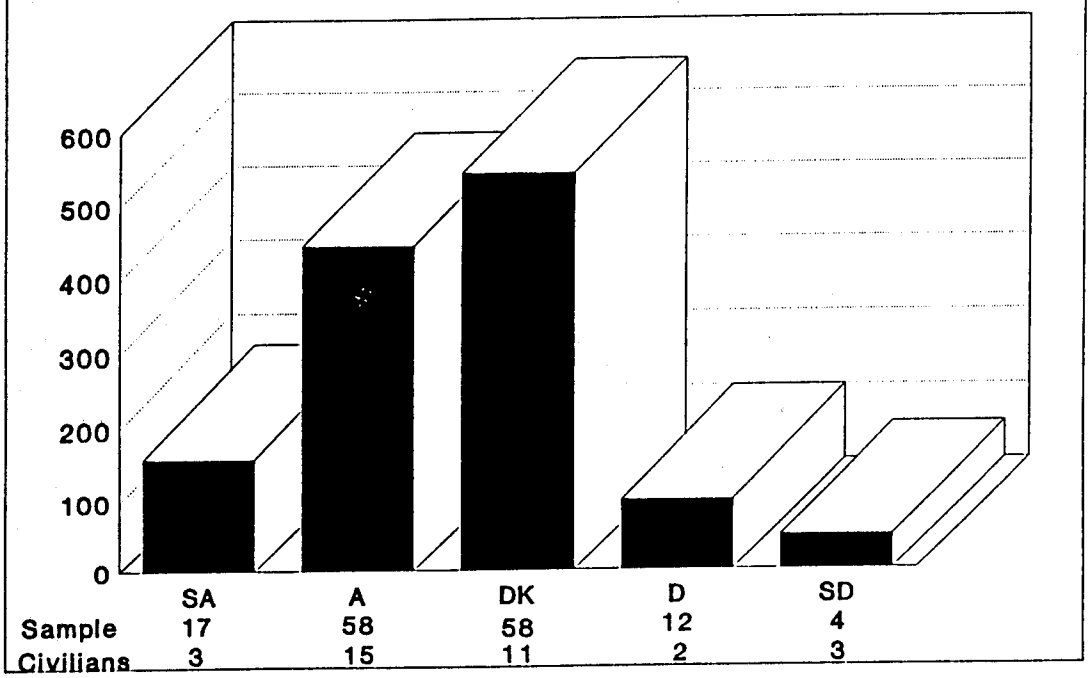


ANALYSIS

These responses show the military community at Pope AFB is receptive to TQM; however, more "how to" education is required.

Figure 4-17

My supervisor really believes in TQM.

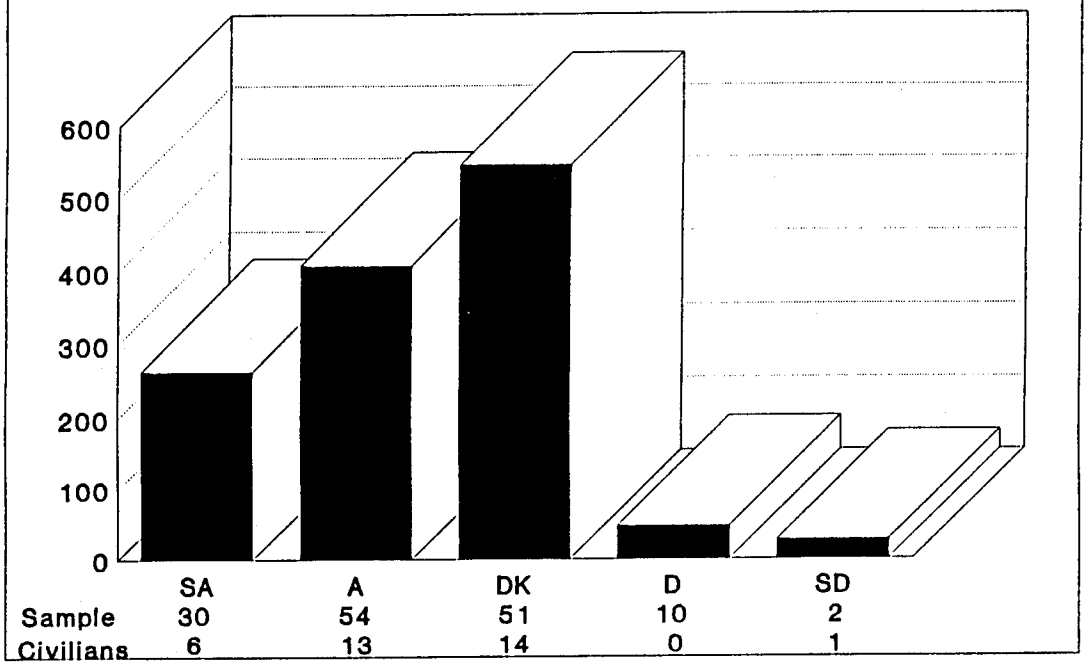


ANALYSIS

Although there were more positive than negative responses to this item, "Don't Know" was the most frequent response. This is disturbing because 100% participation is required for TQM to really work.

Figure 4-18

My commander really believes in TQM.

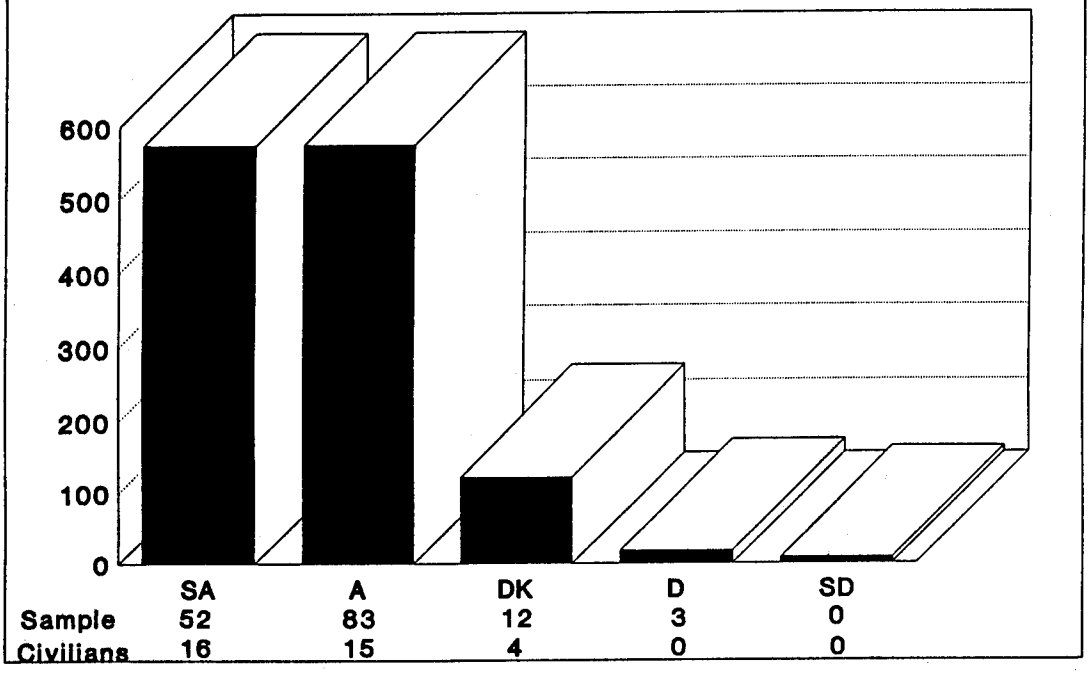


ANALYSIS

Same as 4-17. However, AF implementation requires a top-down approach. If members don't believe that their commanders believe in TQM, they will not support it either.

Figure 4-19

Quality grows from open communication.

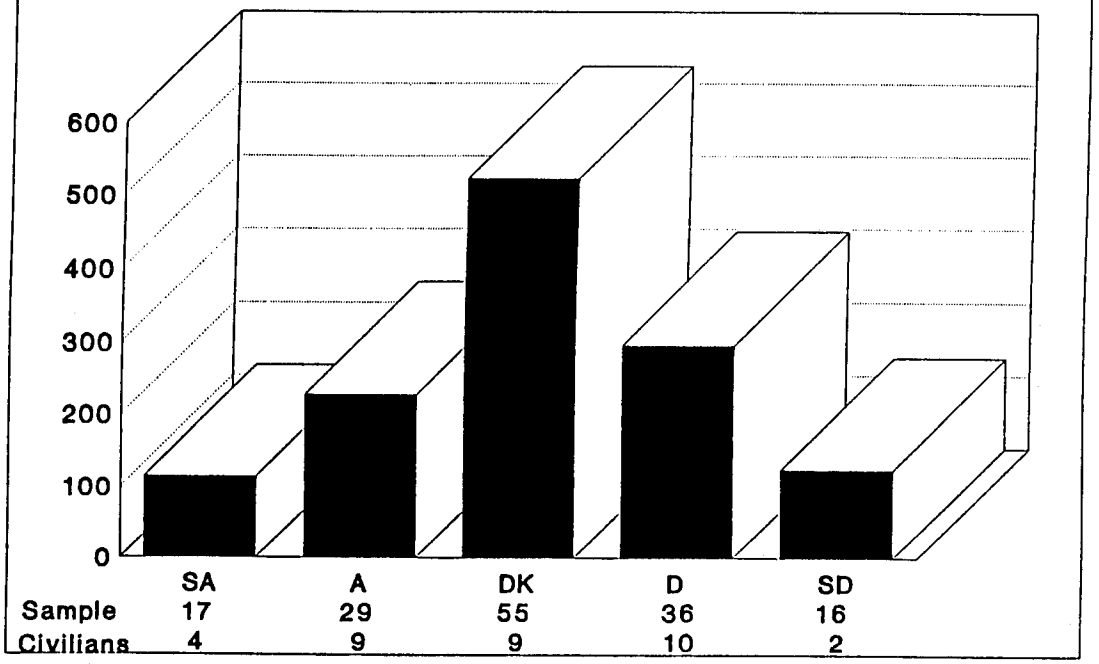


ANALYSIS

This was by far the most positive response to any item. The implication is that respondents recognize the value of open communication, both top-down and bottom-up.

Figure 4-20

TQM is a fad that will pass in time.

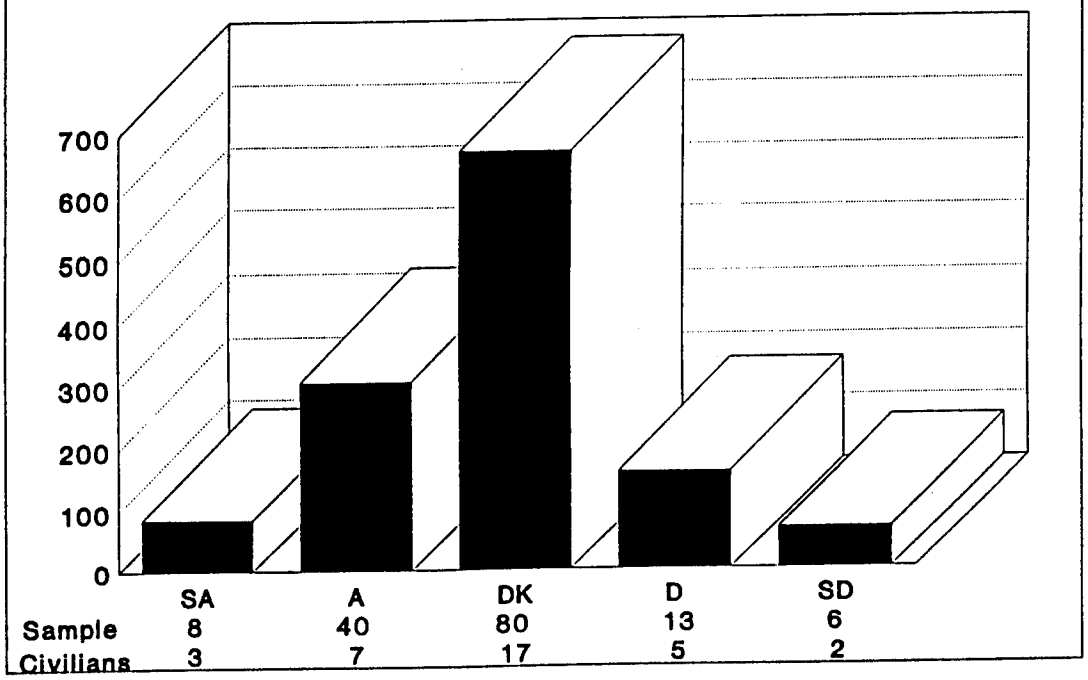


ANALYSIS

The name may change, but the concepts will be around for a long time. Many comments echoed this concept. The conclusion from the graph is that only time will tell.

Figure 4-21

TQM works in the Air Force.

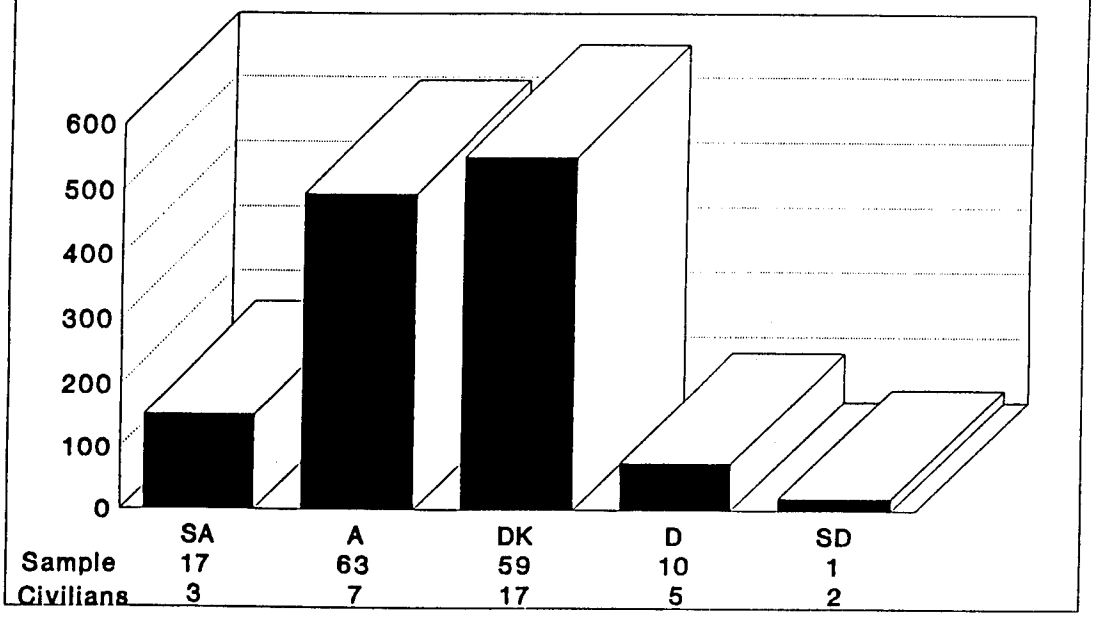


ANALYSIS

The biggest response was "Don't Know," indicating that TQM is still relatively new and hasn't been in effect long enough to produce too many visible results.

Figure 4-22

TQM could work in the Air Force if some modifications were made.

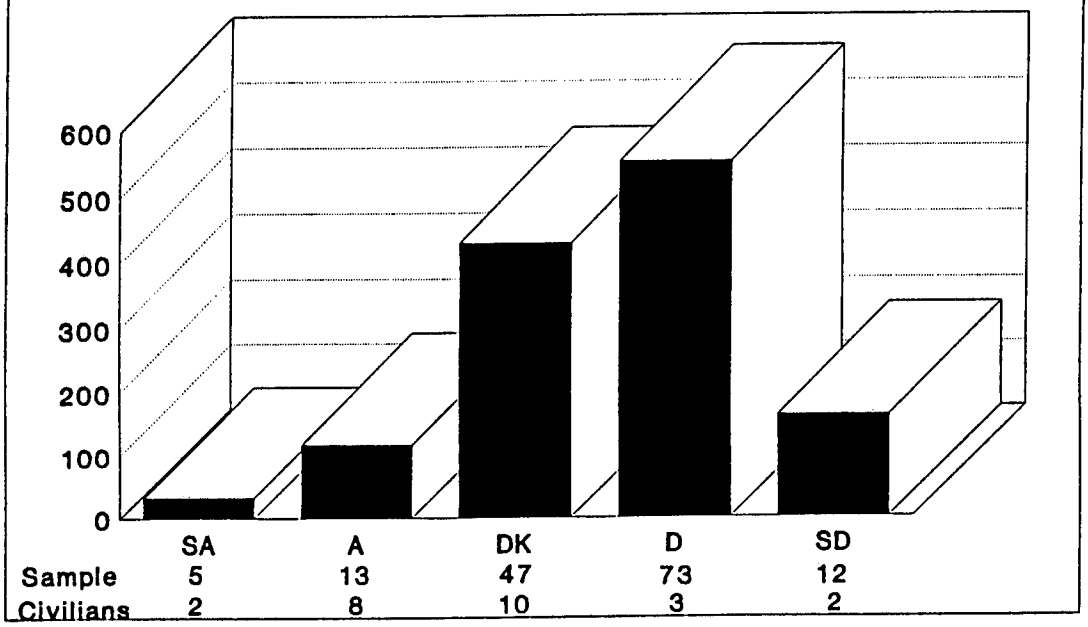


ANALYSIS

The jump in "Agree"s between this item and 4-21 indicates that many individuals see problems with the way the Air Force is implementing TQM; however, if modifications were made, TQM could work.

Figure 4-23

TQM is good, but I (we) don't have time for it.



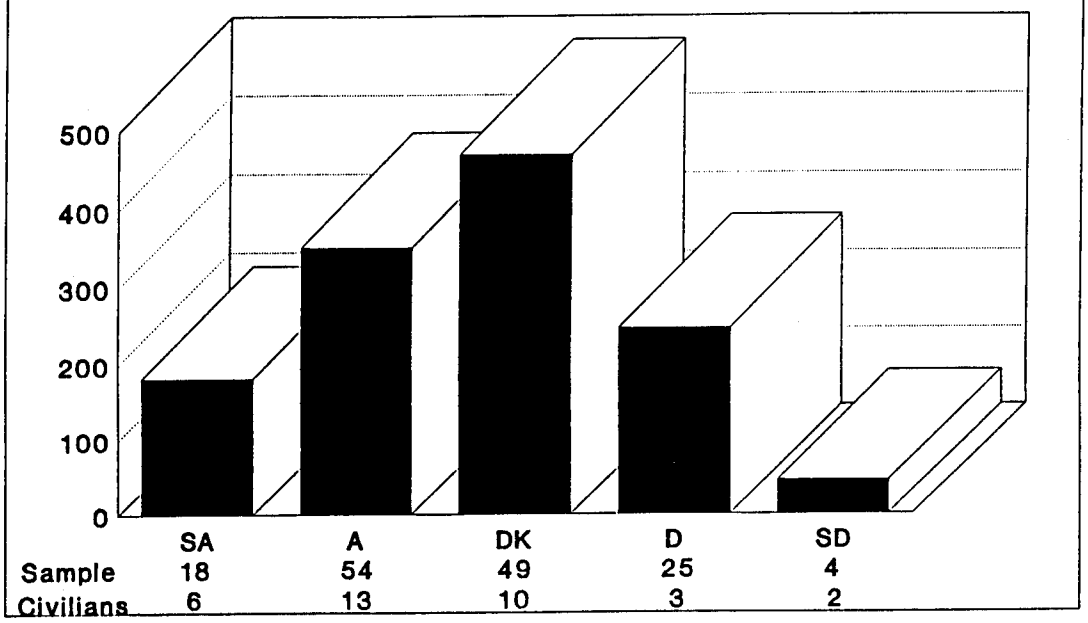
	SA	A	DK	D	SD
Sample	5	13	47	73	12
Civilians	2	8	10	3	2

ANALYSIS

This is the only unclear item on the questionnaire. It appears that most individuals interpreted the question correctly and disagreed, meaning that there is time for TQM.

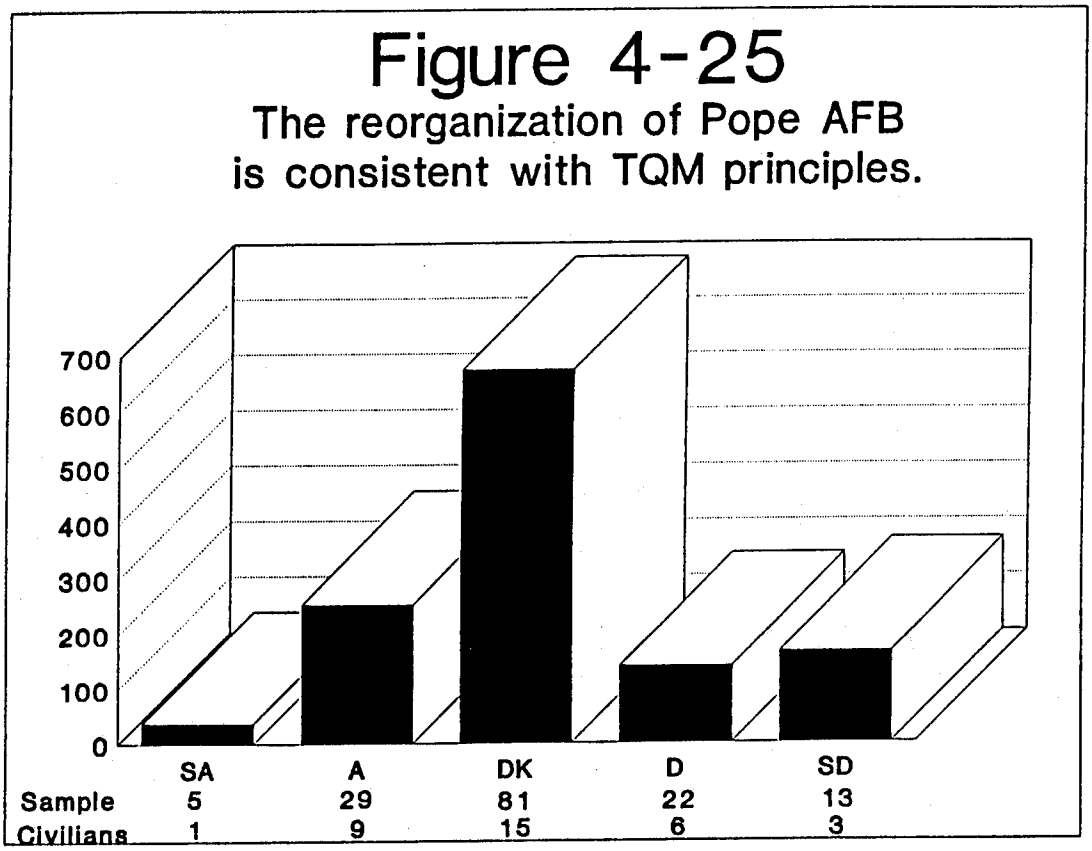
Figure 4-24

The military rank structure inhibits TQM applications.



ANALYSIS

The military chain of command was built on an authoritative top-down system. Unless commanders and supervisors at all levels buy into TQM, RHIP (Rank Has Its Privileges) will continue to control the way the military operates.



ANALYSIS

The reorganization of Pope AFB caused a lot of confusion and turmoil. Some believe the changes are for the better while others are now discontented.

Figures 4-26a through 4-28d present graphically the score frequencies for the three groups studied: (1) officers, (2) SNCOs, and (3) all other enlisted personnel. Please see Appendix B (pages 165-167) for the total score frequency distributions that summarize the next ten figures.

TQM PERCEPTIONS AND ATTITUDES SURVEY

_____ Rank _____ Squadron Command: _____ ACC (Prior TAC)
_____ ACC (Prior MAC)
_____ AMC
_____ AFSOC/JSOC
_____ Other: _____

TQM Training; Check all that apply:

_____ None
_____ PIT Member
_____ PIT Leader
_____ PIT Facilitator
_____ TQM Instructor
_____ Other: _____

For each statement, circle the letter(s) that best represent your opinion: SA Strongly Agree, A Agree, DK Don't Know (don't have enough knowledge to answer), D Disagree SD Strongly Disagree.

In my squadron, TQM gets a lot of lip service, but not too much action.	SA A DK D SD
TQM is a real priority in my squadron.	SA A DK D SD
I have participated in TQM activities, other than training.	SA A DK D SD
I practice TQM principles while performing my duties.	SA A DK D SD
I am comfortable sharing my improvement ideas with others.	SA A DK D SD
My job satisfaction has increased during the last year.	SA A DK D SD
My job frustration has increased during the last year.	SA A DK D SD
I am expected to do more with less.	SA A DK D SD
I know how and where I fit into my squadron's mission.	SA A DK D SD
The OPR/EPR system fairly represents my performance.	SA A DK D SD
OPR/EPR ratings deal more with politics than performance.	SA A DK D SD
Hot, priority projects continually interupt my scheduled projects.	SA A DK D SD
I am given conflicting priority projects by those in my chain of command.	SA A DK D SD
I provide quality products/service to my internal customers.	SA A DK D SD
I provide quality products/service to my external customers.	SA A DK D SD
I believe TQM is worth my time and effort.	SA A DK D SD
My supervisor really believes in TQM.	SA A DK D SD
My Commander really believes in TQM.	SA A DK D SD
Quality grows from open communication.	SA A DK D SD
TQM is a fad that will pass in time.	SA A DK D SD
TQM works in the Air Force.	SA A DK D SD
TQM could work in the Air Force if some modifications were made.	SA A DK D SD
TQM is good, but I (we) don't have time for it now.	SA A DK D SD
The military rank structure inhibits TQM applications.	SA A DK D SD
The reorganization of Pope AFB is consistent with TQM principles.	SA A DK D SD

Additional Comments: _____

_____

_____

PLEASE RETURN YOUR SURVEY TO YOUR FIRST SERGEANT OR YOUR UNIT PROJECT OFFICER.

THANK YOU FOR YOUR PARTICIPATION!

Total Score Frequency Distribution

	SA	A	DK	D	SD
1.	182	319	421	314	60
2.	87	399	416	307	89
3.	90	330	253	422	201
4.	201	651	272	127	47
5.	356	708	86	113	37
6.	152	453	148	344	201
7.	328	386	119	371	90
8.	509	477	112	179	20
9.	235	702	199	104	57
10.	145	530	194	229	200
11.	370	354	224	290	56
12.	229	405	215	428	21
13.	151	337	220	515	72
14.	419	702	149	23	3
15.	438	692	145	17	5
16.	236	512	409	96	55
17.	159	445	544	100	49
18.	263	409	546	47	27
19.	574	575	121	18	8
20.	114	228	524	296	124
21.	87	307	672	161	68
22.	153	495	552	76	19
23.	33	119	430	553	162
24.	182	352	470	247	45
25.	37	253	695	140	166

Figure 4-26a

Officer Total Scores(25-45)

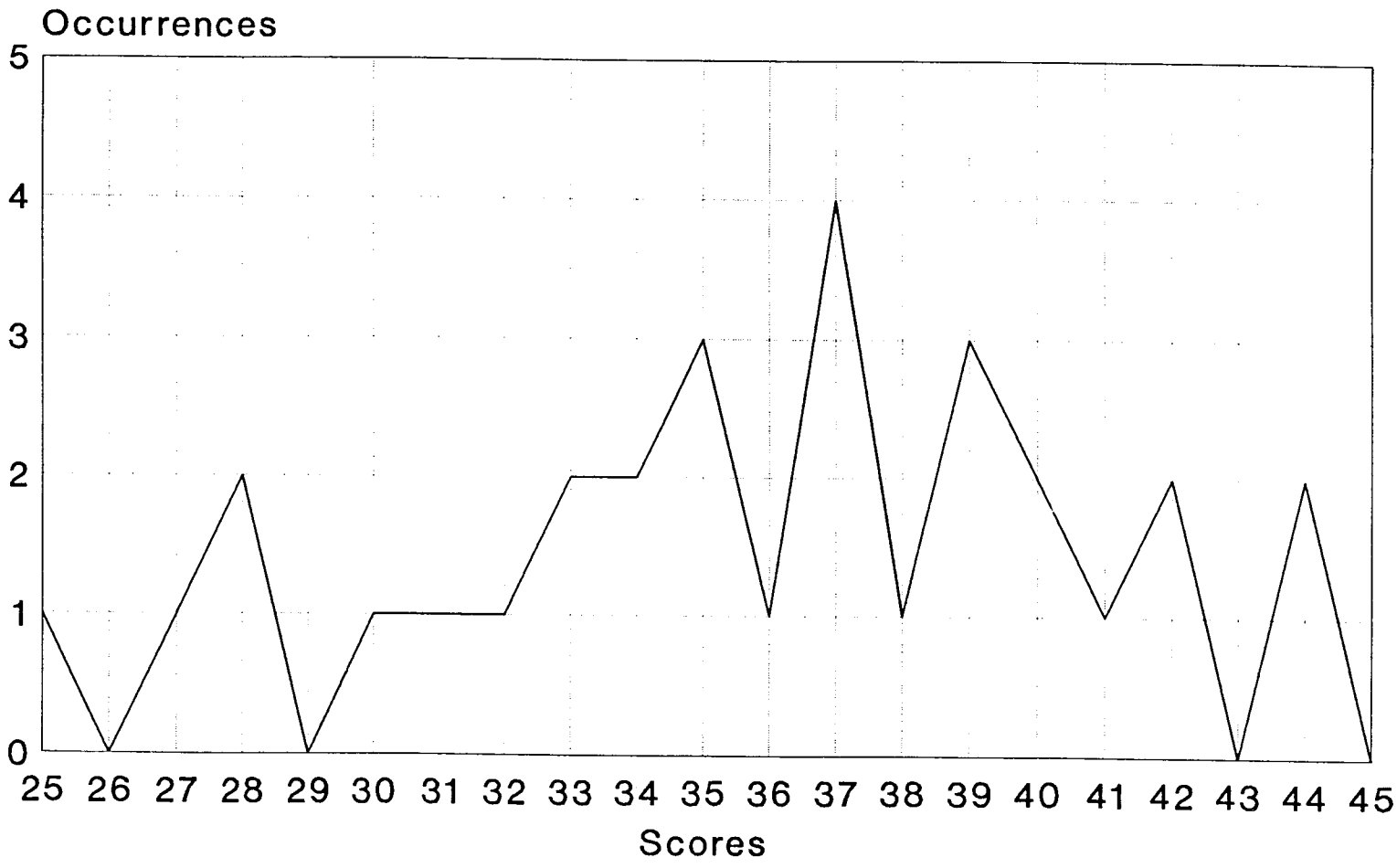


Figure 4-26b

Officer Total Scores(46-70)

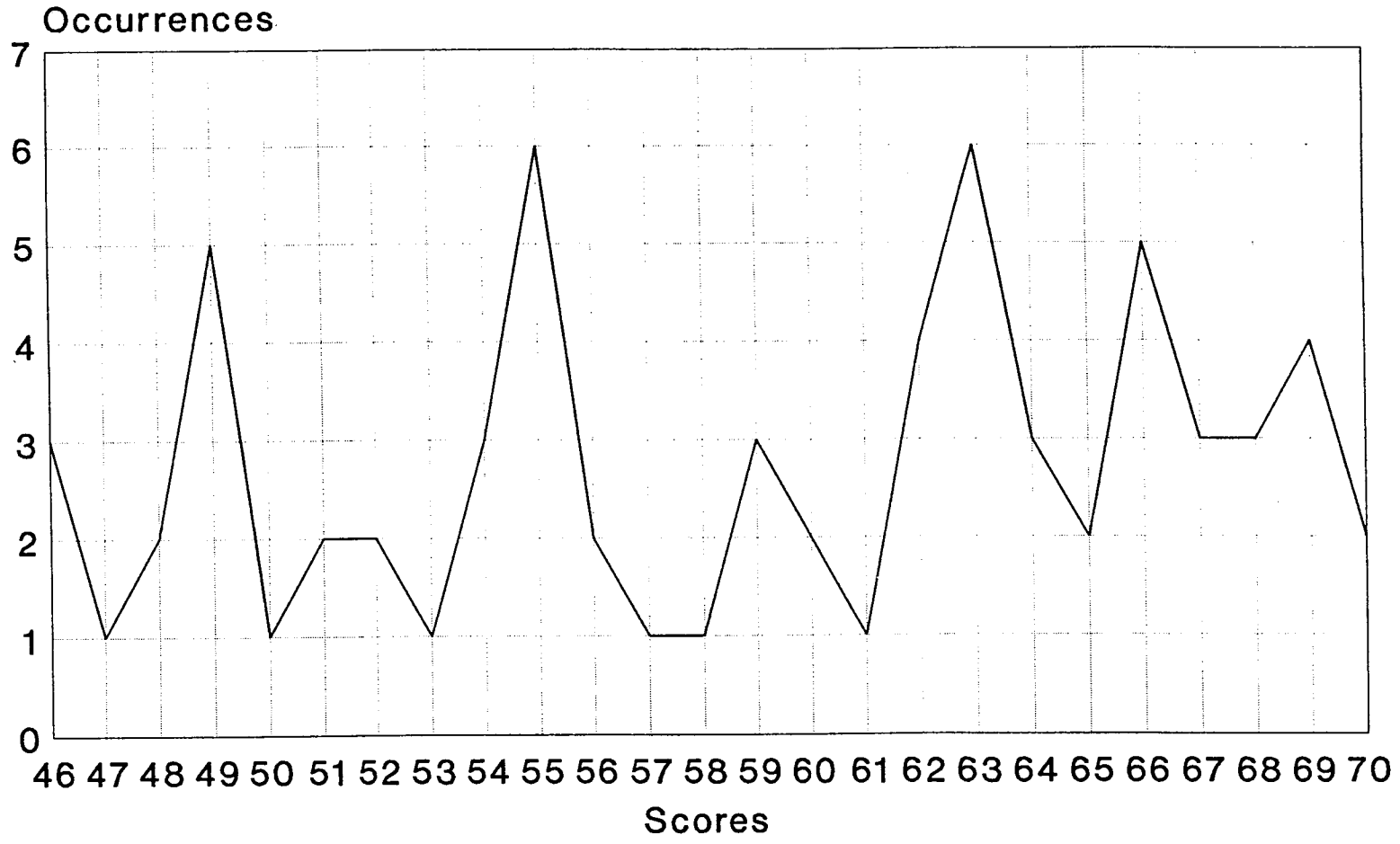


Figure 4-26c

Officer Total Scores(71-95)

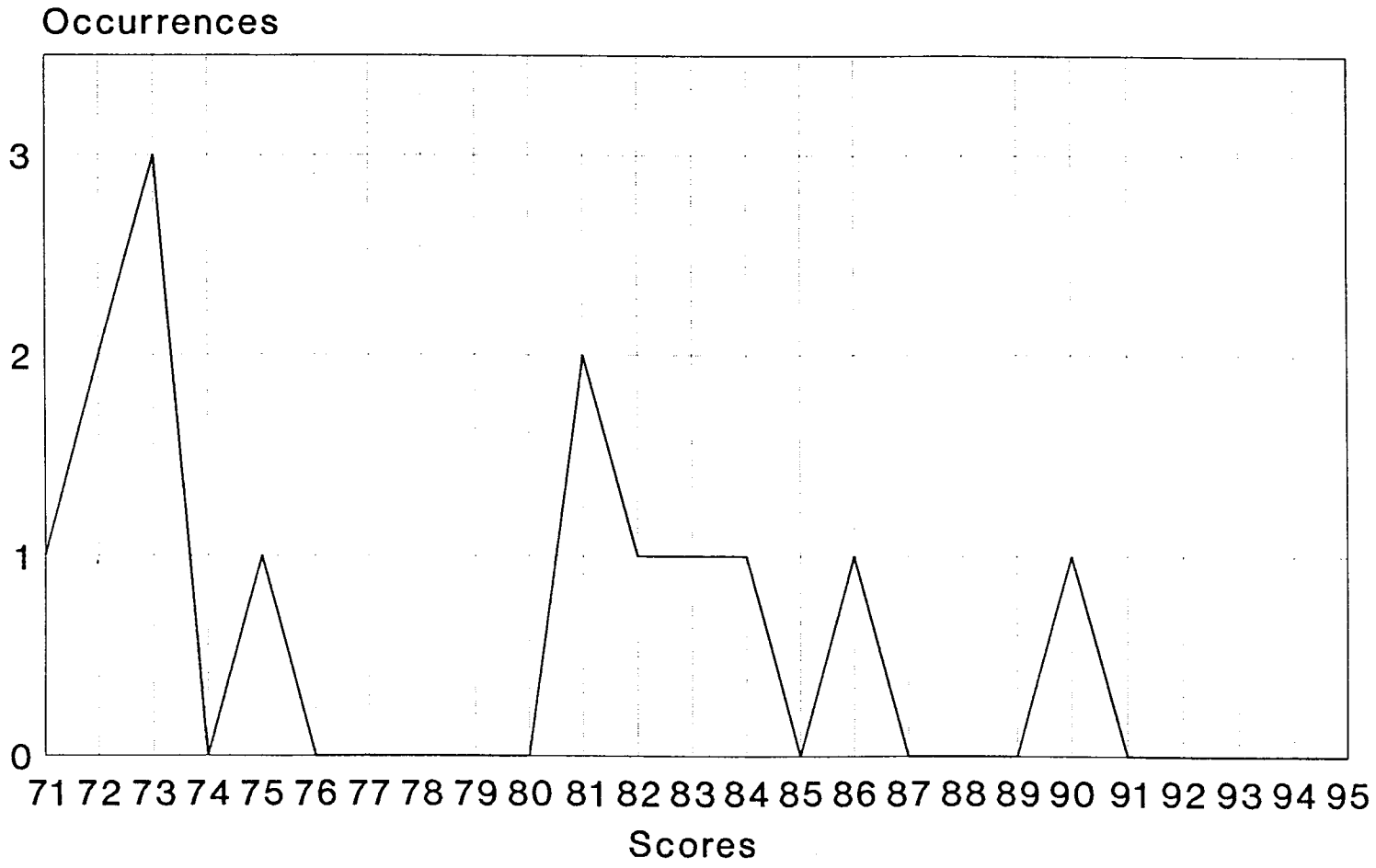


Figure 4-27a

SNCO Total Scores(25-45)

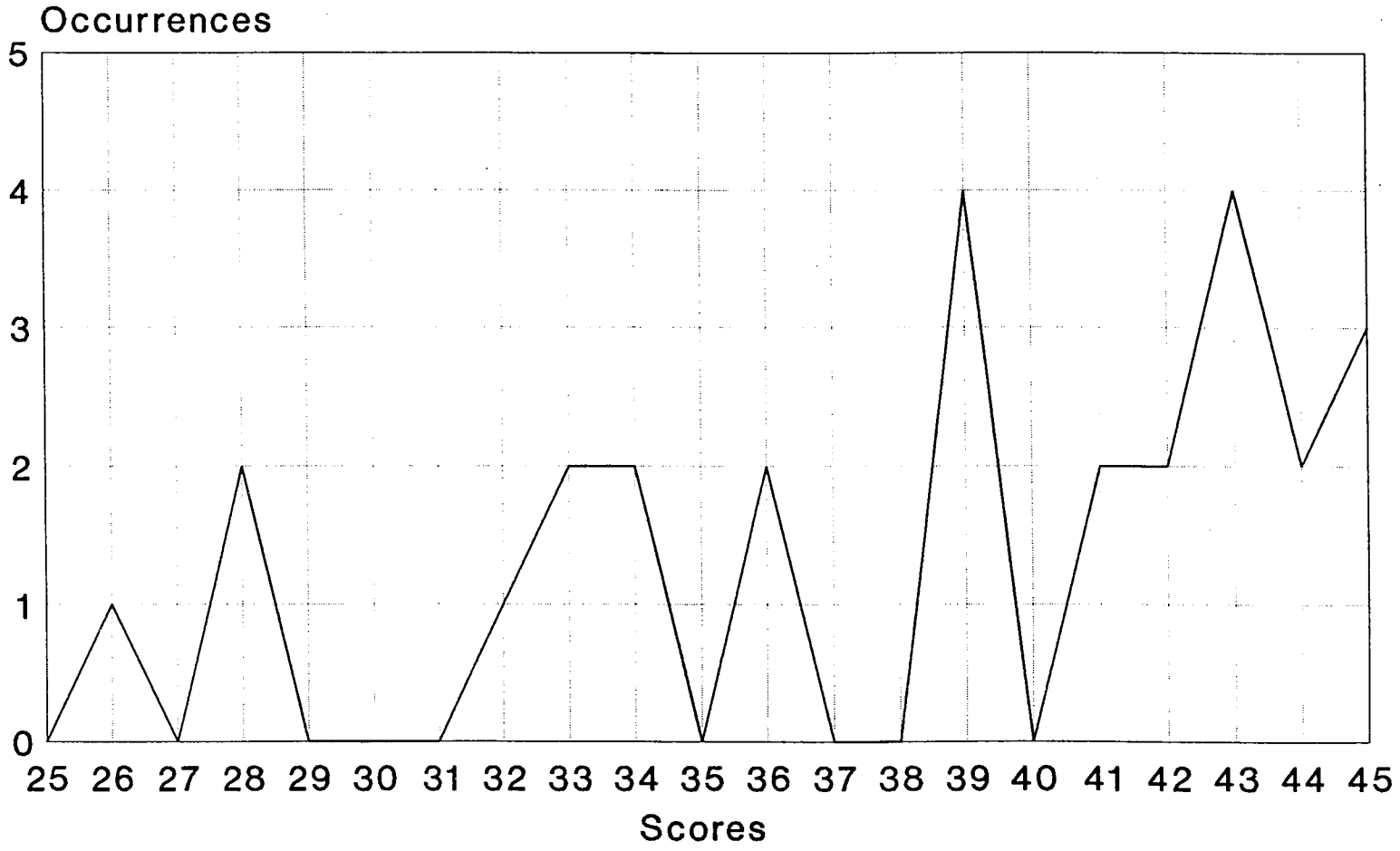


Figure 4-27b

SNCO Total Scores(46-70)

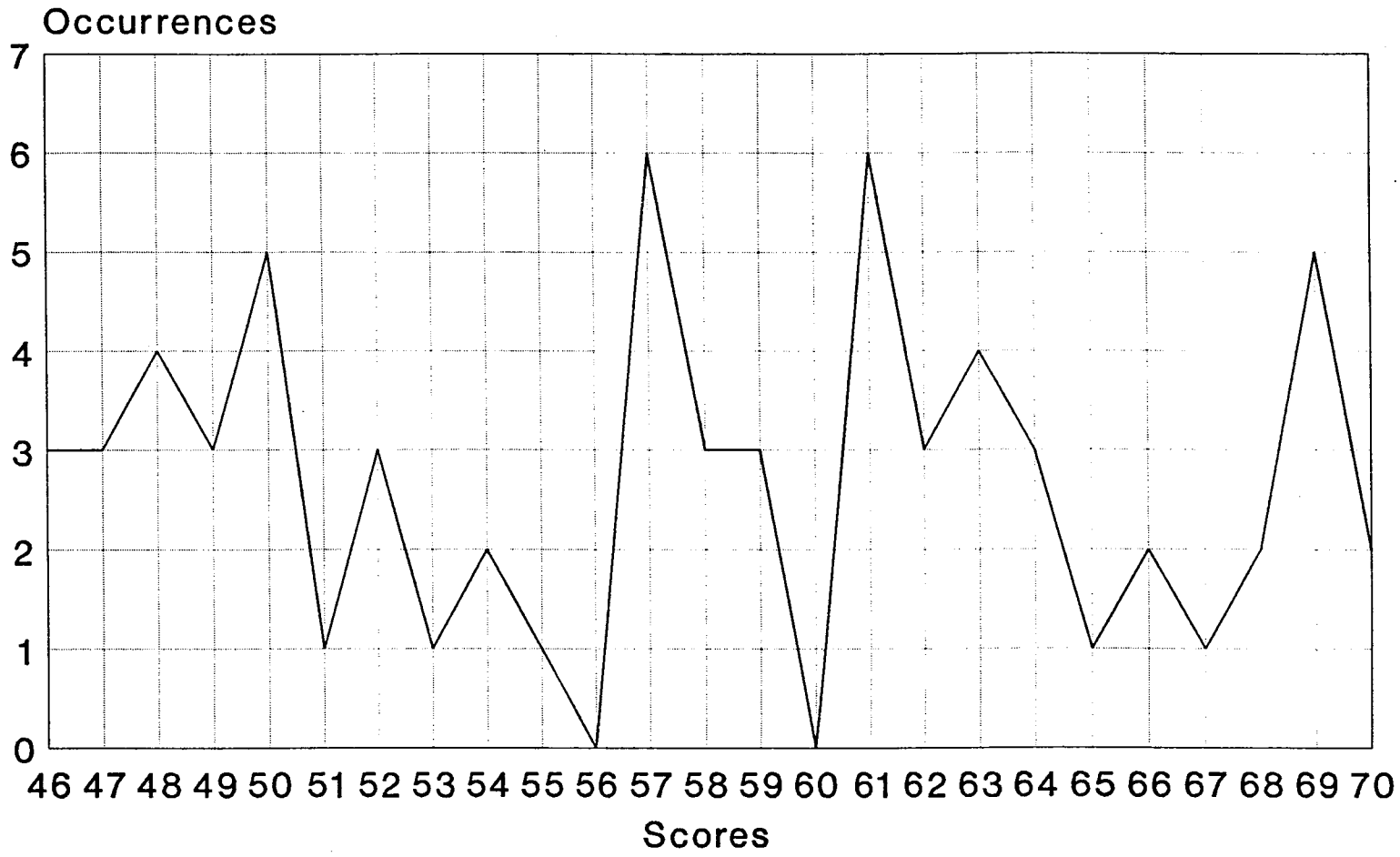


Figure 4-27c

SNCO Total Scores(71-95)

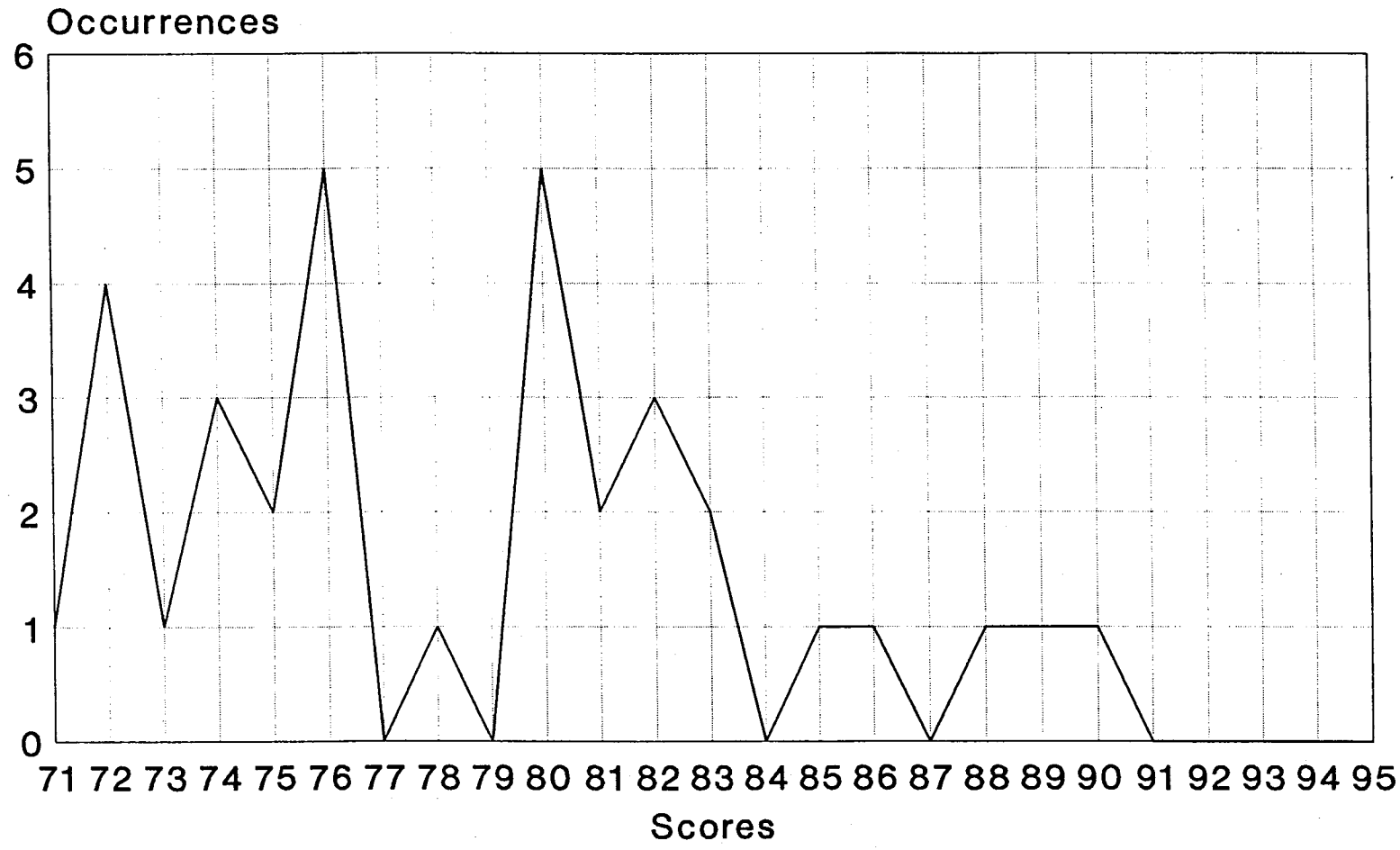


Figure 4-28a

All Other Enlisted Personnel
Total Scores (00-24)

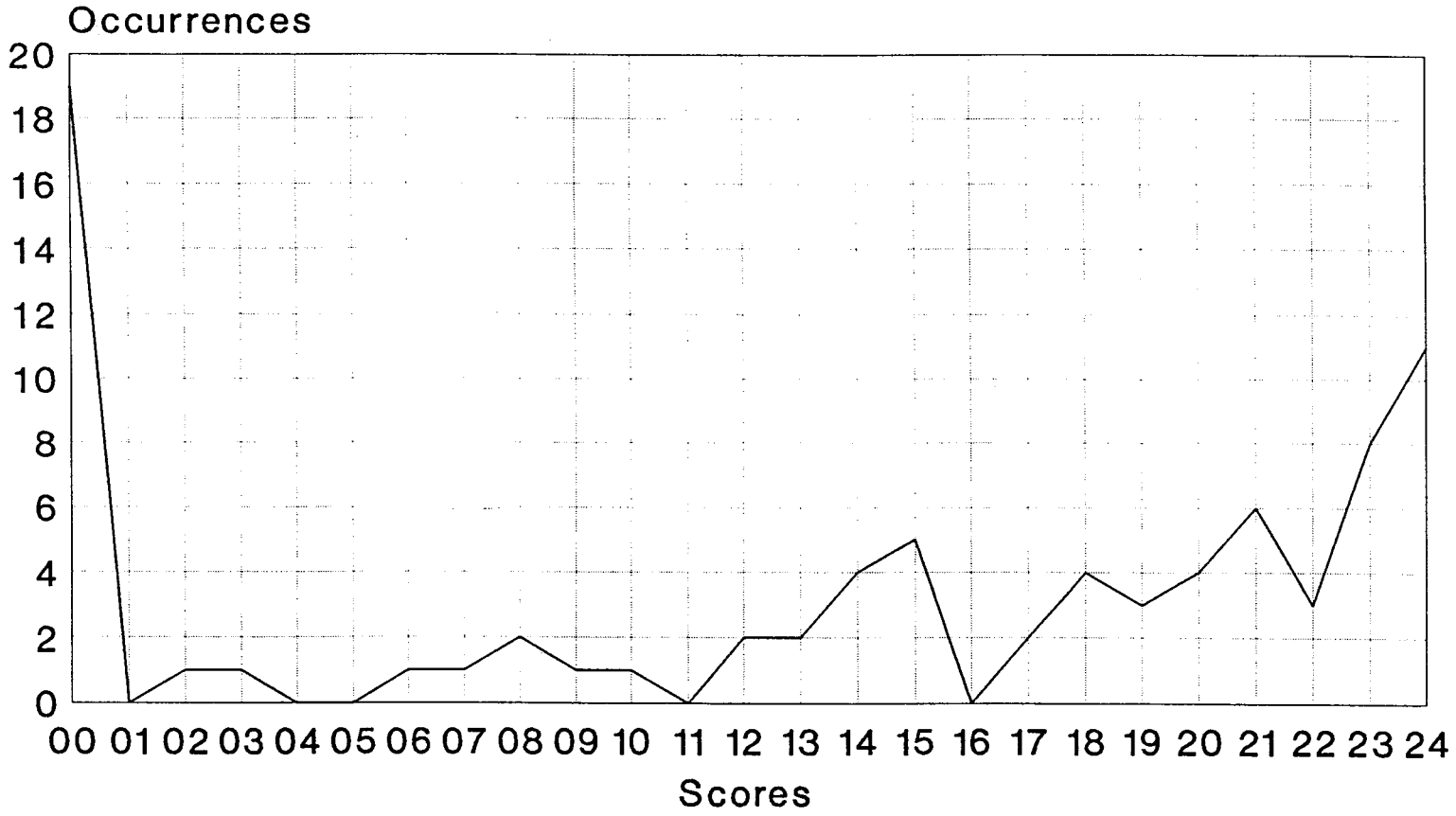


Figure 4-28b

All Other Enlisted
Total Scores (25-45)

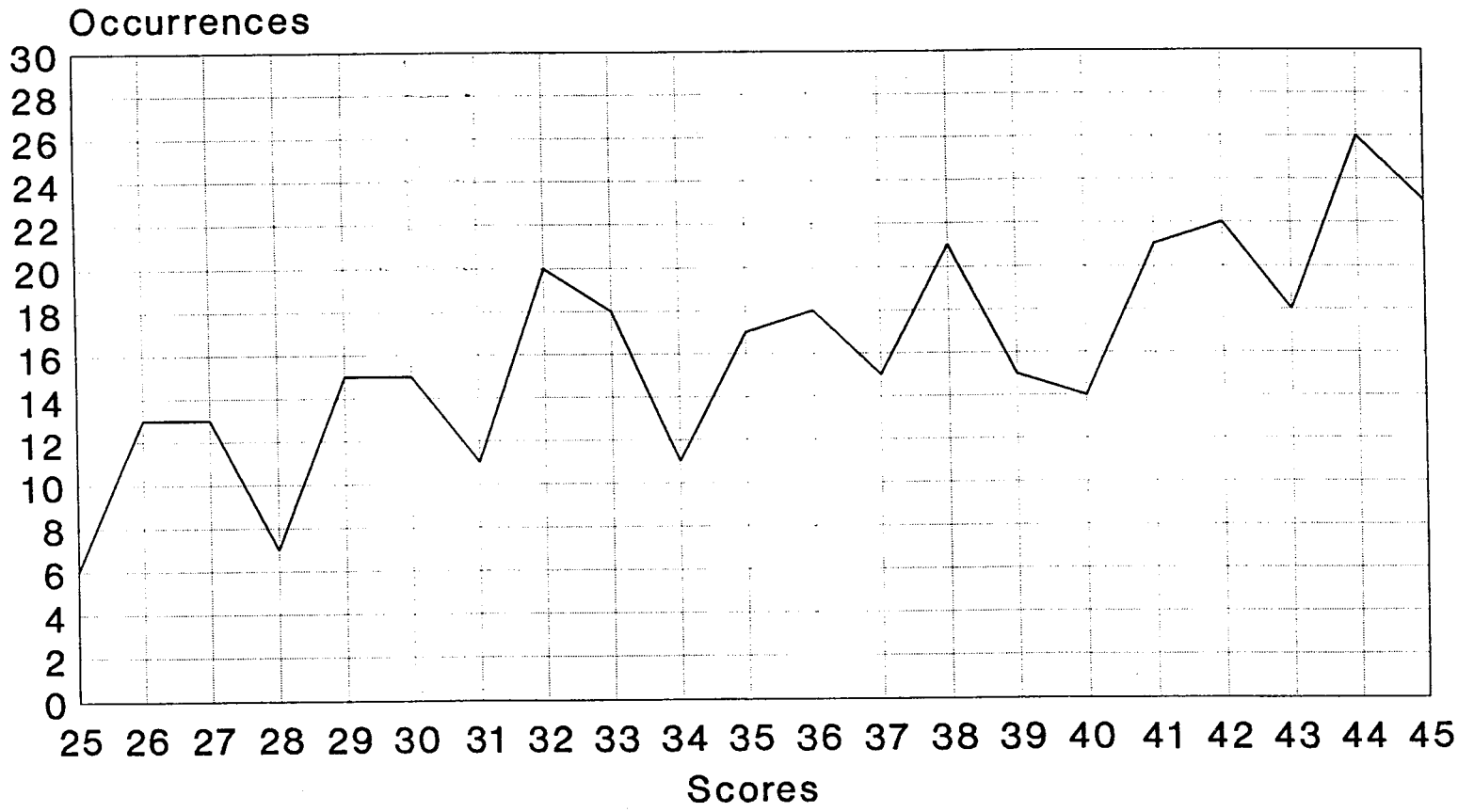


Figure 4-28c

All Other Enlisted
Total Scores (46-70)

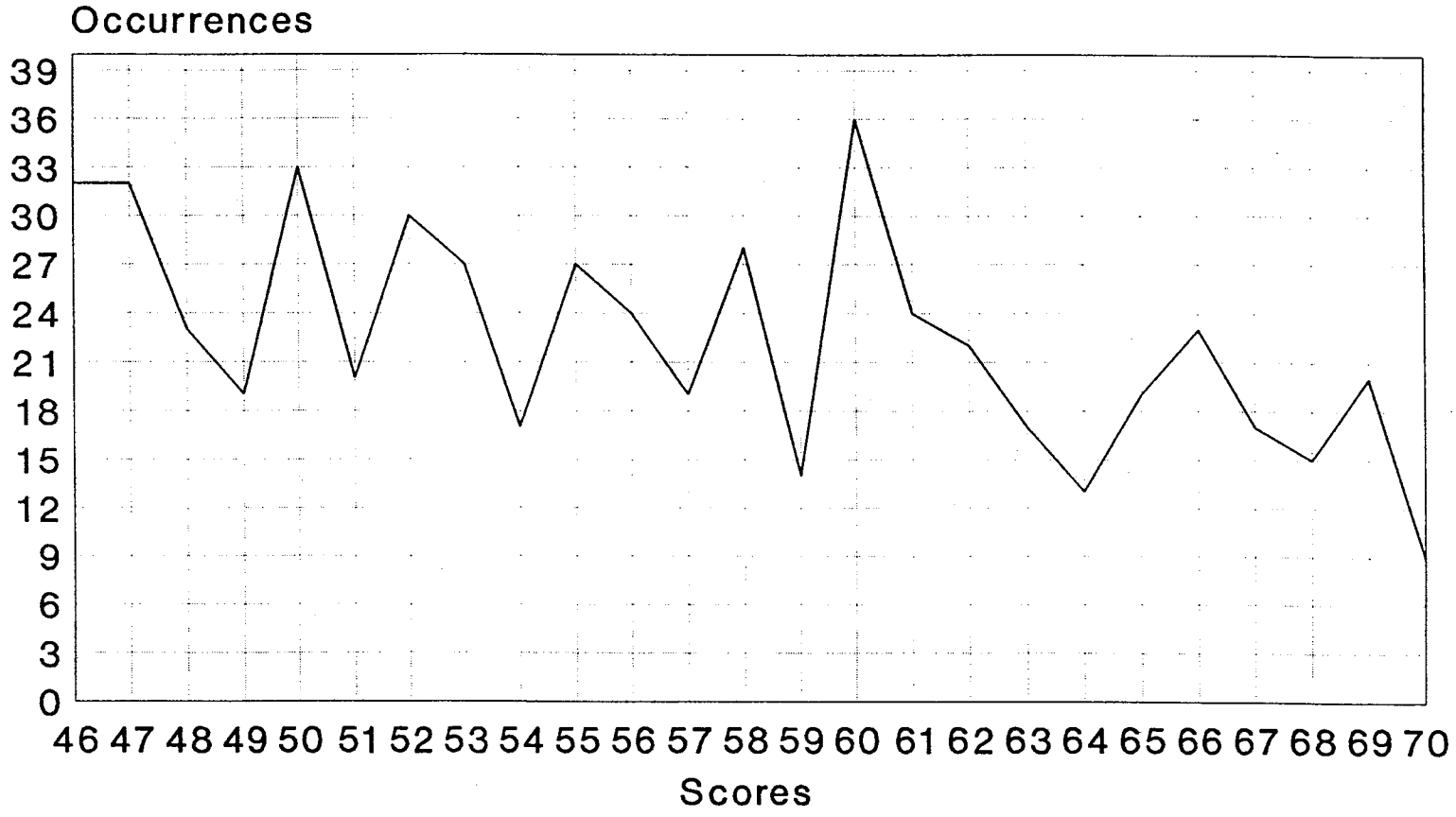
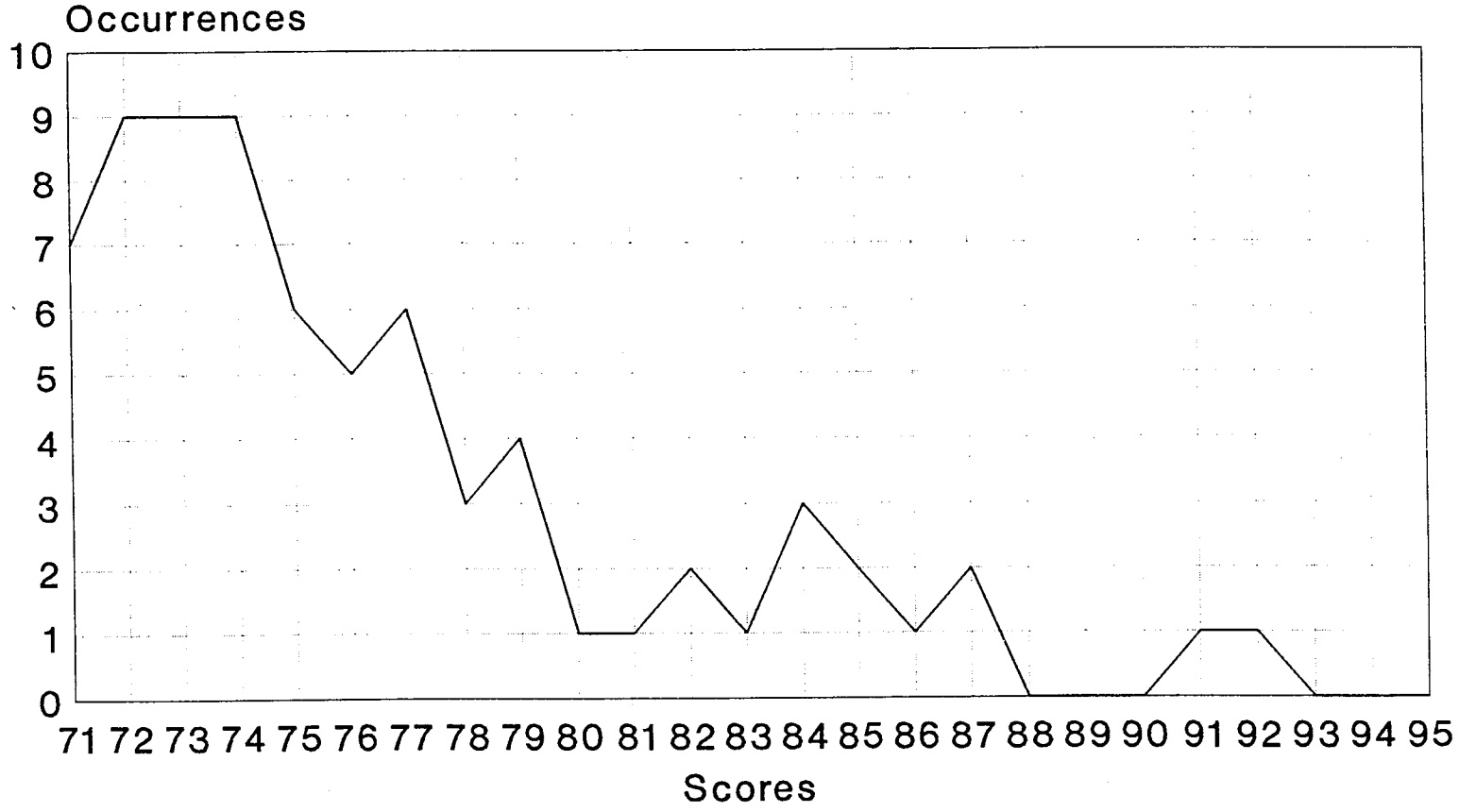


Figure 4-28d

All Other Enlisted
Total Scores (71-95)



Discussion

In support of the hypothesis, and especially sub-hypothesis 3 (H_3): The lower-ranking enlisted personnel ("all others"), as a group, responded least favorably to the perceptions and attitude survey. Only this group had total scores falling in the 0-24 range; the other two started at 25. Additionally, the comments of the three groups showed differences in attitudes, but these differences are not apparent to the reader due to the precautions taken to protect the anonymity of the respondents.

This research, in terms of total scores, did not support sub-hypotheses 1 and 2:

H_1 Officer perceptions and attitudes are more favorable as a whole than those of either of the other two groups.

H_2 The SNCO perceptions and attitudes are split between favorable and unfavorable responses.

Officers had more low scores than the SNCOs, and the SNCOs had more high scores than the officers. Overall, however, these two groups appear to be more similar than different.

The researcher believes the similarities are due to the range of time in service of the Officer Corps. Had the O-1s, O-2s, and O-3s (the first three officer ranks) been a separate group, the results would probably

support H_1 and H_2 as well as H_3. This is an area that could be explored in a supplemental or separate study.

This study did reveal some significant findings unrelated to the hypotheses. For instance, "Don't Know" was the response indiciated most often for both: "My supervisor really believes in TQM" and "My Commander really believes in TQM." "Don't Know" was the number one answer again to "TQM is a real priority in my squadron." In this case, almost equal numbers agreed and disagreed with the statement.

Only a small portion of the respondents have participated in TQM activities other than training, yet almost all agree that they practice TQM principles while performing their duties and that they provide quality products/service to both their internal and external customers.

Additionally, a large number of respondents feel that OPR/EPR ratings deal more with politics than performance. Furthermore, there seems to be a problem with planning. Hot, priority projects interrupt and replace planned daily activities.

The supplemental sample of 150 first-time nonrespondents supported the generalizability of the reported results to all personnel assigned to Pope Air Force Base. Overall the bar graphs with the extra responses added are similarly proportioned. Only one

bar from one of the 25 graphs is proportionally higher. This is the "Agree" bar for the item: "Quality grows from open communication." The results are consistent, with the majority of all responses forming the SA and A bars. The sample numbers are presented under each graph with the civilian totals.

The nine interviews also revealed some interesting perceptions and attitudes. For instance, there is one squadron Commander who has a two-shelf bookcase full of publications about or related to quality. On the other hand, another officer commented, "TQM has created a mountain of paperwork" and that his people are spending so much time doing the paperwork, they do not have time to provide quality service. He feels the Air Force is not applying TQM as Deming intended, but that his situation could be improved if TQM were properly applied.

The third officer interviewed is a recent graduate of Officer Training School (OTS). He sees the importance of 100% participation in the quality movement and wonders why quality was not a topic taught during OTS.

The SNCO interviews were also very informative. The first SNCO thinks the ideas behind the quality movement are sound, but the Air Force is like a half-cocked pistol in implementing its program. "We develop

good programs and then implement them in a manner that breeds failure."

Metrics (quality measurement) will impress the staff performing the quality visit. This point was mentioned during the second SNCO interview. This individual was frustrated because he had received a lot of quality training at his last base, but none of the rest of his staff had even attended the Awareness course.

The third SNCO had just completed the Awareness course. Although he had heard the acronym TQM before, but he did not know the TQM principles and ideas. Now that he knows some of the background of the quality movement and the intent of the Air Force program, his attitude toward TQM is very positive.

A member from the "all other enlisted personnel" group stated that the military rank structure prohibited TQM application because the individual's chain of command always comes first. What his or her supervisor and/or Commander says goes; it doesn't matter what logic and quality say.

Based on her job assignment, another NCO felt empowered by her use of metrics.

The last individual expressed the view that quality will not work in the Air Force until some of the "old hats" retire. They are too resistant to change and do

not want to listen to the improvement ideas of young airmen and NCOs.

These interviews are a small sample of the perceptions and attitudes of Pope AFB personnel. Appendix C contains a complete listing of all the additional comments people took the time to write.

Conclusions

Implications

This study has shown that many Pope personnel have heard about TQM, but that only a small portion of the sample have participated in TQM activities other than training. Large numbers of subordinates do not know if their supervisors and Commanders really believe in TQM. For a philosophy that requires top-down support and everyone's participation, this finding suggests a huge problem.

The OPR/EPR (Performance Appraisal) system appears to be a key issue troubling many assigned personnel. The system is not functioning as it was designed to do. This is verified by the overwhelming number of responses stating that OPR/EPR ratings deal more with politics than performance. This reinforces another old adage, "It's not what you know, but who you know."

These problems lead to low morale and lack of motivation. They hinder the progress of the quality movement and must be dealt with if Pope AFB is to truly become a quality organization.

Applications

The results of this study should be used to develop new training courses and to tailor existing course to the needs of the personnel assigned to Pope AFB.

For example, the Awareness course is good for enlisted personnel up through the rank of E-5 or Staff Sergeant, but it should be modified to contain some statistical/metrics awareness and an introduction to the situation leadership model.

Moreover, a new course should be developed for E-6s (Technical Sergeants) and above. This course should cover (1) a basic introduction to TQM, (2) a block on application of TQM principles in the workplace with a special emphasis on empowerment and two-way communication, (3) an overview of the seven basic tools and flow charts, including when and how they should be used, and (4) an extensive block on the situational leadership model--what it is and how to apply it. "Walking the talk" and leading by example must be stressed.

In addition, supervisors and Commanders must verbalize and demonstrate their support for quality.

There is nothing that can be done locally about the OPR/EPR system at Pope; however, it can be addressed to HQAMC when they come for the Quality visit in December as a "nagging problem" that cannot be solved locally.

Perhaps an Air Force-wide PIT, including representatives of all ranks and major commands could devise a better system or disassociate the current ratings and reports from the WAPS (Weighted Airman's Promotion System) calculations.

These two applications would at least send a message to base personnel: "We hear you and are trying to do something about your concerns." Quality takes time. If workers feel supervisors and Commanders are committed, they, too, will commit to the long Quality journey.

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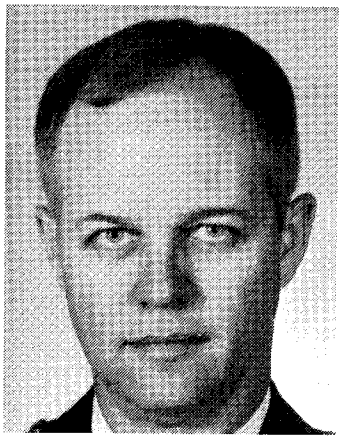
SERVICE QUALITY INDICATOR



Lt Col Don Swallom

SERVICE QUALITY INDICATOR

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ABSTRACT

As the United States Special Operations Command's Air Force component, Air Force Special Operations Command (AFSOC) provides specialized air support for USSOCOM surface forces such as Army Special Forces and Navy Seals. We thought we were doing a good job, but informal feedback indicated customers were not always satisfied. AFSOC needed to develop and institutionalize a customer feedback program. Inspired by the Federal Express (FEDEX) Service Quality Indicator (SQI) concept, based on its "Hierarchy of Horrors" model, AFSOC chartered a Process Action Team (PAT) to develop our own "Hierarchy of Horrors." The team included two members representing our customers. The customer feedback program allows for both objective and subjective feedback. We expect SQI will improve customer support and it is being used to measure progress toward achieving AFSOC strategic planning goals.

INTRODUCTION

Air Force Special Operations Command was designated an Air Force major command in May of 1990. As the commander of an Air Force major command, Major General Bruce Fister reports directly to the Air Force Chief of Staff, General Merrill McPeak. AFSOC is also the Air Force Component of the United States Special Operations Command or USSOCOM. In short, AFSOC works for two bosses, the Chief of Staff of the Air Force and the Commander-in-Chief, United States Special Operations Command.

In the Spring of this year, AFSOC took a major step forward in our quality effort by publishing our first strategic plan. The purpose of the plan is to align all AFSOC toward the same ends, improving support to our joint customers to accomplish our war fighting responsibilities. In the words of General Fister, "Our focus in developing this plan has been improved support to our customers/teammates, especially our Army and Nay comrades in arms. We are part of a joint team. Our successes are tied to theirs, and their problems are ours. We will not waiver from that focus." AFSOC does not provide a product; we provide a specialized service. AFSOC's mission is to deliver special operations combat power anytime, anywhere. Special operations combat power can be Army Rangers and Special Forces, Navy SEALs, and Air Force Special Tactics Teams, or a 105 round from a gunship.

Last year, during what we call a "hotwash" or after-action debriefing for a joint exercise, General Fister asked one of our customers how we did on a particular mission. He was told everything went well except that the aircrew put the team on the wrong drop zone! We discovered that the aircrew did not drop the team on the primary drop zone because of the weather conditions. They then proceeded to the alternate drop zone, but did not inform the team. Once the team hit the ground, they were disoriented until they realized what had happened. In the real world, this could have resulted in mission failure and even loss of lives. This specific incident supported

General Fister's belief that we need to develop and institutionalize a systematic process to obtain feedback from our customers and measure their satisfaction with our support so we could continually improve that support. General Fister's discussions with the AFSOC Quality Council led to chartering a Process Action Team (PAT) for this purpose. The team began meeting in October, 1992.

THE FEDERAL EXPRESS SERVICE QUALITY INDICATOR

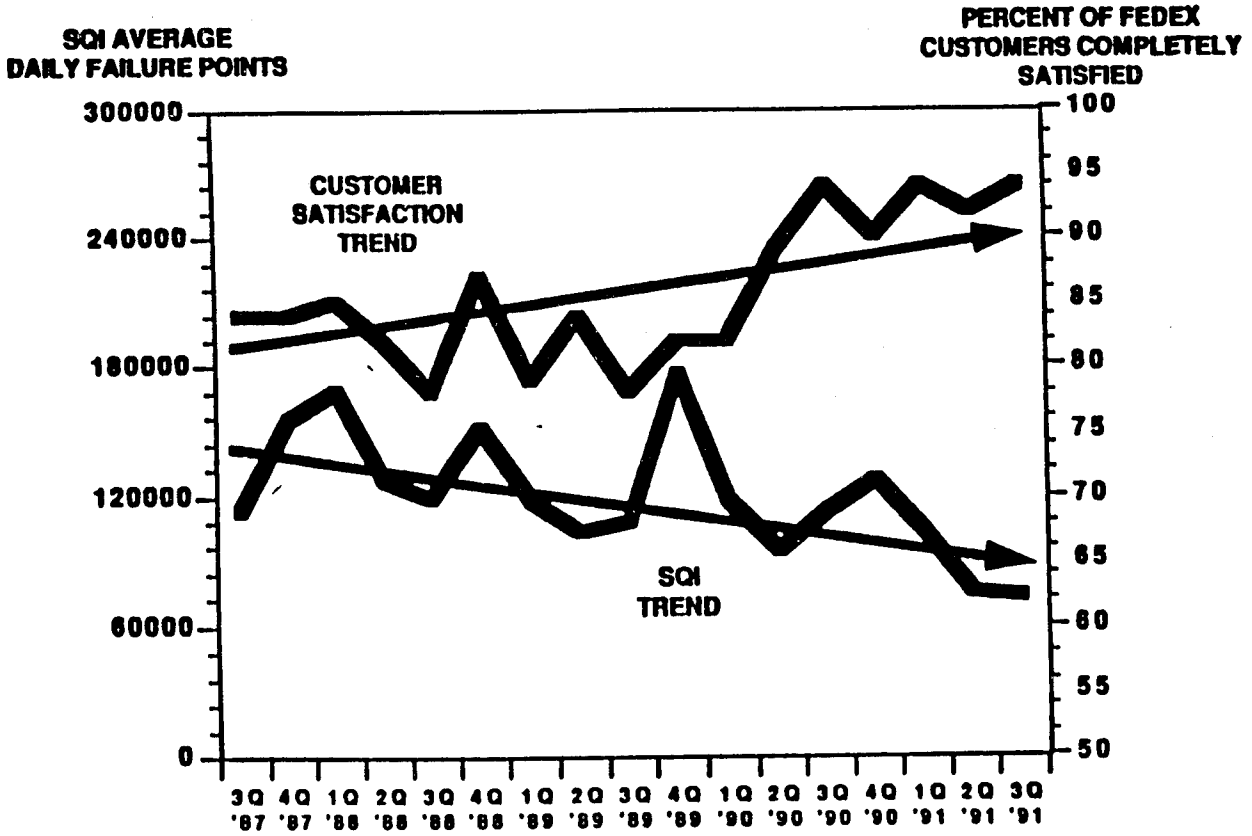
Over the course of that Summer and Fall of 1992, the senior leadership of AFSOC visited Federal Express (FEDEX) headquarters in Memphis, Tennessee participating in the Federal Express Quality Forum where FEDEX shares their approach to Quality with interested companies and agencies. In 1990, Federal Express had won the Malcolm Baldrige National Quality Award, and, until this year, they were the only service company to win it.

Customer satisfaction is very important to Federal Express. Just a one percent level of dissatisfaction means tens of thousands of unhappy customers. Usually, customer satisfaction is expressed in various subjective degrees, such as "I am very satisfied," or "I am extremely dissatisfied." But according to Frederick W. Smith, Chairman, CEO, and Founder of Federal Express, "We believe that service quality must be mathematically measured." In the late 1980s, Federal Express developed what they refer to as their "Hierarchy of Horrors." These are critical institutional events defined as anything that could go wrong from a customer's viewpoint. Examples include lost packages, damaged packages, late deliveries, missed pickups, and tracer actions. The company also considered such things as paper mistakes, billing errors, and employee performance failures. However, while the "Hierarchy of Horrors" and FEDEX's customer satisfaction surveys identified factors that drove customer dissatisfaction, they did not provide the kind of information that would allow management to anticipate and eliminate complaints before the call or letter comes in. The next step for FEDEX was to prioritize the list from the customers perspective and assign a weighted value to the "Horrors." The more critical the problem, the higher the point value. The following represents the Federal Express SQI model and is taken from Blueprint for Service Quality, The Federal Express Approach:

INDICATOR	WEIGHT	INDICATOR	WEIGHT
Abandoned Calls	1	Missed Pickups	10
Complaints Reopened	5	Missing Proofs of Delivery	1
Damaged packages	10	Overgoods (Lost and Found)	5
International*	1	Right Day Late Deliveries	1
Invoice Adjustments Requested	1	Traces	1
Lost packages	10	Wrong Day Late Deliveries	5

*Composite score from FEDEX international operations. Includes customs clearance delays.

FEDEX established procedures to track every single package using bar code readers at various steps in the shipping process and a very sophisticated communications and management information system. Federal Express accounts for every error and accumulates a daily total score. At the end of each week, they determine an average daily score. There are different ways to analyze these scores. FEDEX looks at the score as the level of customer dissatisfaction. Their ultimate goal is to continually bring this score down. The lower the score, the better. Using this score and breaking it down into its component parts, FEDEX identifies trends and areas for improvement. While upper level managers are interested in watching the numbers go down, they are also interested in spikes in the chart. Mid level managers are responsible for explaining spikes, such as weather delays, maintenance problems, or other problems at a particular hub. By plotting the overall trend, managers can not only determine customer satisfaction, but with careful analysis and using teams can determine and resolve root problems or take advantage of improvement opportunities. This chart shows actual SQI data and compares this to actual FEDEX customer satisfaction survey data.



THE AFSOC SERVICE QUALITY INDICATOR

After his visit to FEDEX, General Fister realized that the Service Quality Indicator concept could have great utility for AFSOC, since AFSOC is also in the business of delivering packages, packages of combat power for special operations. AFSOC could use its own SQI to measure our customers' level of satisfaction. So in September, 1992, as the Customer Feedback Process Action Team was being formed and trained, the team was also tasked to develop an AFSOC Service Quality Indicator along the lines of that used by Federal Express.

The process action team itself consisted of thirteen members from Headquarters (HQ) AFSOC; the 1st Special Operations Wing (1 SOW); and the 720th Special Tactics Group, all stationed at Hurlburt Field, Florida. The team members represented functions that included current operations, aircrew training, joint training, joint exercise planning, security assistance planning, contingency operations, and special tactics. In addition, the team had representation from our customers in the form of the US Army Special Operations Command (USASOC) liaisons to HQ AFSOC and 1 SOW. Over the course of three months, the team met almost twice a week. We used several Quality tools including multivoting, flow charts, checklists, and action plans but the most effective was unconstrained brainstorming. By allowing the free flow and exchange of ideas, all members felt encouraged to participate in open and frank discussions.

After the team discussed and understood the charter, the team decided to tackle the customer feedback process first and then, either integrate the SQI into the customer feedback or develop SQI as a separate process. The team's first task, when tackling the concept of customer feedback, was to identify who exactly is the "customer" we are talking about. We narrowed the focus of effort to the teams to whom we provide airlift or, as is the case with our AC-130 gunships, fire power. The customers then, are the Army Ranger and Special Forces Teams, Navy SEAL Teams, and Air Force Special Tactics Teams. Throughout the process, we focused on the four customer-supplier alignment questions. These are: What are your requirements? How are will you use what we give you? How are we satisfying your requirements? How can we improve? Using these questions as our reference, we were able to stay focused on who our customers really are and what we need to find out from them. We developed a problem statement consisting of the current state, the impact of the problem, and the desired end state. The current state and impact of the AFSOC Customer Feedback Process are as described earlier in this discussion. The team determined that we needed four things for our desired end state. First, the customer has to have an opportunity to provide feedback. Second, the feedback has to be used to improve customer support. Third, the process has to be simple for the customers to understand and AFSOC people in the field to administer, yet useful to all. And finally, we have to know, up to the AFSOC Commander level, if the customer is really satisfied with our support.

The next phase of our effort involved looking at existing after-action reporting systems associated with Special Operations to see if any might provide a vehicle for the customer feedback process. With the knowledge our team members already possessed plus some additional research we discovered basically three methods of after-action reporting. The first, the Joint Universal Lessons Learned (JULLS) is used only for JCS exercises and actual operations and deals with problems that are reported by major commands up to the Joint Staff and then disseminated to the other services and major commands. This is a long process and does not deal with the

problems at the team-to-team level. Next, we looked at the Special Operations Lessons Learned Management Information System (SOLLMIS). This system is currently used by USASOC Special Forces and Ranger units to report lessons learned to USASOC for dissemination to their other units. This system is currently being evaluated by USSOCOM for application to all USSOCOM components but is not yet in place in AFSOC. If this system is implemented USSOCOM wide, it might provide the best medium to use for reporting customer feedback. The team decided it would be prudent to develop customer feedback apart from SOLLMIS and integrate with SOLLMIS, if and when this program is implemented in the future. The next existing process the team looked at was HAVE ACE (the 1 SOW joint training program). In this program, the USASOC liaison to 1 SOW debriefs the Army and Navy teams who come to Hurlburt Field to train with 1 SOW units and briefs the 1 SOW staff on feedback from these teams. The HAVE ACE approach showed the most promise of the existing systems we studied. It appeared we simply needed to incorporate some improvements to the HAVE ACE debriefing concept so we had a focus on the four customer-supplier questions and then institutionalize it across AFSOC.

Next, we concentrated on the Federal Express SQI concept. Based on the inputs from our liaison officers, we developed our own "Hierarchy of Horrors." The team decided that we should examine joint operations both in the planning and execution of training and actual operational events. With heavy reliance on our liaison officers, we were able to ascertain our customer's most important mission considerations. We came up with a list of fourteen questions. A "no" answer to any question (except question 7) constitutes a "horror." The following is the list:

1. Did you have adequate planning and rehearsal time with the crew?
2. Did our schedule meet your schedule?
3. Did you have the aircraft we told you to expect and was it properly configured?
4. Did the aircrew have the proper mission qualifications to meet your objectives?
5. Did the situation allow for development of a joint backup plan?
6. Did you implement the backup plan?
7. Did we impose limitations on your requirements?
8. Were we flexible to your required changes?
9. Did the on-board communications plan work?
10. Did the air-to-ground communications plan work?
11. Were the safety risks adequately assessed and briefed by the aircrew?
12. Did we meet your time over target or time of arrival?
13. Did we hit the right drop zone, landing zone, or target?
14. Did the assigned AFSOC crew meet your mission requirements?

We realized that some of the questions were subjective in nature. We were faced with the dilemma of how to put a quantitative measure on a qualitative process? After reconsidering the questions, we believed they were useful and we just needed a means to quantify them. We were still intent on using the FEDEX SQI concept. By rephrasing the questions we were able to put a value on the responses. As an example, let's examine the question, "Did you have adequate planning and rehearsal time with the crew? Yes or No? If no, what was the impact on your objectives?" If the respondent answered "Yes," no problem occurred. If he answered "No," then we had to determine the impact of this on his satisfaction with the support. Each question was

given the following four additional responses defined as follows:

a No impact - a problem occurred, but it had no impact on the mission objectives.

b. Marginal impact - a problem occurred, but the team was able to adjust to accomplish its mission objectives.

c. Significant impact - a problem occurred causing some mission objectives to not be met.

d. Major impact - a problem occurred causing most or all of the mission objectives to not be met.

Customers won't be aware that their responses will end up contributing to an SQI. They will only know they are providing feedback on AFSOC's support to their mission. Each mission impact response will be weighted as follows and become a value that adds to the SQI.

No impact - 0 Marginal impact - 1 Significant impact - 5 Major impact - 10

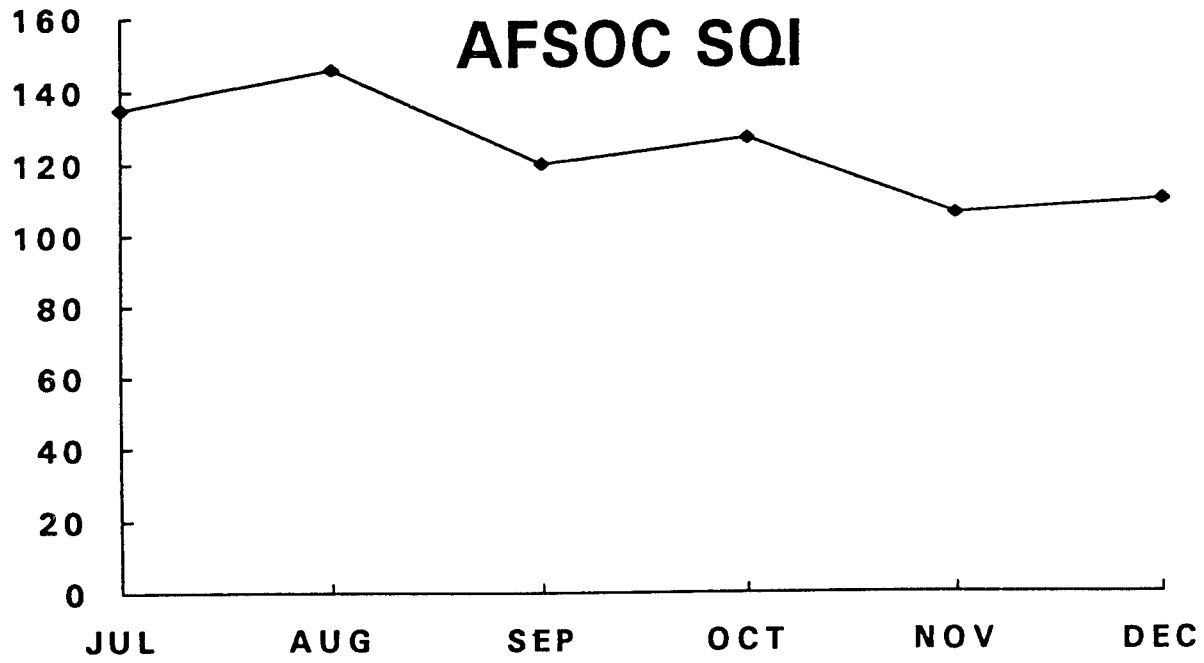
The primary difference between the FEDEX SQI and AFSOC SQI is based on the difference between the service we provide. FEDEX's service for the majority of their customers is to get packages from point A to point B within a specified period of time in one piece. Therefore, the impact of their errors is assumed to be the same in every case. Further, the FEDEX SQI is automatically determined using their sophisticated tracking system. On the other hand, AFSOC's service varies depending on the mission requirements of the teams we transport or provide with fire support. They have their own mission objectives to which we tailor our support. Consequently, the customer must determine the impact of our mistakes on their mission. This can vary significantly from mission to mission. For example, a specific time on target may be critical so a SEAL team can coordinate with other teams during a mission and an AFSOC crew's failure to make this time may blow the entire mission. On another mission, the timing may be no factor at all. Further, AFSOC has no sophisticated management information system to track the delivery of our customers. We have no way to put a bar code on a Special Forces troop's forehead and determine if he arrives at his destination by 10 o'clock the next day. We have to depend on our normal administrative channels to get feedback from the customer and transmit the SQI data to Headquarters AFSOC until such time as AFSOC has a command-wide management information system, such as SOLLMIS, in place. Consequently, we will not compile the AFSOC SQI more frequently then monthly as opposed to weekly as FEDEX does.

Basically, what we have developed is a fourteen question survey. It provides our customers an opportunity to provide feedback and provides us a means of determining their level of satisfaction. We emulated the Federal Express concept of "Hierarchy of Horrors," but we allowed the customer to determine the impact of our error on the objectives of his mission, in essence, the customer's satisfaction with the quality of our service.

Presently, we are working with our sister components, Naval Special Warfare Command and United States Army Special Operations Command, to implement this program. During our test

phase, from May to July of this year, we received very favorable feedback. We think this is because our customers believe we are sincerely trying to improve our support. Over the course of a month, AFSOC may drop 30 to 40 teams plus any fire support or special tactics missions we may conduct. By adding up all the points, we can determine the overall level of customer satisfaction or dissatisfaction.

AFSOC's SQI has been incorporated into the metrics of the AFSOC Strategic Plan. It will be used to appraise one of AFSOC's six goals, "Enhance Combat Readiness" by measuring a subordinate objective, "Improve Combat Training," specifically, AFSOC's joint training with our customers. This measurement will be briefed to the AFSOC Commander on a monthly basis. The results will look something like this:



As you notice, we show the scores coming down over time. This should indicate, as with FEDEX, that the overall level of customer satisfaction and mission accomplishment are going up. We believe this model will meet the four criteria for the desired state of our problem statement described earlier. The process offers the customer an opportunity to provide feedback. The feedback will identify problems whose resolution will enable us to provide better support. Using a customer survey with straight forward questions and response should prove to be simple for our customers and AFSOC personnel to administer, yet useful from the team level up to Headquarters AFSOC. And finally, the process will show the Commander and senior leadership of AFSOC, the overall level of customer satisfaction.

LESSONS LEARNED

Although we have not fully implemented the program yet, the AFSOC Quality Council was extremely pleased with this new process. From this process action team effort, we learned two important lessons. We can benchmark against a recognized world-class organization and there is no need for us to "reinvent the wheel" when it comes to implementing Quality in an organization. Part of the Quality improvement process is to build upon the good ideas of others. Our senior leadership recognized a good idea and tasked a team to tailor it to meet AFSOC's needs. Second, include your customer as part of your team, whenever you can. Customer involvement was absolutely essential to develop this process aimed at improving customer service.

CONCLUSION

Quality concepts such as the FEDEX Service Quality Indicator can be applied to the operational Air Force and be effectively employed to identify and fix problems, and take advantage of improvement opportunities. The AFSOC Customer Feedback Program which uses this Service Quality Indicator model will enable General Fister and the rest of AFSOC to discern just how well we are meeting our customer' requirements and whether our efforts to improve the quality of our support are effective.

ACKNOWLEDGEMENT

A special thanks to Major Aryea Gottlieb who served as facilitator for the AFSOC Customer Feedback Process Action Team. He personally contributed much to the detailed work associated with this project and to this paper, as well. I would also like to thank Lieutenant Colonel Sam Smith, USASOC Liaison to AFSOC, and Chief Warrant Officer Vernon Ward, Ground Liaison to 1 SOW, for giving us that "customer perspective" and testing the feedback process with Army and Navy teams training at Hurlburt Field. Finally, thanks to the other members of the PAT for making time in their busy schedules to contribute their expertise and do a little brainstorming.

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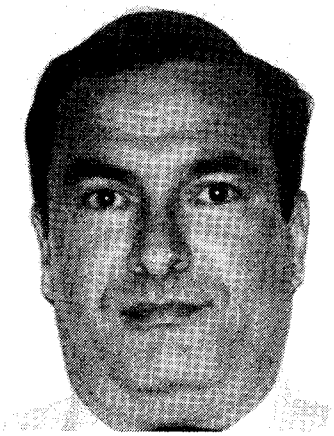
SATISFACTION SURVEYS: HOW TO DETERMINE WHAT THE CUSTOMER REALLY WANTS AND EXPECTS FROM THE SERVICE INDUSTRIES



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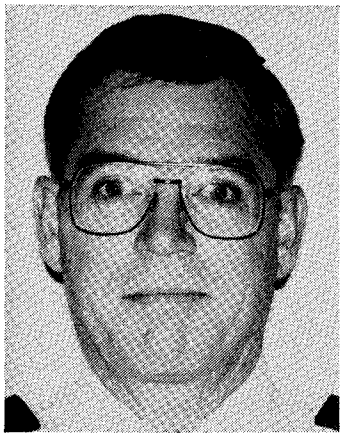
CMSgt Raymond Paige



Col Yowell Sherill

SATISFACTION SURVEYS: HOW TO DETERMINE WHAT THE CUSTOMER REALLY WANTS AND EXPECTS FROM THE SERVICE INDUSTRIES

by

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&

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One of the cornerstones of any quality effort is customer satisfaction. The problem in the service sector is to define what satisfies the customer. Unlike manufacturing industries where a product can be made "fit for use" or defect free through a system of process improvements before it gets to the customer, quality in the service sector is totally perceptual in nature and includes not only the outcome of the service but also how it is delivered.

In their pioneering work on customer expectations in the service industries, Zeithaml, Parasuraman and Berry (1990) used focus groups to develop a model for service quality that defined quality in terms of a discrepancy between expectations of what was important to a customer and how the customer perceived that the service was delivering that feature. These authors also delineated factors which can shape a customers' expectations (past experiences, word-of-mouth communication, personal needs and external communication) as well as the dimensions which customers use to judge how well quality was delivered (Tangibles, Reliability, Responsiveness, Assurance and Empathy). They devised a survey instrument, SERVQUAL to quantify customer expectations and perceptions along these five dimensions. Quality efforts could then be judged upon how well these efforts eliminated the "GAPs" between the expectations and perceptions of the customers. In health care research, this is very similar to Pascoe's "Contrast Model" (Steiber and Krowinski, 1990)

Focus groups have been used in marketing research for the past 30 years as a tool to discover people's opinions and the reasons for those opinions.(Kreuger, 1988) This method employs non-directive interviews with groups of people who have similar experiences with a particular product or issue. A trained moderator conducts these groups usually with about 10 participants in a comfortable, non-threatening environment. The subject matter is presented and the group members use each others ideas and comments to stimulate their own thought processes and the resulting synergy yields valuable information about the respondents' perceptions. Focus groups differ from more traditional structured interview procedures or self-administered questionnaires in that these former methods are limited by choices already decided upon by the developer of the survey. Hence they can be susceptible to some degree of bias. Some investigators have even suggested that focus groups be used to design survey instruments in novel populations. (O'Brien, 1993, and Wolf, Knodel and Sittitrai, 1993)

The delivery of quality health care has been the subject of concern for many agencies both

within the Air Force (Health Services Inspections) and exterior to the agency (JCAHO). Part of the quality assurance regulation (AFR 168-13) is the surveying of patients as to their perceptions of care. While there are many examples of surveys which purport to assess health care quality, there is a lack of research-based survey tools specific to the Dental Services. Assessment of quality in this specialty is usually based upon the restorative features (durability, conformance to standards, appearance) of the outcome and whether the dental procedure was performed in a timely and painless manner. The purpose of this study was to develop a self-administered survey which measures patient satisfaction in the delivery of Dental Services. Central to this survey's development was the determination of the patients' expectations and perceptions of quality as they related to this delivery of care. Focused Groups were used to establish the dimensions of care and to design the survey instrument.

METHODS

Subjects:

Subjects for the focus groups were drawn from the Active Duty Air Force population base of the Department of Dental Services, David Grant USAF Medical Center (DGMC), Travis AFB, CA. Squadrons on base were asked to send individuals who had used the Dental Services at DGMC during the last calender year. The groups were stratified by rank. One group was composed of members in the ranks of Master Sergeant to Chief Master Sergeant. Another was made up of members in the ranks of Captain and Major, while the third group was composed of Airman to Senior Airman. The groups were stratified by rank in order to encourage the free expression of ideas and to lessen the risk of deferring opinions due to the presence of senior ranking NCO's or Officers. Both genders were asked to participate. The groups were conducted over a 75 to 90 minute period. There were two moderators present who directed the discussion and who took notes of the proceedings.

Initial questions offered by the moderators were structured to elicit responses along the five dimensions of quality (Tangibles, Reliability, Responsiveness, Assurance and Empathy) mentioned by Zeithaml et Al (1990). Also, the moderators sought out factors that influenced expectations of the respondents to quality dental care.

Questions:

What do you think about dental care and going to the dentist?
What do you think about coming to this dental service?
What prompted you to go to the dentist the last time?
What did you like or dislike about it?
What do your friends, or people you work with say about this dental service?
How do you want to be treated here?
What do you think about the clinic areas, both waiting rooms and treatment areas?

Following each group, a draft of a survey was given to the respondents and they were asked to critique the questions, format and distribution plan. This survey was developed from input from members of the Dental Executive Committee.

RESULTS

Tangibles

All groups felt that neat and clean areas were important and contributed to a sense of patient safety. Reading materials should be kept available and be of a nature that could be read in a 15 minute time period. Many respondents were knowledgeable about infectious disease precautions and expected these to be followed. These precautions were not viewed as being of a nuisance but a necessity.

Reliability

There was an overwhelming consensus that all dental work be done in a "one-stop" session if at all possible. Dependent care was a major concern as was the quality of third party insurance plans. Continuity of care was also expressed as a quality expectation.

Responsiveness

People wanted appointments to be convenient for themselves and their subordinates. Mission aspects such as flying status, mobility and shift work should be taken into consideration when planning appointments. Prompt sick call procedures were also a concern particularly when a patient was in pain. All groups agreed that waiting times should be minimal for all procedures. The range of acceptable times was from 5 to 15 minutes.

Assurance

People wanted to feel that they were important when they were in the clinic waiting for services. This began with the appointment process, continued with how they were greeted at check-in, in the waiting areas, and as each procedure was performed. There was a universally high expectation for information. The customers wanted to know why a particular procedure was being done, what type of follow-up care was needed, what was happening as it was occurring and the results particularly if they were not optimal.

Empathy

Another major expectation was in the area of sensitivity to the patient. Besides being given information about what was occurring, patients wanted the dental staff to realize that the patients had needs after a procedure was performed. Concerns such as rides home, duty excuses and waiting for prescriptions while uncomfortable should be considered before beginning a procedure. Accomplishing the Dental Patient Medical History Forms annually when the patient's health status had not changed had a negative effect on this dimension. Redoing the paperwork contributed to a sense that the provider had not read the chart from the previous visit. It was also generally agreed that all ranks be treated equally during the dental visit.

These group meetings contributed to the development of a 24 question survey designed to measure the five dimensions on two scales.(Atch 1) The first scale represents the expectation of the patient on each item in terms of its importance to the patient. The second scale measures how well the item was performed by the dental staff for that visit. A seven point scale was used in which "1" represented "Very Low" and "7" represented "Very High" ratings. The differences between importance and performance can be quantified and the discrepancy used to guide quality

improvement efforts. Questions 1 through 15 are designed to measure these dimensions. Questions 16 and 17 assess validity while questions 18 to 22 measure demographics.

DISCUSSION

The results from this study indicate that dental patients have very high expectations of quality service. The similarity of these expectations to those mentioned by Zeithaml et Al (1990) in their research on service industries was initially designed into the questions for the focused groups. However these dimensions (Tangibles, Reliability, Responsiveness, Assurance and Empathy) offered a starting framework to discuss quality of dental care and were adequate to qualitatively sort the expectations of our group members in regards to dental care.

The use of the focus groups as a starting point to delineate quality features of dental care and to assist in the development of a survey tool to measure this quality was invaluable. Further utilization of this technique to ascertain customer expectations should be encouraged. In order to measure quality from the customers perspective, one needs to know what the customer is thinking. Quality service does not happen by accident. (Losordo and Rossi, 1993)

One might ask why a non-profit service organization with a "captive customer base" who must use that service, would be concerned with customer input. In manufacturing industries one can measure waste, put a price tag on it, and use it as a metric to improve the process. In service industries, a dissatisfied customer can result in a serious drain upon several scarce resources. Negative feedback from customers decreases morale, increases stress and often requires allocation of resources to resolve the issue. The staff can also be taxed by having to formally answer complaints, deal with patients' non-compliance with treatment and schedule unnecessary follow-up appointments. A satisfied customer can provide the staff positive feedback which is a definite morale booster and stress reducer.

Should we as managers fear a customer, who is without the necessary skills we have to perform our particular job, telling us how to perform our job? Do not we as experts know what is best? The answer found from this study is that the customer is a valuable member in the service process. In the focus groups, the patients always assumed a high level of technical expertise of the provider. Problems in perceived quality developed when information was not shared with the patients. These patients did not pretend to know dentistry but they did know when they were treated in a manner which was not up to their expectations.

In conclusion, it is vitally important to listen to our customers. Their perceptions of the quality of services provided is an excellent indicator of the overall function of dental service processes. Unhappy customers may indicate that processes are broken.

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DEPARTMENT OF DENTISTRY
PATIENT SATISFACTION SURVEY

TO OUR PATIENTS,

Our goal is to provide you quality dental care with dignity and sensitivity. Please help us help you by taking a few minutes to complete the following survey.

If you would like a personal reply, please provide your name and phone number on the FOLLOWING lines.

_____

_____

Thank you for your feedback.

THE ENTIRE DGMC DENTAL SERVICE STAFF

DIRECTIONS

EACH SCALE IS NUMBERED FROM 1 TO 7. WHEN USING THIS SCALE CONSIDER A "1" AS "VERY LOW" AND A "7" AS "VERY HIGH". . . . . 1 2 3 4 5 6 7 ☐ ☐ ☐ ☐ ☐ ☐ ☐

HOW IMPORTANT ARE THE FOLLOWING FEATURES IN AN EXCELLENT DENTAL SERVICE, AND HOW DOES THIS DENTAL SERVICE PERFORM ON THESE FEATURES.

1. Ease of obtaining THIS appointment.

	1 2 3 4 5 6 7		1 2 3 4 5 6 7
1. IMPORTANCE .	☐ ☐ ☐ ☐ ☐ ☐ ☐	PERFORMANCE . .	☐ ☐ ☐ ☐ ☐ ☐ ☐

2. Timeliness of today's appointment. (Being seen when you needed to be seen.)

	1 2 3 4 5 6 7		1 2 3 4 5 6 7
2. IMPORTANCE .	☐ ☐ ☐ ☐ ☐ ☐ ☐	PERFORMANCE . .	☐ ☐ ☐ ☐ ☐ ☐ ☐

3. Today's appointment being convenient to your other duties.

	1 2 3 4 5 6 7		1 2 3 4 5 6 7
3. IMPORTANCE .	☐ ☐ ☐ ☐ ☐ ☐ ☐	PERFORMANCE . .	☐ ☐ ☐ ☐ ☐ ☐ ☐

4. Received in a courteous manner.

	1	2	3	4	5	6	7		1	2	3	4	5	6	7
4. IMPORTANCE .	❑	❑	❑	❑	❑	❑	❑	PERFORMANCE . .	❑	❑	❑	❑	❑	❑	❑

5. Being seen on time.

	1	2	3	4	5	6	7		1	2	3	4	5	6	7
5. IMPORTANCE .	❑	❑	❑	❑	❑	❑	❑	PERFORMANCE . .	❑	❑	❑	❑	❑	❑	❑

	Yes	No
6. Were you seen today on, or before, your scheduled time?	❑	❑

7. How long past your scheduled appointment time did you have to wait? (In minutes) . . . . . [ ]

	Yes	No
8. Did you complete paperwork for this visit (OTHER THAN THIS SURVEY)?	❑	❑

9. If Yes, the reasons for paperwork were explained.

	1	2	3	4	5	6	7		1	2	3	4	5	6	7
9. IMPORTANCE .	❑	❑	❑	❑	❑	❑	❑	PERFORMANCE . .	❑	❑	❑	❑	❑	❑	❑

10. Treatment explained to your satisfaction.

	1	2	3	4	5	6	7		1	2	3	4	5	6	7
10. IMPORTANCE .	❑	❑	❑	❑	❑	❑	❑	PERFORMANCE . .	❑	❑	❑	❑	❑	❑	❑

11. Follow-up care instructions given in an understandable manner.

	1	2	3	4	5	6	7		1	2	3	4	5	6	7
11. IMPORTANCE .	❑	❑	❑	❑	❑	❑	❑	PERFORMANCE . .	❑	❑	❑	❑	❑	❑	❑

12. Questions answered completely

	1	2	3	4	5	6	7		1	2	3	4	5	6	7
12. IMPORTANCE .	❑	❑	❑	❑	❑	❑	❑	PERFORMANCE . .	❑	❑	❑	❑	❑	❑	❑

13. Feeling comfortable and relaxed.

	1	2	3	4	5	6	7		1	2	3	4	5	6	7
13. IMPORTANCE .	❑	❑	❑	❑	❑	❑	❑	PERFORMANCE . .	❑	❑	❑	❑	❑	❑	❑

14. Your primary reason for appointment was accomplished.

	1	2	3	4	5	6	7		1	2	3	4	5	6	7
14. IMPORTANCE .	❑	❑	❑	❑	❑	❑	❑	PERFORMANCE . .	❑	❑	❑	❑	❑	❑	❑

15. Neat and clean areas.

	1	2	3	4	5	6	7		1	2	3	4	5	6	7
15. IMPORTANCE .	❑	❑	❑	❑	❑	❑	❑	PERFORMANCE . .	❑	❑	❑	❑	❑	❑	❑

16. I am extremely satisfied with the Dental Care I received today.

❑ Strongly Agree
❑ Agree
❑ Mildly Agree
❑ Mildly Disagree
❑ Disagree
❑ Strongly Disagree

17. If I had the choice, I would not hesitate to choose this Dental Service over any other military Dental Service for my care.

❑ Strongly Agree
❑ Agree
❑ Mildly Agree
❑ Mildly Disagree
❑ Disagree
❑ Strongly Disagree

18. Please check the type(s) of appointment(s) you had today

❑ EXAM
❑ CLEANING (PROPHY)
❑ FILLING PERFORMED
❑ ORAL SURGERY
❑ GUM DISEASE (PERIODONTICS)
❑ CROWNS and BRIDGES (PROSTHODONTICS)
❑ ROOT CANAL (ENDODONTICS)
❑ BRACES (ORTHODONTICS)
❑ CHILD DENTISTRY (PEDODONTICS)
❑ HOSPITAL DENTISTRY
❑ URGENT CARE (SICK CALL)
❑ OTHER _____

19. What is THE PATIENT'S beneficiary status?

❑ ACTIVE DUTY
❑ DEPENDENT, ACTIVE DUTY
❑ RETIRED
❑ DEPENDENT, RETIRED

20. What is your rank?

❑ E1 to E4
❑ E5 to E6
❑ E7 to E9
❑ O1 to O4
❑ O5 to O6
❑ O7 to O10

	Yes	No
21. Are you on flying status?	❑	❑
22. Are you on mobility status?	❑	❑

THANKS FOR STAYING WITH US SO FAR!
PLEASE TURN THE PAGE FOR THE LAST SEVERAL QUESTIONS>

23. Was there anyone here who should be recognized for excellent service today? _____

_____

_____

_____

_____

_____

_____

24. Tell us what we can do better. _____

_____

_____

_____

_____

_____

_____

_____

_____

IF YOU WISH TO DISCUSS ANY MATTER CONCERNING YOUR DENTAL CARE OVER THE PHONE, IN CONFIDENCE, PLEASE CONTACT THE DENTAL PATIENT ADVOCATE AT 7-7012.

THANK YOU FOR YOUR TIME!

PLEASE DROP THIS OFF IN THE BOX IN THE LOBBY OR USE THE DISTRIBUTION ENVELOPE AND RETURN TO DGMC/SGD

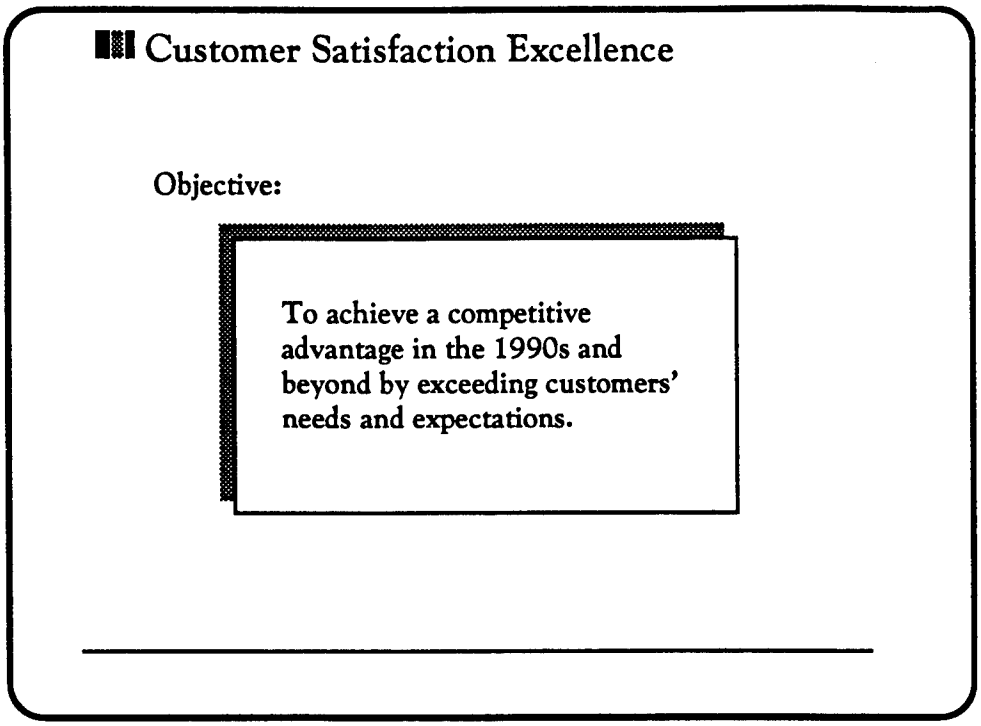
WORLD CLASS CUSTOMER SATISFACTION

Roderick McNealy

WORLD CLASS
CUSTOMER
SATISFACTION

RODERICK M. McNEALY

Johnson & Johnson
HOSPITAL SERVICES INC.



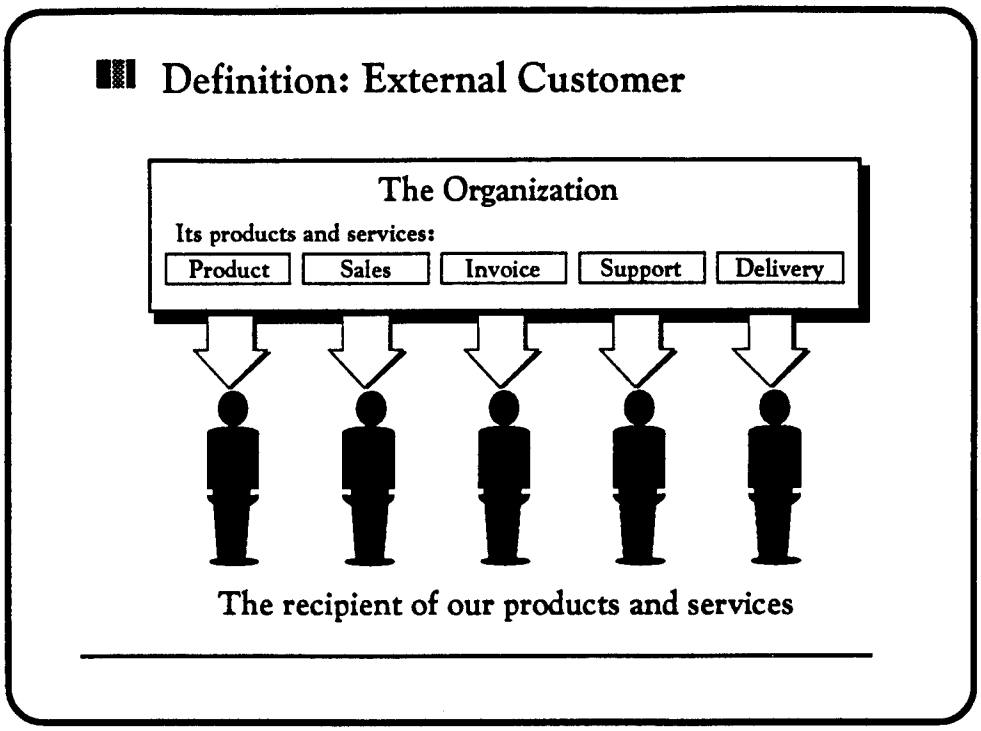
1 World Class Customer Satisfaction

World Class Customer Satisfaction is about achieving a competitive advantage in the 1990's and beyond by exceeding our customers' needs and expectations.

For many years, product performance and competitive pricing have been the major keys to business success. Clearly, they remain important, even critical. We continually see the quality of the products and services we compete with improving— and there is ongoing pricing pressure to hold costs yet improve our margins.

However, in the 1990's and beyond, we are also going to be forced to address the necessity of meeting and exceeding the increasingly demanding needs and expectations of our customers. These needs and expectations relate not only to the quality of our products and services but also to our related services such as billing, credit, customer service and delivery. Satisfying customers in all these areas is going to be crucial to our success. □

Notes:



2 Definition: External Customer

First, two key terms: "customer" and "World Class Customer Satisfaction." We define "customer" as "the recipient of our products and services."

There is an extended definition of *customer* on the following page, but for now we will use this simple working definition.

Though we all have *internal* customers, we'll focus on our *external* customers for whom we all have responsibility, regardless of whether we have contact with them or not.

We are focusing on the external customer today because if we do not quickly set about exceeding that customer's needs and expectations, we may not be around to consider the needs and expectations of our internal customers.

Edwards Deming says: *"The customer is the most important part of the production line. Without someone to purchase our product, we might as well shut down the whole operation."*

Everything we will discuss today about our external customers can just as easily be applied to our internal customers. □

A CUSTOMER

1. **A Customer** is the most important person in any business.

2. **A Customer** is not dependent on us. We are dependent on them.

3. **A Customer** is not an interruption of our work. They are the purpose of it.

4. **A Customer** does us a favor when they call. We are not doing them a favor by serving them.

5. **A Customer** is a part of our business, not an outsider.

6. **A Customer** is not a cold statistic. They are flesh and blood human beings with feelings and emotions like our own.

7. **A Customer** is not someone to argue or match wits with.

8. **A Customer** is a person who brings us their wants. It is our job to fill those wants.

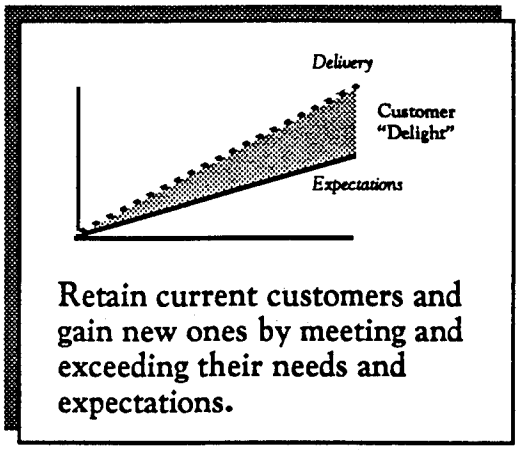
9. **A Customer** is deserving of the most courteous and attentive treatment we can give them.

10. **A Customer** is the life-blood of this and every other business.

11. **A Customer** is the person that makes it possible to pay our salaries.

Customer Satisfaction Excellence

Strategy:



Retain current customers and gain new ones by meeting and exceeding their needs and expectations.

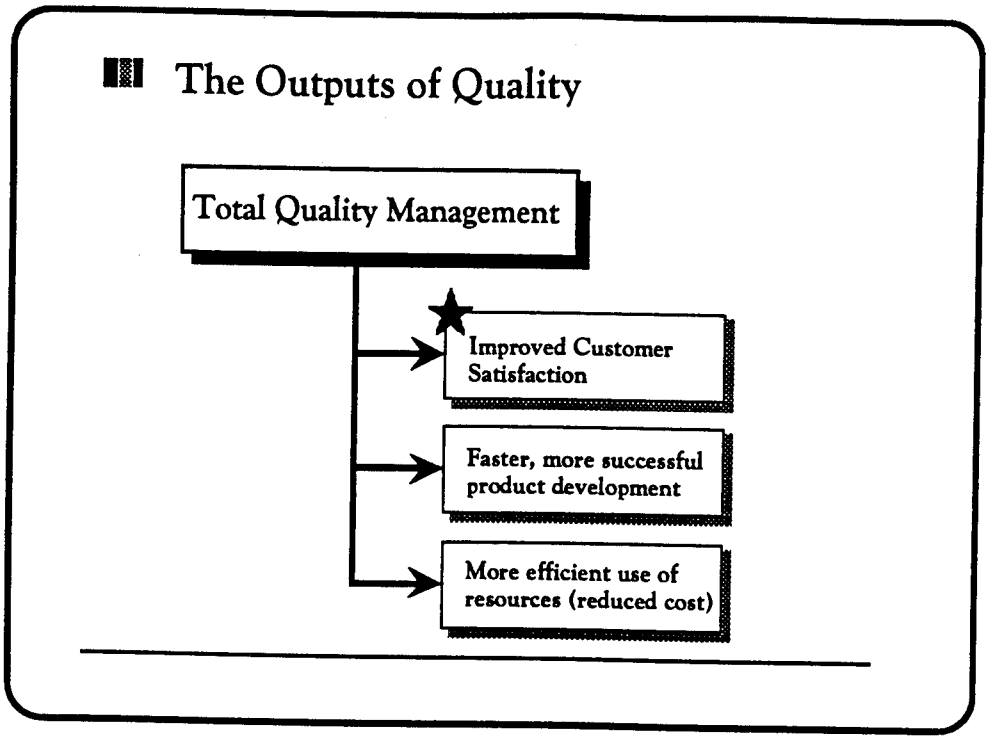
3 World Class Customer Satisfaction

Next, we want to define what we mean by "World Class Customer Satisfaction." Our strategy of **World Class Customer Satisfaction** is to profitably achieve our business objectives by retaining current customers and gaining new ones by continually meeting and exceeding their needs and expectations in every part of our organization.

We should not be content to merely **satisfy** customers, or to merely **meet** their expectations. Customers who are merely "satisfied" may be loyal until a more attractive alternative appears and then they will abandon us immediately.

Our goal must be to exceed our customers' expectations—to "delight" our customers—and to do so continuously. □

Notes:



4 The Outputs of Quality

Now that we know what we mean by a "customer" and "World Class Customer Satisfaction," how do they fit into our Total Quality Management process?

Customer Satisfaction is the key component in a Total Quality Management process. By understanding our customers and their expectations better than our competitors do, we are better able to develop and introduce profitable new products and services specifically designed to exceed those expectations.

By focusing our organization on providing the products and services our customers really want, we can reduce costs by eliminating those processes within our organization that do not add value and that are not focused on the customer. This increases our efficiency and makes us an even more formidable competitive force. □

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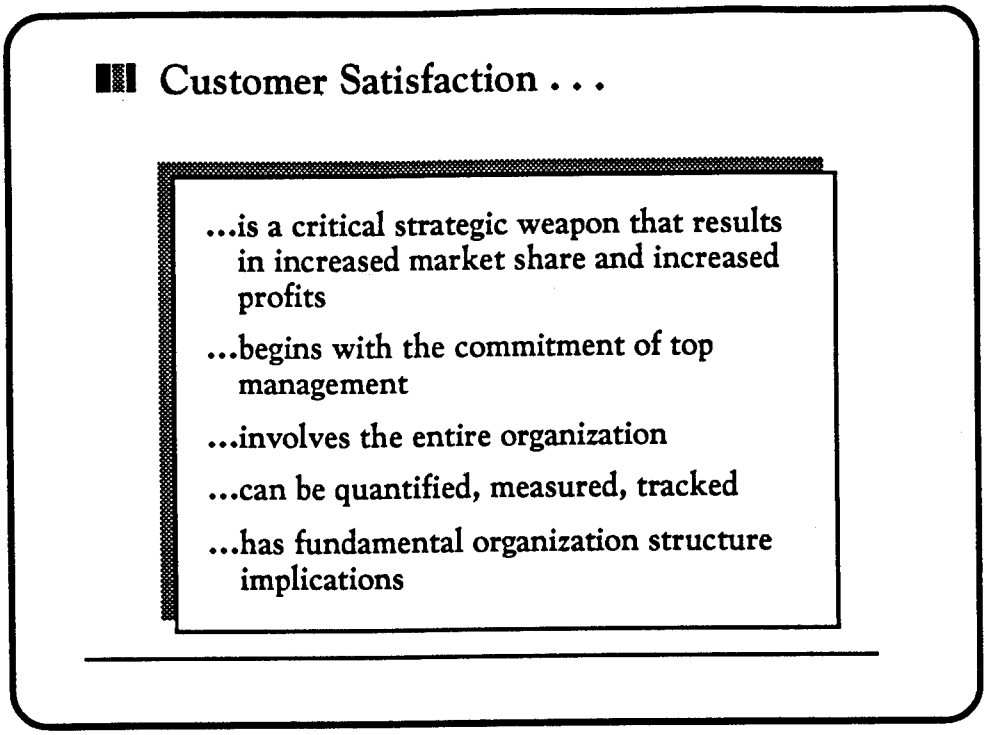


5 Customer Satisfaction . . .

Customer satisfaction is not a program or a tool in a Total Quality Management process. It is a **strategic approach** to achieving our business objectives and it has bottom-line impact. (Data relating to this will be presented in the next segment.)

Because customer satisfaction is a strategic approach, it must start at the top of the organization. All the organizations that we will reference today (and those you can read about in the materials provided or see in the recommended videos) are focused on customer satisfaction by their management in an absolute and unswerving manner. Frederick Smith, CEO of Federal Express, continually reinforces the primacy of customer satisfaction to his employees,

"The employee has to feel that he or she has the right, the authorization, or the backing to do whatever is necessary to satisfy the customer."

Because it is a strategic approach, customer satisfaction will involve the entire organization, not just those who deal directly with customers on a daily basis.

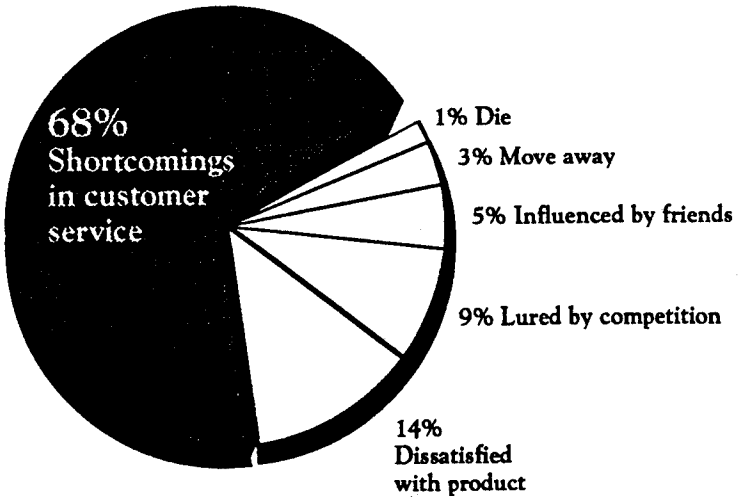
Moreover, customer satisfaction can be quantified, measured, and tracked—and not just on a one time basis. We will discuss one organization that receives *daily*

updates on their levels of customer satisfaction. Are we prepared to compete with someone with that level of customer satisfaction knowledge?

Finally, customer satisfaction has fundamental organizational structure implications. Most of our current organizational structures have been developed with our own *internal* needs in mind. They were not designed for easy access to the customer or for our customer to have easy access to our organization. We will show how the world class leaders in *World Class Customer Satisfaction* have designed their organizations to listen to the "voice of the customer," not the "voice of the organization." □

Notes:

Why Companies Lose Customers



6 Why Companies Lose Customers

This point is illustrated by the results of a recent research project which show that the lack of Customer Satisfaction, particularly with service issues, is the leading reason companies lose customers.

The 82% directly traceable to customer dissatisfaction with either the product or service dwarf any of the other reasons. Significantly, the 68% service dissatisfaction level is FIVE times that of actual product dissatisfaction. This reinforces quite clearly the critical role satisfying customers' service needs plays in *World Class Customer Satisfaction.* □

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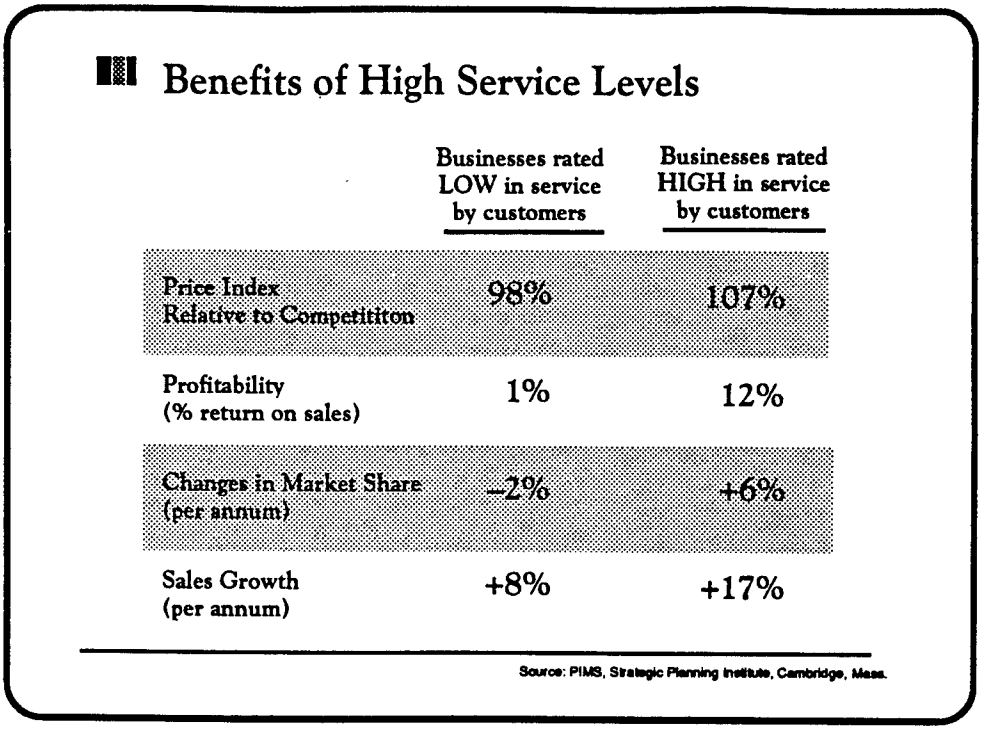

7 Benefits, High Service Levels (PIMS)

One of the reasons for this near unanimity in response concerning the importance of Customer Satisfaction is the clear "bottom line" achievements of those firms who have excelled in Customer Satisfaction.

Those firms that have been rated highly *by their customers* for satisfying their needs and expectations have achieved:

- A 7% price premium to competition.
- 12 times the return on sales of lesser rated companies.
- Significant share growth—while poorly rated companies are losing market share.
- Twice the sales growth rate. □

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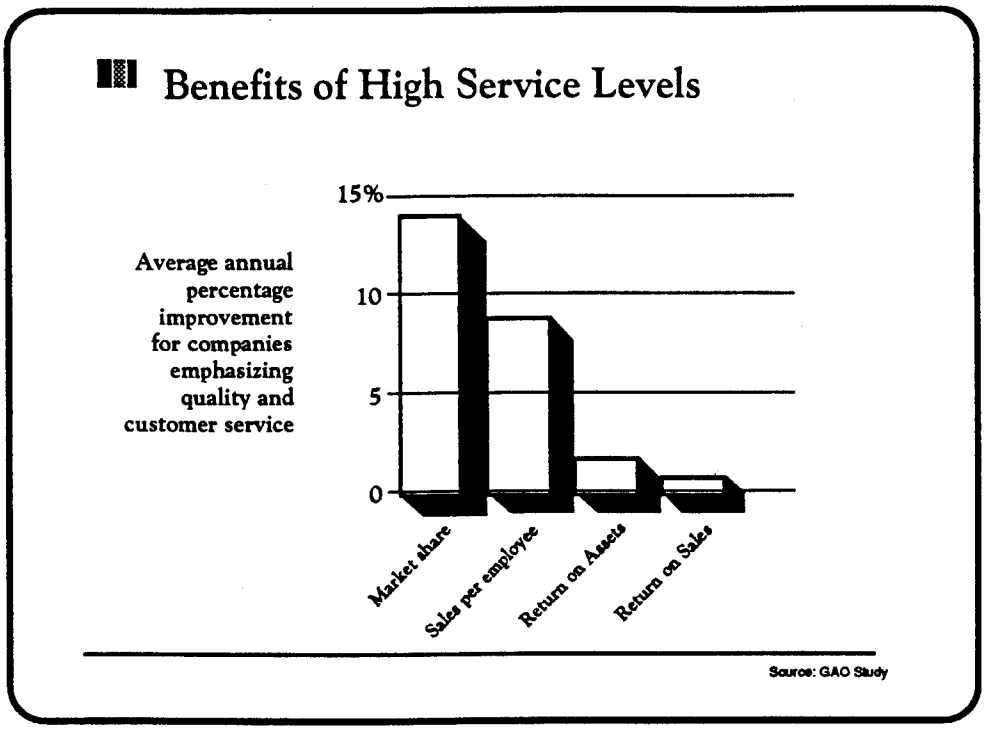

8 Benefits, High Service Levels (GAO)

These results from the PIMS study are reinforced by results reported in the Government Accounting Office (GAO) study conducted with National Quality Award winners and site visit recipients.

This study shows that these firms, which had generally very strong Customer Satisfaction results, achieved:

- Annual market share growth rates of almost 14% (13.7%);
- An average annual increase in sales-per-employee of 8.6%;
- An average annual increase in return on assets of 1.3%;
- An average annual increase in return on sales of .4%. □

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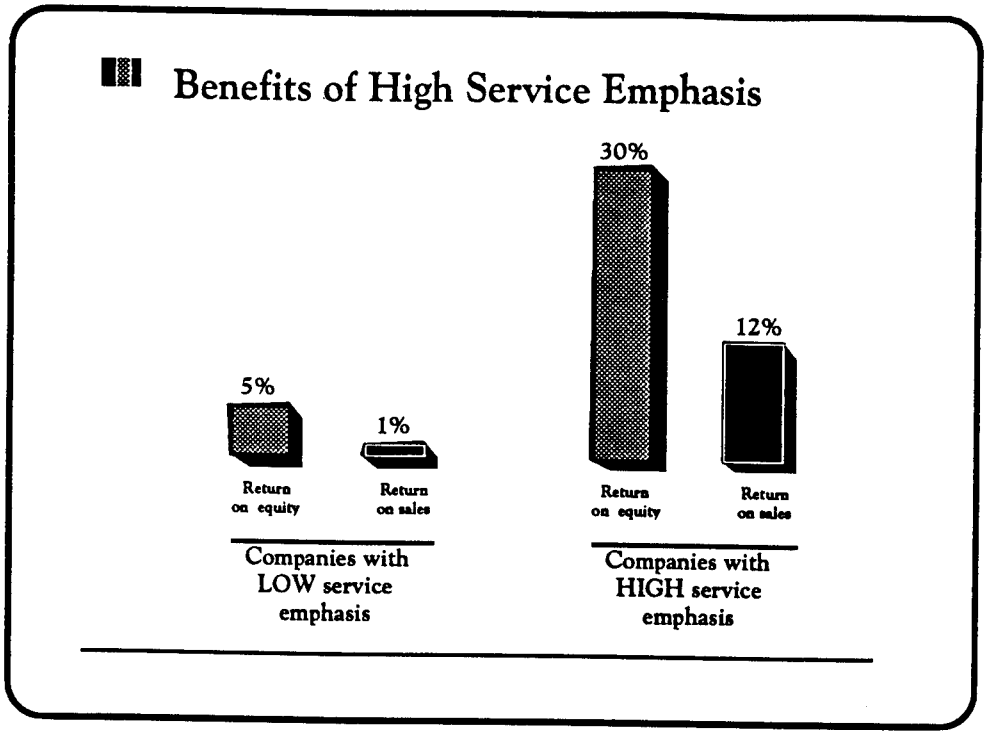

9 Benefits, High Service Emphasis

Similar results were seen in a Strategic Planning Institute study which demonstrated that firms emphasizing Customer Satisfaction and Customer Service were far more profitable than those that did not.

The study determined that by emphasizing Customer Satisfaction, these companies created increased brand loyalty and differentiated their products and services from the competition.

Investments in Customer Satisfaction were found to provide market share and financial benefits that compounded over time, whereas companies that emphasized cost efficiency over Customer Satisfaction achieved short term profits and shareholder value, but not the longer term improved operating performance of those focused on Customer Satisfaction. □

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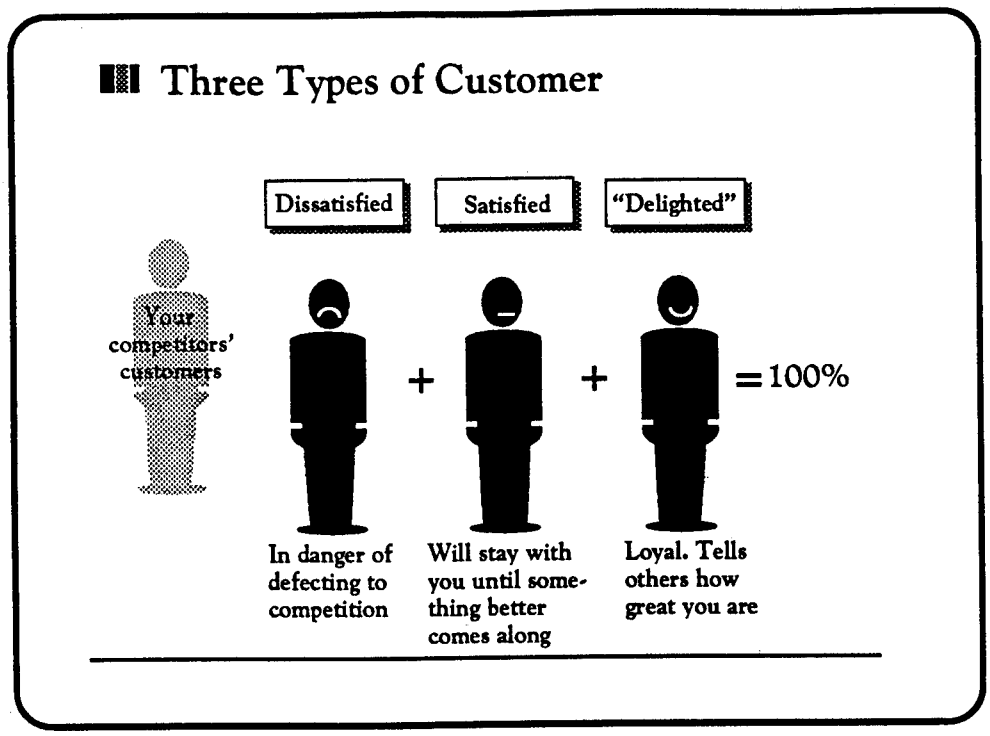

10 Three Types of Customers

There two types of customers in a broad sense—yours and your competitors'. For the moment, we are going to concentrate on *our* customers, but later we will return to the issue of attracting our competitors' customers.

Our customers fall into three basic categories:

- *Dissatisfied* and in danger of defecting to the competition at any time.
- *Satisfied* and willing to stay until something better comes along. "Satisfied" means the lack of an attractive alternative.
- *Delighted*, with needs and expectations exceeded on a continual basis. These customers are loyal and singing your praises to the world. □

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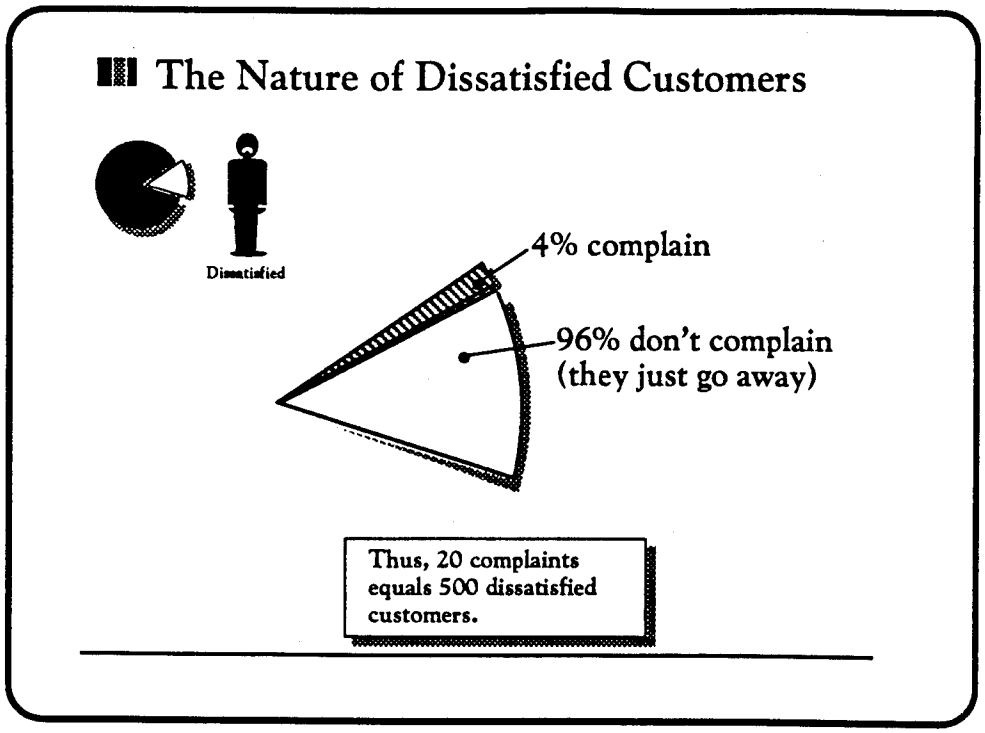

11 Nature of Dissatisfied Customers

Let's look at this slice of our customer pie we call the "dissatisfied customer." We know we have some because we hear from them on our 800 line or by letter. But we do not really have very high levels of either complaint calls or letters, so there appears to be no real problem.

Or is there?

Research by the Technical Assistance Research Programs Institute (TARP) shows that 96% of dissatisfied customers *do not complain*. They just leave and find another alternative.

That means that if you have only 20 complaints, you really have 500—or more—dissatisfied customers who are "looking for the door." □

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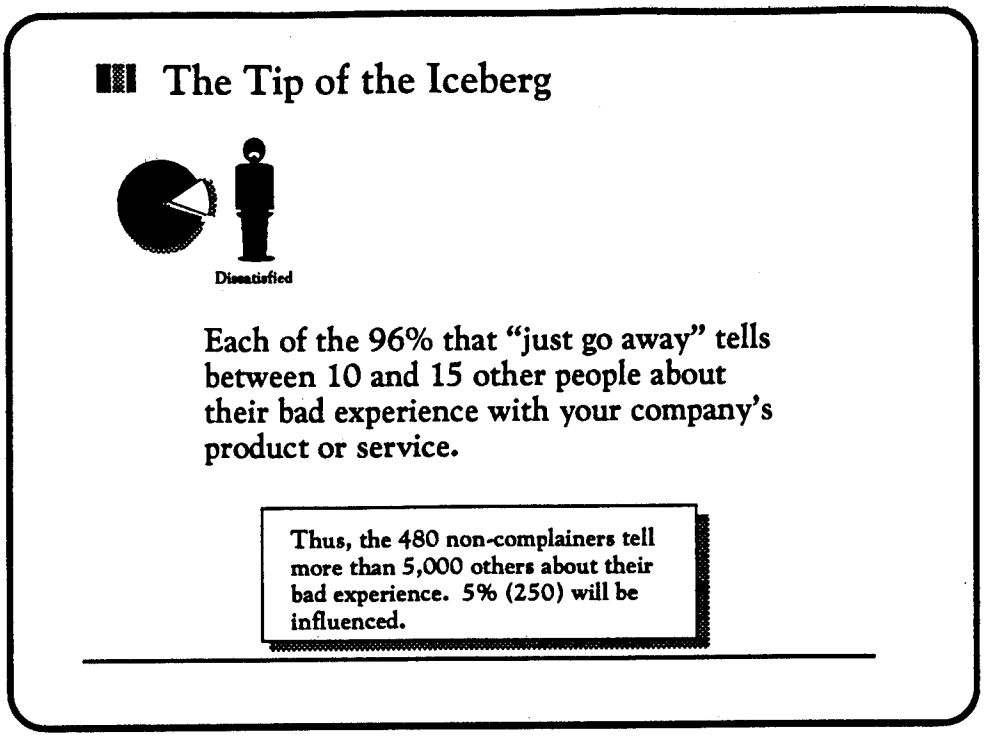


12 The Tip of the Iceberg

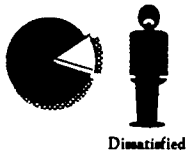
Unfortunately, these dissatisfied customers do not go away quietly. On average, they tell between 10 and 15 other people about their bad experience with you and the problem is magnified the more people they tell. Additionally, 13% of these dissatisfied customers will tell 20 or more people.

Therefore, from the 20 complaints you receive, you really have 500 dissatisfied customers of whom 480 did not bother to tell you. However, they did take the time to tell close to 5000 others about your shortcomings!

TARP has found that 5% of this 5000, or roughly 250 potential or current customers, will be seriously influenced by this "word of mouth" criticism, which is believed at twice the level as favorable comments about goods and services. □

Notes:

Complaint Resolution



Of the 4% who complain, more than half (60%) will stay if their problem is resolved. 95% will stay if their problem is resolved *quickly*.

Thus, of the 20 complainers, you can keep 12 to 19 with a responsive complaint resolution program ("hot lines" and warranties).

13 Complaint Resolution

There is some good news in the TARP data. Of the 4% who complain to you by phone or letter, 60% will remain your customers IF you resolve their problem to **their** satisfaction. **Ninty-five percent** of the 4% will remain your customers if you resolve their problem **quickly** and to **their** satisfaction.

The good news is you can keep between 12 and 19 of the 20 who originally complained to you. You have been able to do this because you had an 800 telephone line and/or a customer service department, which are really just *reactive* customer satisfaction vehicles.

Much to your chagrin, and your competitors' delight, the 480 dissatisfied customers who did not complain are gone because you never had the chance to learn of their problems or even try to solve them.

So *reactive* measures are just not enough. We need to take a *proactive* stance towards our customers. □

Notes:

The "Delighted" Customer as an Asset

The "delighted" customer has received an unexpected service from the company. He'll tell 5 other people how terrific you are. 5% will be influenced.

Thus, delight 100 customers who will tell 500 others. Two dozen may become new customers.

Source: TARP Data

14 The Delighted Customer as Asset

The same TARP data that tells us all the bad things that can happen to us through dissatisfied customers also tells us that the "delighted" customer can have a significant positive impact on our business.

The "delighted" customer tells 5 others and will have some degree of influence over them. Therefore, "delighted" customers are a sound investment and some companies clearly understand their impact.

For example, Toyota has positive "word-of-mouth" advertising from satisfied customers as one of its three strategic approaches for building their business. Discuss Nordstrom's Department Store, SAS Airlines, even the famous Stew Leonard's outlet dairy store in Connecticut, and you will hear one great story after another. What would we pay to have this type of positive, enthusiastic public relations? Do our customers feel this way about us? Do we even know if they do?

After today, we will know how to determine exactly what our customers need and expect, and how they perceive us. □

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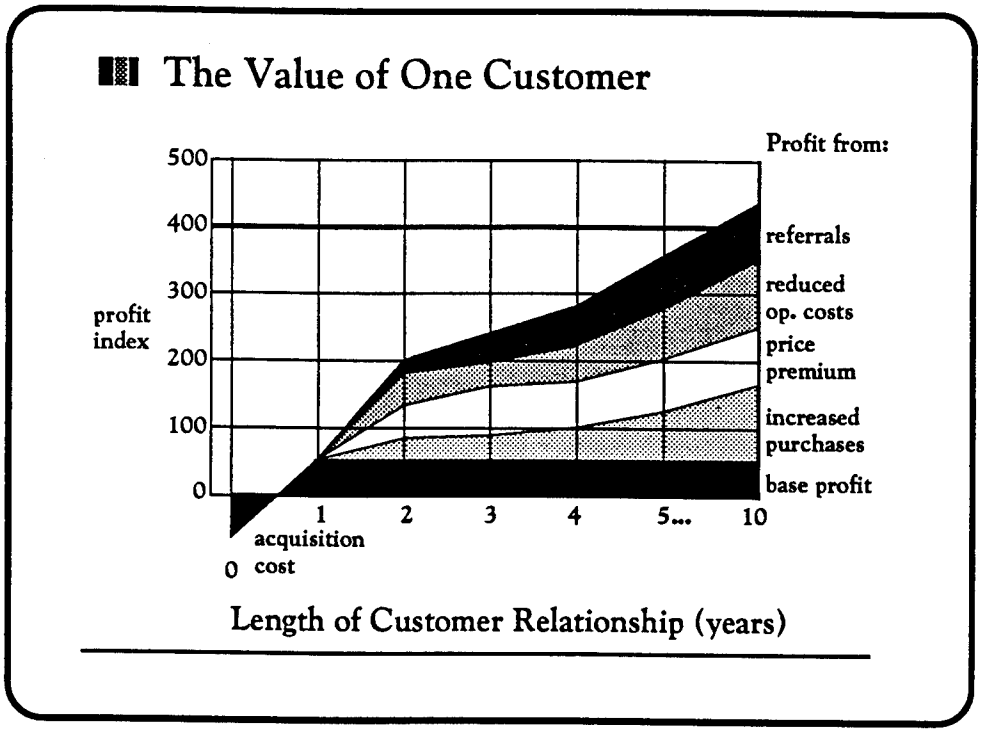

15 The Value of One Customer

"Delighted" customers are those who share their positive experience with others, as you just did. This "delighted" customer is a RETAINED customer and certainly not part of the 90% of our dissatisfied customers who are ACTIVELY looking for alternatives to us.

This retained customer is the key to market share growth. We have seen how organizations which satisfy their customers have market share growth rates far exceeding those of organizations which do not emphasize Customer Satisfaction. They achieve these growth rates because they maintain and build upon their customer base. They do this because they understand the VALUE of a retained and satisfied customer.

Consider your examples from our last exercise. What did those organizations do to delight you? What did they really have to spend? (Draw on specific participant examples here.) In the negative experiences, what are those organizations going to spend to get you back or to even get you to CONSIDER coming back?

Companies that emphasize Customer Satisfaction and customer retention understand the long-term value of a customer. This is not just so many words. The hard, cold, long-term value of a retained customer can be calculated in each of our

businesses. Here is how some organizations have calculated the value of their customers:

- The automobile industry believes that a loyal customer represents a lifetime average revenue of $140,000. Why then, do some companies like Lexus go out of their way for customers while others do not?

- Stew Leonard in the grocery industry sees each shopper as worth $52,000 over a ten year period: $100/week, 52 weeks a year for 10 years. Therefore he gives their children free ice cream cones and will not allow lines at checkout. People will drive out of their way to come to his store when major grocery chains are far more convenient. What does he know that his competitors do not?

- Do you think Procter & Gamble knows the lifetime value of a satisfied and retained sanitary protection product customer? Do you think Merck knows what a complying customer and prescribing physician is worth to them for one of their brands? Do you think U.S. Surgical knows the lifetime value of a surgeon who is delighted with their products? Armed with this knowledge, aren't our competitors better able to be even more efficient and effective marketers? Can we really allow them this advantage?

Therefore, it is critical to view our customers over the long term. This study by Opinion Research Corporation shows the profit potential of a "delighted" and retained customer.

How profitable are we going to be if we are always looking for new customers to replace those we have dissatisfied? Look at the incredible pain, financial loss and expense American auto makers are experiencing in order to get the American auto buyer to even *consider* buying an American car.

Therefore, our objective in **World Class Customer Satisfaction** is to profitably build our businesses by retaining current customers and gaining new ones by meeting and exceeding their needs and expectations. Let's now look at how we are going to achieve these results. □

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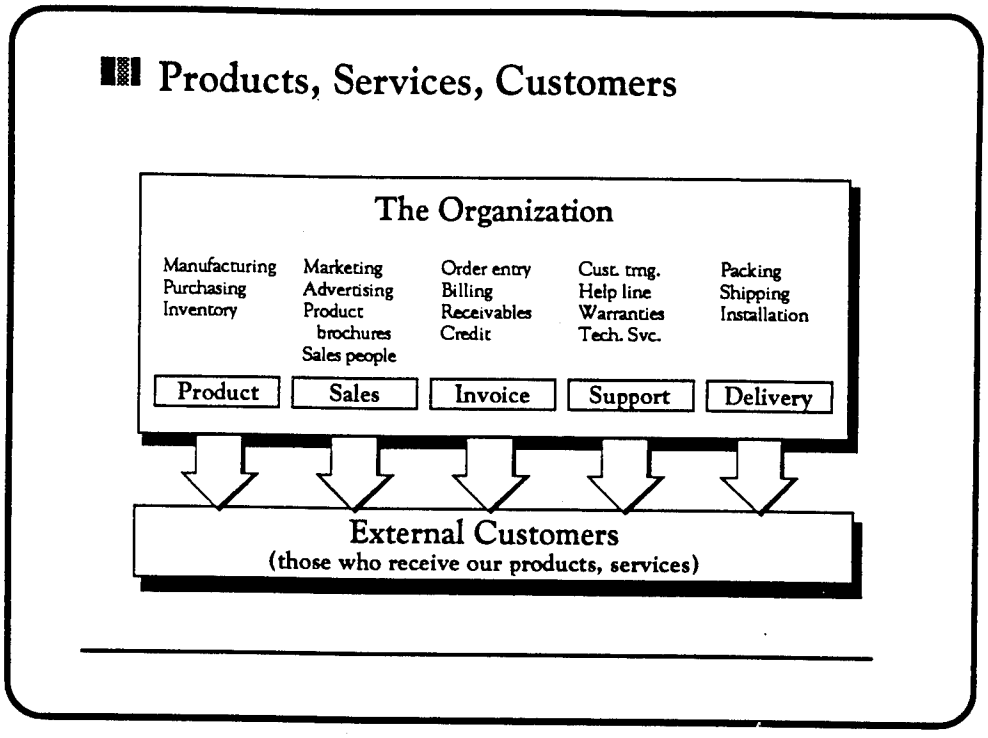
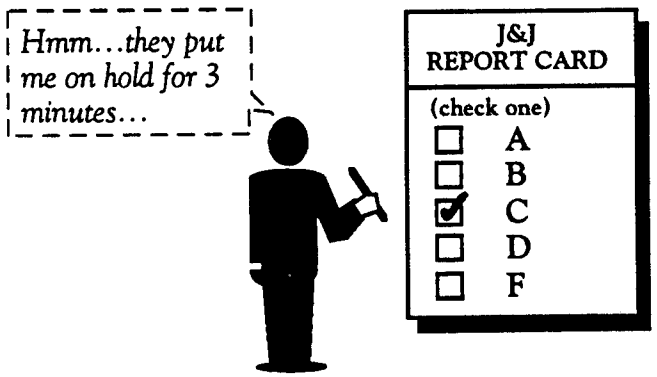


16 Products, Services, Customers

Our first step is to start learning more about our customers and how they interact with our organization. Earlier, we defined "customer" as "the recipient of our products and services." It is important to determine just where our organization comes into contact with our customers. This is vitally important because every customer contact, with any part of the organization, is an opportunity to make a favorable impression on our customers.

Traditionally, we have thought that only a few parts of our organization actually "touch" the customer. Most often we think of Sales, Customer Service, and possibly Marketing. In fact, our organization is making hundreds of customer contacts each day and each contact generates a customer perception of our organization. These perceptions accumulate over time and play a dramatic role in whether we retain "delighted customers" or lose customers who find us too difficult to do business with. □

"Moments of Truth"



Moment of Truth: An opportunity for a customer to make a judgment about the product or service of your organization.

17 "Moments of Truth"

Jan Carlzon, CEO of SAS turned that airline from a state-run "also ran" in the airline industry to one of the most competitive and preferred airlines in Europe. He coined the term "Moments of Truth" because he quickly realized on becoming president of SAS in 1981 that customers' perceptions of a product or service were actually the sum of numerous separate perceptions acquired over time.

In each of these "Moments of Truth," we generate a customer perception of our products, our services, our entire organization.

Take a moment to think about all the opportunities you had to form your own perceptions about the airline you flew on your last trip. Think about each of the various "Moments of Truth" in that experience when that airline had your complete attention and had an opportunity to make either a favorable or unfavorable impression.

Write down on an easel the Moments of Truth in their Airline Experience and what grade they would give the airline for each. To facilitate the discussion, here are some examples participants might site:

- *Initial and subsequent phone reservation contacts*

- *Skycap or curbside baggage check personnel*
- *Ticketing or re-scheduling personnel*
- *Speed of entire check-in procedure*
- *Attitude, personality of check-in personnel*
- *Cleanliness of terminal and specific waiting area*
- *Available seating options on the plane*
- *Boarding procedures*
- *Gate personnel assisting in boarding*
- *Departure time*
- *Cleanliness of the airplane interior*
- *Flight attendant greeting and attitude*
- *Promptness of food and beverage service*
- *Quality of food and beverages*
- *Flight crew contact*
- *Arrival time*
- *Promptness of baggage arrival*
- *Flight crew contact*
- *Other*

We can see from this one simple exercise that on one flight our airline has had an enormous number of opportunities to make an impression upon us and for us to develop a perception about them. The story is told of airline passengers who stopped flying a certain airline because the food-beverage trays at their seat were always dirty. These passengers made the assumption that the airline probably did not do a good job on maintenance in total and therefore this probably extended to the more important airplane maintenance as well.

This perception may have been incorrect, but the customer's perception is all that counts. They are buying the product and/or service and therefore, we had better know what is important to them. □

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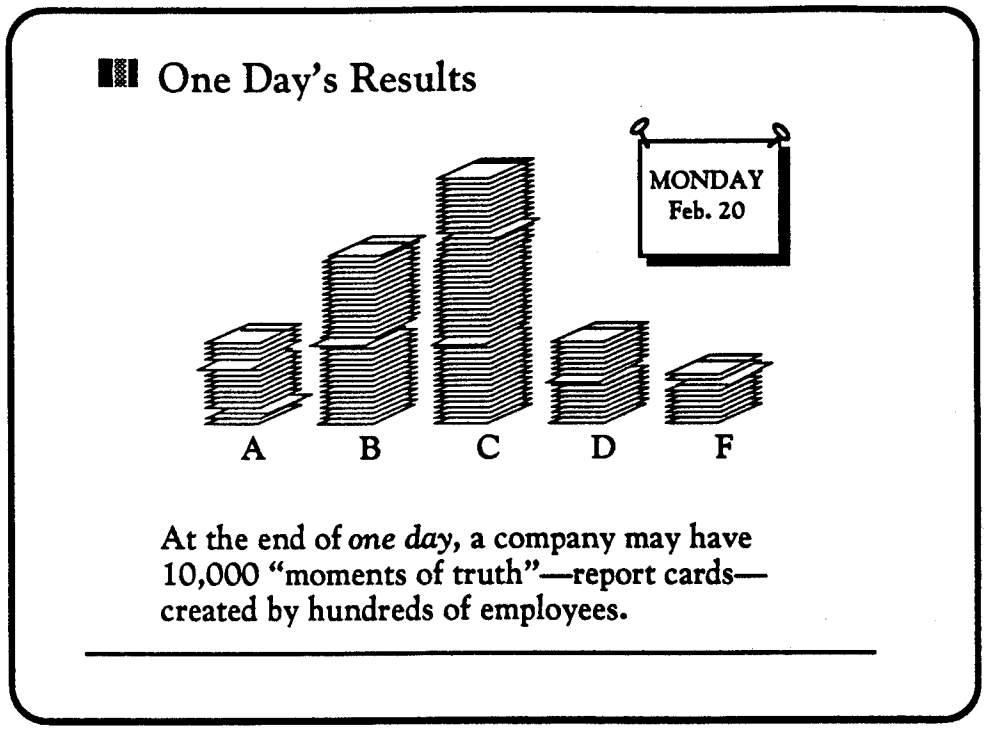

18 One Day's Results

Just think of the number of contacts your organization has *each day* with its customers. Each of these contacts is a "report card" for our organization. When we delight customers, we get A's. When we satisfy them, we get B's and C's. Dissatisfied customers will give us a few D's and F's. Do we really know what kind of grades our customers are giving us each day? □

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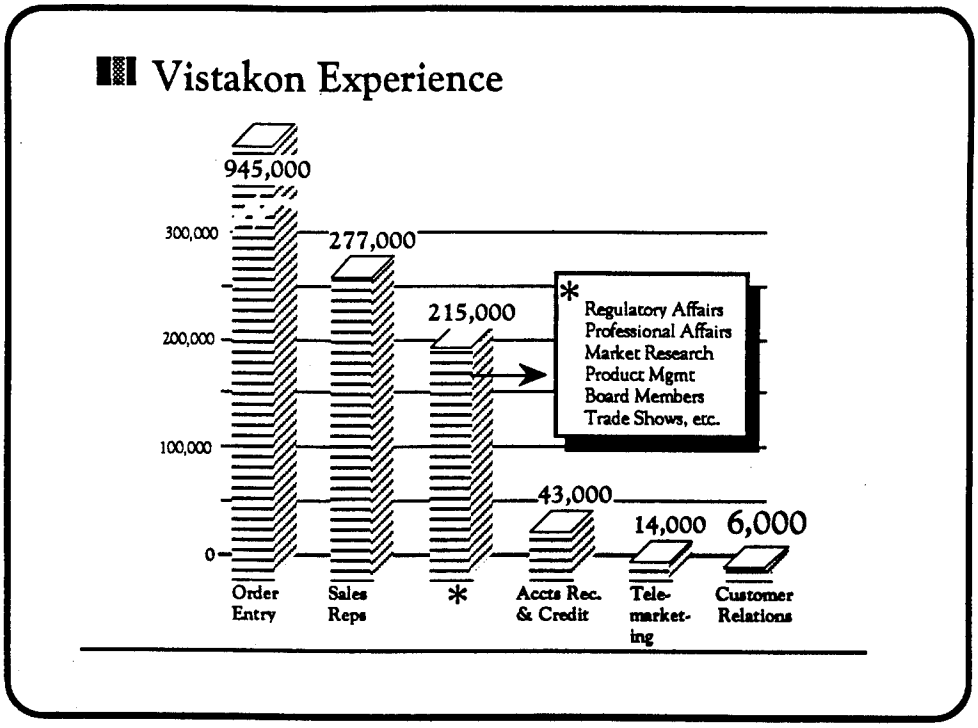

19 Vistakon Experience

One company has actually started to identify and quantify its "Moments of Truth." This company identified over 1,500,000 customer contacts on an annual basis. Interestingly, the vast majority of these contacts came in the Order Entry process, not in the areas we traditionally think of as customer contact.

We have to ask ourselves if these contact people are trained to interact with our customers, what impression are they making, what information is being offered and what are we learning from each of these contacts? And, is there a mechanism for sharing this learning with any part of our organization that can really do something about it? □

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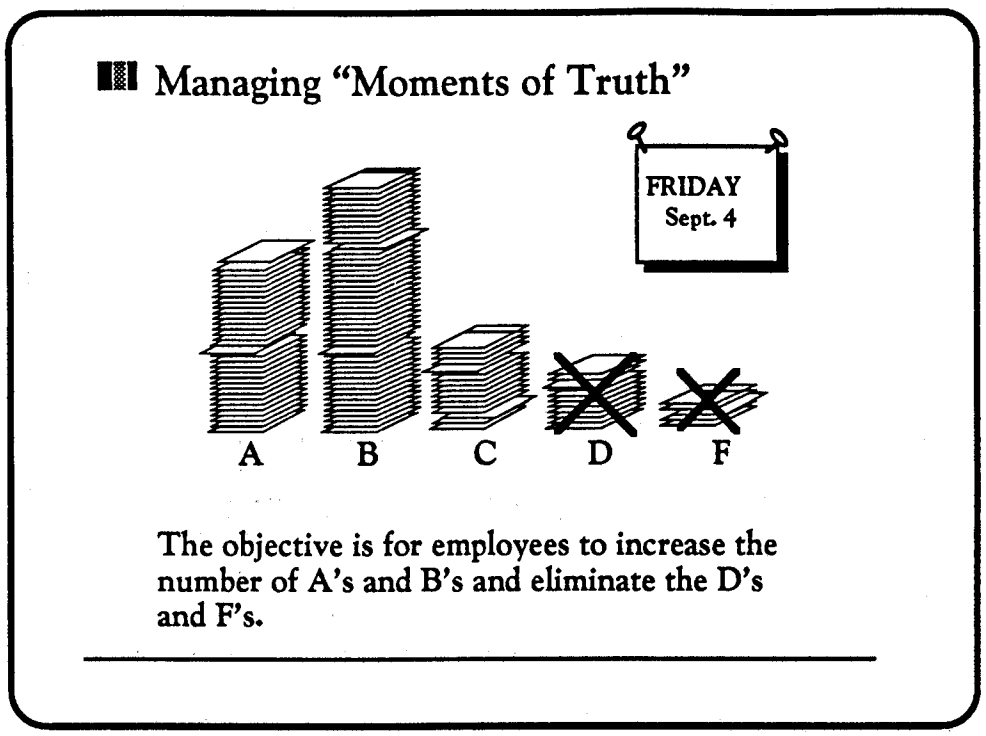


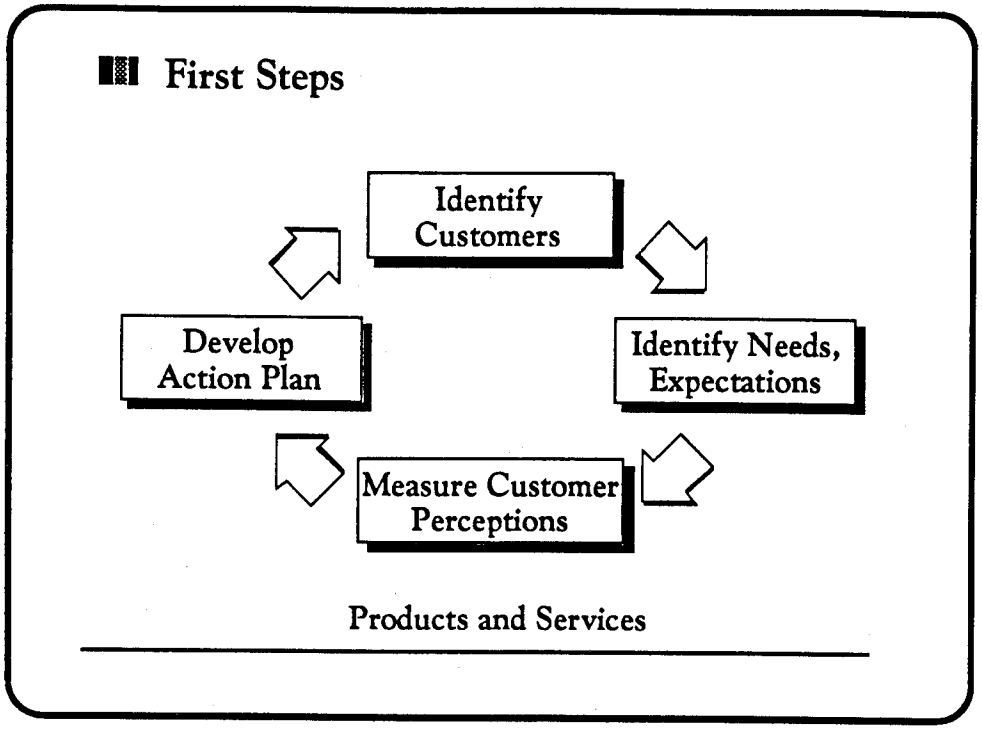
20 Managing "Moments of Truth"

We need to know how many A's and B's we are getting and where the D's and F's are. This will enable us to prioritize our efforts and really start to take a proactive approach to Customer Satisfaction. Do we currently know this?

Federal Express knows on a real time basis the exact status of every package shipped with them—over a million each day. They know if they have arrived on time, how many were late, where there were billing disputes, where there were satisfied and "delighted" customers and where there were unhappy customers. Their management board reviews these results daily and the company's performance on key criteria related to these daily reports determines whether anyone in the organization gets an annual bonus or not.

Federal Express provides all customer service agents—the customer's phone contact to Federal Express—with five weeks of training before they are allowed to handle calls on their own. They receive another four hours of training each month and twice each year have to be recertified for their job by taking a test via computer.

So, not only can Federal Express tell their customers where their packages are at any one of twenty separate parts along their journey, they also have well-trained and prepared individuals at the other end of the phone when you call on any matter.



21 First Steps

Before we can have results similar to those of Federal Express, we need to develop an overall approach—or process—for developing our **World Class Customer Satisfaction** system.

Our approach is a very simple yet comprehensive one. We will overview it briefly now and then detail each segment separately.

Our first step is to **Identify Our Customers**. We need to know who they are currently and who they could be. We need to understand our "chain of customers"—such as distributors, the retail trade, wholesalers and others who form a chain to our final, end customer. We will also have to prioritize the importance of our various customers, because we will not be able to address all of them concurrently. That is one reason why our model is circular—it is a process, not a one-time event.

Next, we need to **Identify Customer's Needs and Expectations**. This identification of needs and expectations will come from the customer's vantage point, not ours. We want them to tell us what they want and expect—what is important to them, what is a "need-to-have" and what is a "nice-to-have." As part of this identification we will also learn how our customers prioritize their needs and expecta-

tions—what is MOST important, what is less important.

Armed with the information on what our customers believe is important, we can now ask them how they perceive we are doing against those expectations. This is the **Measurement of Customer Perceptions.** We can also ask them to compare their perceptions of our performance with that of our competitors.

Once we know how we are perceived by customers and how they perceive our competitors, we can **Develop Action Plans** to address areas where there are important gaps between items the customer has identified as a priority and where they perceive our performance is trailing that of our competition.

This is an ongoing process of Continuous Improvement. We will continually need to determine who are customers are—who comprises the total market for our products and services. Customers' needs and expectations are continually changing. The "bar" is constantly being raised. Therefore, we will continually have to monitor their needs and expectations for changes, additions, deletions, reprioritizations.

We will need to measure customers' perceptions of our performance as frequently as possible and feasible. Clearly, the more current this information is, the better able we are to be proactive rather than reactive.

Our action plans will be continually refocusing on the issues that impact our customers today. This action plan for addressing Customer Satisfaction issues will translate directly into our overall organizational strategic plan.

Finally, we need to understand that our customer is looking to us not only for products but also for the services which accompany those products. We may not think of ourselves as providing "services," but the customer sees Invoicing, Accounts Payable, Delivery and Customer Service as SERVICES that we provide. If the customer sees them that way, we had better see them that way as well. □

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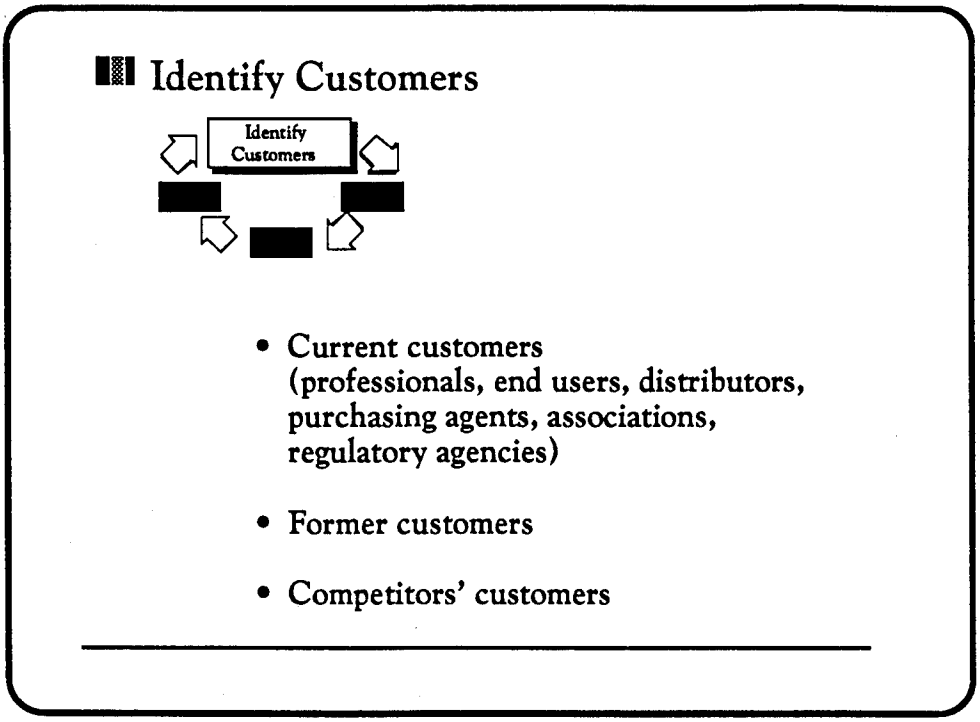


22 Identify Customers

Our first step is to identify who our customers are. We spoke earlier about our broad approach to customers—both ours and those of our competitors. Let's refine this slightly by looking at our current customers, our former customers, and those who could be our customers but currently belong to our competitor's. (Of course our former customers could be a sub-set of our competitor's customers as well.)

We need to identify who our current customers are. Just who is it that comprises our current franchise? Who actually purchases our products and services and who directly influences these purchases? We have to make certain that we have identified all parties that influence the purchase of our product and then understand their relative importance in that purchase decision.

We can learn who these customers are by talking with our organization to understand the PROCESS involved in the purchase of our products and services. Who places the orders? Who needs to authorize them? Who recommends? Who can cancel them? We can learn most of this information by studying the actual process and by conducting qualitative research within our organization with those departments and functions who deal with the customer.

As we progress further with this model, more and more information will have to be developed using basic market research. While most major companies have a market research capability, they may not be entirely conversant with the type of research required.

Therefore, it is necessary to identify organizations that are more than just Market Research firms. We need to identify firms that specialize in the area of Customer Satisfaction research.

It is not the objective of World Class Customer Satisfaction to make our employees into market research technicians. Therefore, no time in any presentations will be spent on the development or execution of research questionnaires.

Nor should organizations believe they can seriously conduct their own Customer Satisfaction measurement without some professional input. Neither should they believe they can merely tailor someone else's approach to their needs.

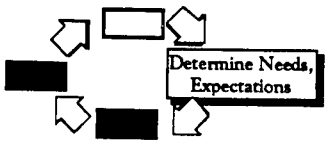
It is very important to emphasize that the actual quantitative Customer Satisfaction measurement should be left to the professional, "world class" firms.

We also need to understand who are former customers are and why they are FORMER customers. This will also require some research. Possibly we can meet with these former customers and learn of their concerns/problems with our operation. In other instances we may have to depend on third party research—where we are not identified as the subject of the research—to clearly bring our their real concerns. It is important not to be satisfied with the initial, superficial reasons former customers may give for moving their business from us.

Remember that earlier we saw that 68% of dissatisfied customers who leave do so because of SERVICE issues. Therefore, do not assume that PRICE is the reason—even if that is given as the initial response. It is **seven times** more likely to be service related (68% to 9%).

Finally, we need to learn about who comprises our competitor's customers. How are they different from ours? If they are made up solely of our former customers, what are our competitors providing that we did not? Remember, it is probably NOT price alone. □

Determine Customer Needs



- Determine the characteristics of your product and services (such as size, price, color, availability, support, etc.)
- Ask customers to rank characteristics according to relative importance.
- You now have a list of what customers need and expect.

23 Determine Customer Needs

The next part of our model involves the determination of our customers' needs and expectations concerning our products and services. It is critically important that these needs and expectations be determined by us through the customer. These are NOT to be OUR perceptions of what we THINK our customers need and Expect. Rather, we are looking for the Voice of the Customer to tell us their expectations of our products and services.

This may be a source of controversy and defensive behavior among some in the organization—particularly Marketing and Sales. They have long been viewed by the remainder of the organization as the "keepers" of customer knowledge. They may, in fact, be the keepers of customer DATA, but they usually lack real customer KNOWLEDGE—particularly hard, quantifiable, ranked and weighted knowledge on customer needs and expectations. Do not challenge or confront defensive participants, but make it clear that **World Class Customer Satisfaction** *shares our commitment to Manage by Facts, and not opinions.*

Additionally, we want our customers to rank their needs and expectations for us. Clearly, when we are buying a product and service we have a hierarchy of expectations and needs. We now want to find out what these are for our products from our customers' point of view.

In the process of ranking these needs and expectations, we should also have our customers weight the relative importance of these ranked needs and expectations. For example, if our customer had ten needs and expectations that they had ranked from one to ten, how would they weight each item relative to each other? Would they give items one through ten each 10%? Or would the first two items be the most important and be weighted 30% and 20% respectively?

These are all issues that professional customer satisfaction measurement experts can determine for us. These are not rankings and weightings we want to do on our own. However, it is important to understand that once we obtain this data, we have very powerful knowledge about what is really important to our customers and it is quantitative knowledge, not "warm feelings."

Federal Express has detailed knowledge of their customers' needs and expectations. This knowledge translates to a detailed ranking and weighting of needs and expectations, against which Federal Express can then measure customer perceptions of their performance on a DAILY basis.

Here are some summary actions to consider as we move to determine customer needs and expectations:

1. Determine your customers' needs and expectations from *their* point of view, not yours;
2. You can help them determine their needs and expectations more specifically by segmenting them by characteristics of products, services, and delivery;
3. Ask your customers to rank their needs and expectations from most important to least important;
4. Ask them to weight these ranked needs and expectations;
5. Calculate the five year value of each of your Top Ten Customers; determine what you are actively doing to keep them;
6. Develop an on-going plan for increasing the number of customer contacts made by management personnel, such as regular visits, participation in sales calls, attendance at customer focus groups, etc. □

Customer Perception

Customers perceive service in their own unique, ideosyncratic, emotional, erratic, irrational, end-of-the-day and totally human terms. Perception is all there is!

–Tom Peters

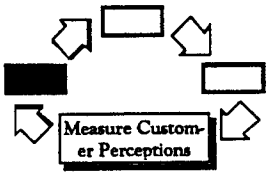
24 Customer Perception

Armed with the knowledge of what customers need and expect from us, we can now measure their perceptions of our performance versus those expectations. We can also learn about their perceptions of our competitors.

We must always remember that the customer's perception of our performance is all that matters. We probably have all had the experience of perceiving a product or service in a certain light while the supplier saw things differently. What sense does it make for us to argue with our Customers over the accuracy of their perceptions, when they are perfectly free to take their business elsewhere? There is no sense in winning an argument if we lose a customer. Their perception is our reality. □

Notes:

Measure Customer Perceptions



- Ask customers, "How are we doing delivering what you want and expect for each characteristic?"
- Ask how they perceive the competition.
- The shortfall between identified needs and perceptions provides the prescription for improvement.

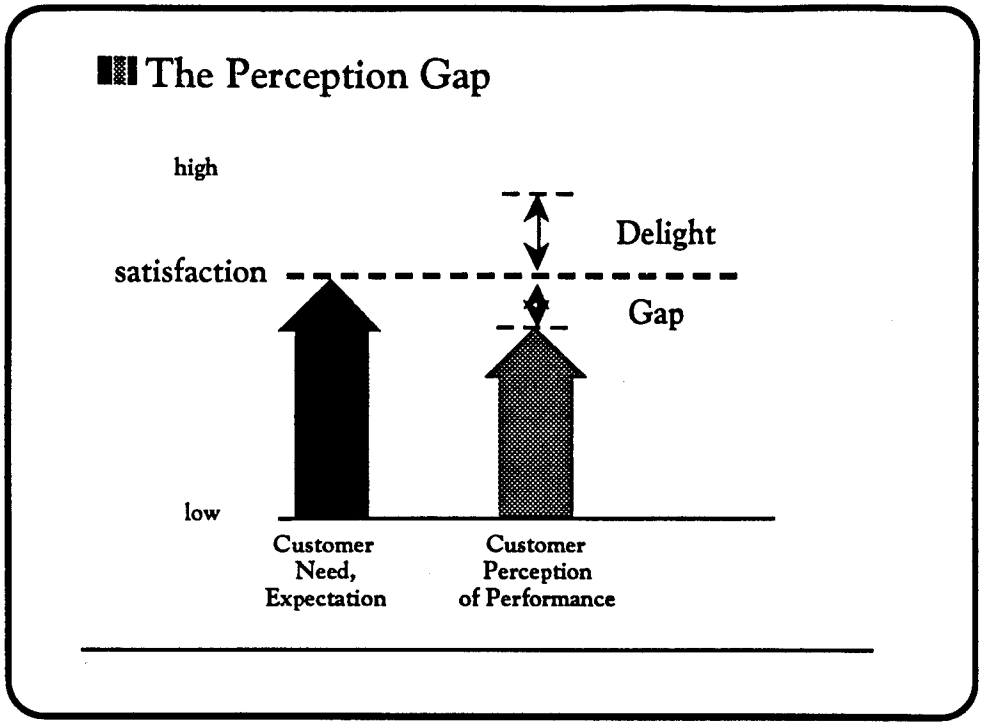
25 Measure Customer Perceptions

Therefore, we need to clearly understand how our performance versus their ranked and weighted expectations is perceived by our customers. Results from this type of study will clearly point out where we need to place our attention and where we may have been placing unnecessary attention.

We can also learn how our customers perceive the performance of our competitors. This can add an important element of urgency if we find that our competitors are outperforming us in the eyes of our customer on their priority needs and expectations.

Additionally, this measure gives us a clear "prescription" for where we need to take corrective action. □

Notes:

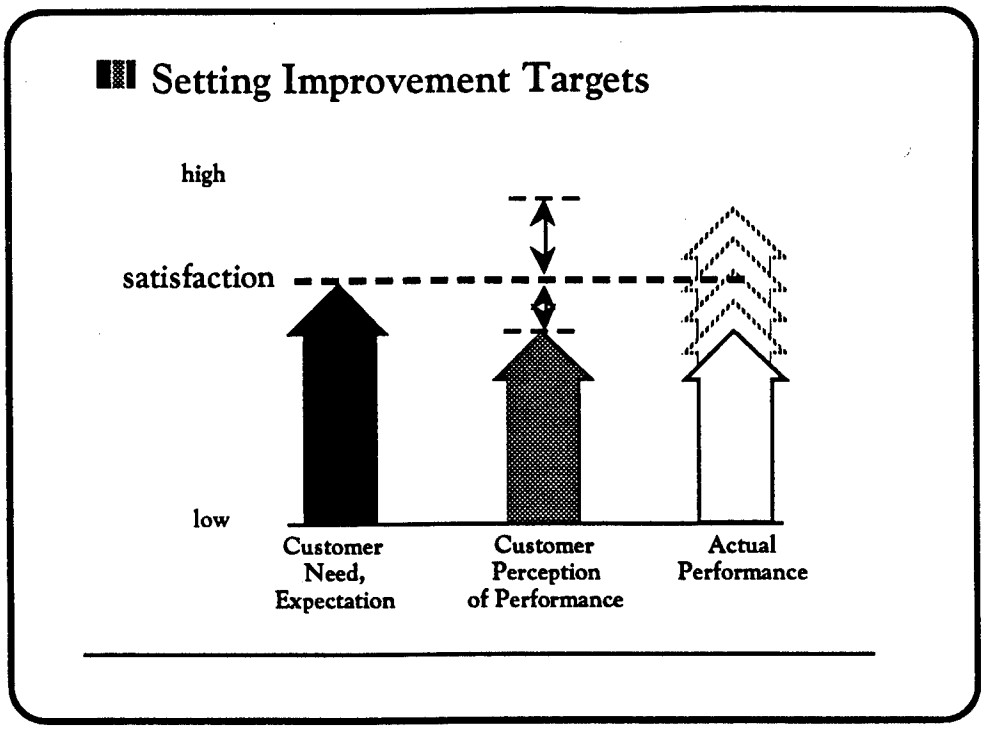


26 The Perception Gap

Quantitative measurement of the customer's perceptions of our performance will provide a clear picture of the "Perception Gap"—the difference between our customer's perceptions of our performance and their needs and expectations.

If we are perceived as performing below their level of expectations, then we need to address this area. If we are perceived as exceeding their needs and expectations, we possibly have some delighted customers and we could consider marketing and merchandising our performance to potential customers and those currently with our competition. □

Notes:

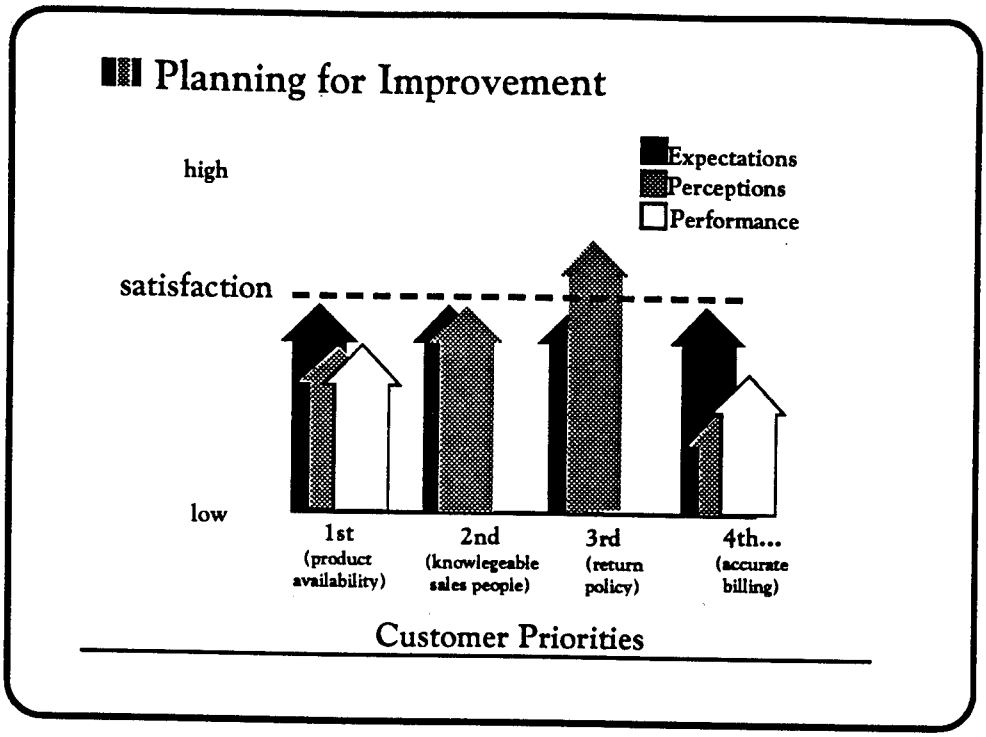


27 Setting Improvement Targets

Another important measure,which should be done concurrently with the measurement of customer's perceptions, is the measurement of our actual performance versus their prioritized and weighted needs and expectations. This measurement can be completed from our own internal sources and will provide us some interesting insight on how our customer's perceptions match our actual internal performance.

For example, how long does it actually take for our customers to receive their order from the time THEY place it until THEY receive it? (Not from when WE receive it until WE ship it!) How long does it take us to invoice our customers? What is our accuracy level? How many orders are sent out complete and correct? How often do our sales representatives actually see our customers?

We cannot change customer's perceptions by addressing the perception directly. If people perceive American cars as lagging behind the Japanese in quality, then all the advertising to the contrary will not change that perception until we address the actual performance. We can only address the performance issue when we know where we are TODAY—our baseline measure. From there, we can set improvement targets. □



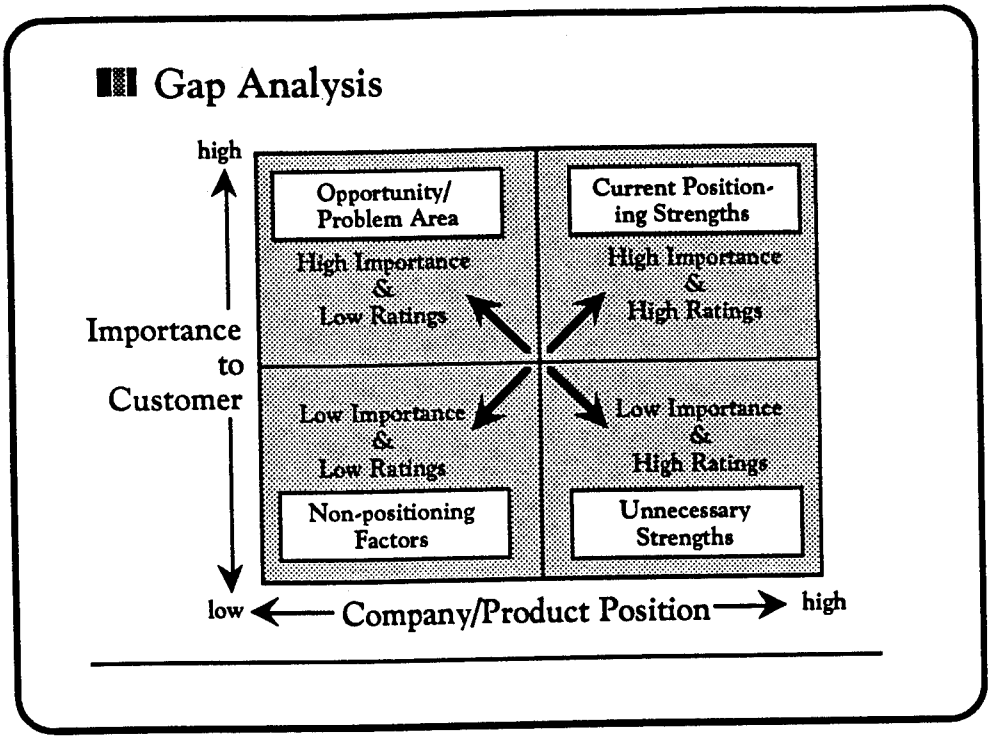
28 Planning for Improvement

There is not a single measure of Customer Satisfaction. Rather, customers rate us on dozens of items and from their own list of priorities. Here we see the top four priorities (dark arrows) and what constitutes a level of satisfaction (dotted line). This is what customers have said they want. The grey arrows show how they think we measure up on each of the four. Obviously, we're doing fine on #2, and even exceeding their expectations on #3. But items #1 and 4 are not reaching their level of satisfaction.

Those two areas that are trailing in customer perception should be our first areas of investigation—to determine just how we're actually performing.

With these three important measures—what customers want, what they think they're getting from us, and how we're performing, we're ready to take improvement actions to close the satisfaction gap. □

Notes:



29 Gap Analysis

A potential output of a customer satisfaction study could be this type of matrix. On one axis (vertical) we measure the customer's view of the relative importance of various attributes of our products or services. On the other axis (horizontal) we chart the customer perception of our performance on those attributes. Opportunities for improvement become very clear.

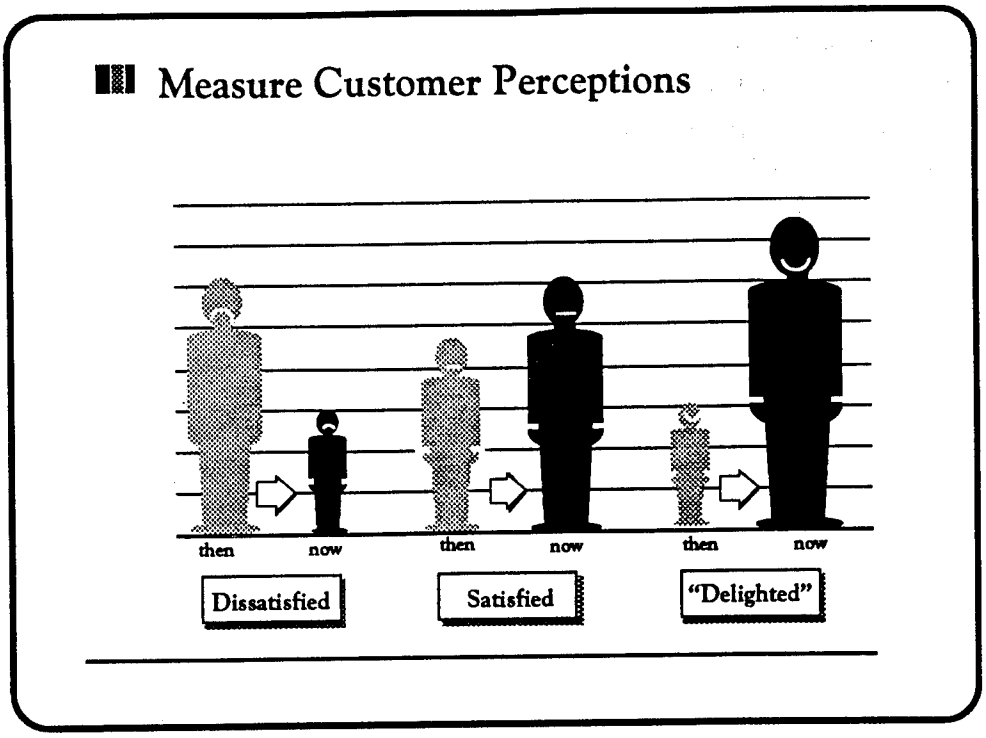
For example, improvement opportunities exist in areas that our customers believe are very important but in which they perceive we are not performing well. This is even more enlightening when we compare their perceptions of us with their perceptions of our competitors. Do our competitors share the same profile, or are they poised to take our customers by being perceived more favorably in areas important to our customers?

Additional opportunities exist on the positive side, in areas that are both important to our customers and where they perceive we are doing very well in comparison to our competitors. These situations represent a clear marketing and promotional opportunity that we can leverage versus our competition in an effort to win over their customers.

The significant actions our organization takes on the basis of customer satisfaction measurement demonstrate the clear

strategic importance of customer satisfaction. However, we will never know about these opportunities to improve or promote our customer-delighting performance if we do not have these quantitative results. □

Notes:



30 Measure Customer Perceptions

By measuring our Customers' perceptions of our performance over time—and taking appropriate action where necessary—we can begin to move an increasing number of our customers into the "delighted" category. We will no longer have to guess about what percentage of our customers fall into which category, as we did earlier today.

We will have quantitative data that demonstrates that fact. And the more customers we move into the "delighted" category, the more likely we are to retain them and build market share. Then we can begin looking at our competitors' customers and developing our strategic plans to make them our "delighted" customers.

Here are summary actions to consider in measuring customer perceptions of our products and services:

1. Armed with the knowledge of what your customers have ranked and weighted as their most important needs and expectations, determine how they perceive your performance, and that of your competitors, on these items.

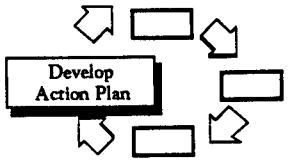
2. Determine what your actual performance is on these characteristics, from internal sources. For example, if we are seen as slow in delivery, what is our actual delivery time? This provides a baseline measurement for future improvement activities.

3. Develop a "gap" matrix, or similar device, that enables your organization to focus on the priority issues and not get sidetracked addressing matters of low priority to your customer.

4. Share the results of the study with the entire organization so that they understand the importance and primacy of **World Class Customer Satisfaction** and so they understand that it is a measurable, quantifiable element they can directly effect. □

Notes:

Develop Action Plan



- Compare customer expectations with their perceptions (identify gaps).
- Based on customer priorities and gaps, select areas for improvement; measure actual performance levels for these critical areas.
- Improve performance levels until they meet or exceed customer expectations.

31 Develop Action Plan

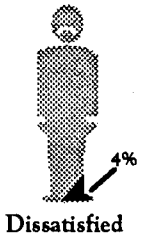
The final element of our **World Class Customer Satisfaction** model is to develop an action plan based upon the analysis you have conducted of the customer perception study results. Your Gap Matrix, or similar tool, should clearly identify where your efforts should be focused. Now a plan must be developed to turn this data into action and improve your performance levels until they exceed your customer's expectations.

In developing our Action Plan, it is critical to focus on addressing those needs and expectations gaps based upon their level of relative importance—ranking and weighting—to our customers. We do not want to spend the organization's time and resources addressing areas which are not priorities to our customers.

Federal Express management reviews their daily Customer Satisfaction results at their morning staff meeting. They can immediately focus on specific problem areas as they occur. There is little or no lag time for small problems to fester into larger ones and for mildly dissatisfied customers to become angry customers telling twenty or more people about Federal Express' failings. □

Notes:

1. Fix Customer Problems . . .



For the 4% who complain, customer complaint personnel who:

- are accessible
- listen and ask questions
- empathize and understand frustration
- are good problem solvers
- are empowered to act on the customer's behalf

32 1. Fix Customer Problems . . .

As we develop our Action Plan, we should also continually challenge the internal organization concerning our customer's perception of us. Specifically, are our policies and procedures focused on satisfying our customers or on assisting those who touch our customers to satisfy them? Do our employees know, as do Fred Smith's at Federal Express, that they are empowered to do anything necessary to satisfy the customer?

Do we stand behind our products and services with our customers? Do we have a customer-oriented policy or approach to the traditional Customer Service function? What kind of guarantees do we offer our customers?

L.L. Bean, the family-run mail order outdoor clothing company with sales of approximately $600 million, has a Customer Satisfaction guarantee that is unequivocal and unsurpassed:

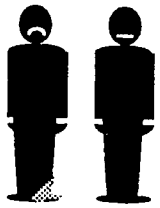
"Our products are guaranteed to give 100% satisfaction in every way. Return anything purchased from us at any time if it proves otherwise. We will replace it, refund your purchase price or credit your credit card, as you wish. We do not want you to have anything from L. L. Bean that is not completely satisfactory."

That is a company policy focused on the customer. Ours should be just as clear and comprehensive.

Our customer contact personnel are our first line of defense—and offense—with the 4% of dissatisfied customers who actually contact us. We need to make certain they are fully empowered to satisfy our customers. □

Notes:

2. Prevent Dissatisfaction . . .



- Share customer data with all employees
- Develop a "customer focus" among all employees
- Set standards for key processes based on customer needs and expectations
- Implement improvement teams to bring key processes to standard
- Measure, measure, measure

33 2. Prevent Dissatisfaction

While each Action Plan will differ by organization, there are some basics for any Action Plan which bear mentioning.

We want to move those customers who are currently dissatisfied to the ranks of the satisfied.

We start this by focusing the organization on **World Class Customer Satisfaction.** One way to do that is to share our Customer Satisfaction measures with the entire organization. Remember, what gets measured, get done.

We should set both short and longer term improvement objectives in the areas we have identified for action. We should not have to wait one year to see if we are really improving. This does not mean that we need to do a major customer satisfaction study each month or have the daily data input of a Federal Express.

It does mean that we can measure our performance in those areas identified by our customers and see if we can demonstrate significant improvement. For example, if our customers say our delivery time is too long and we know from our internal data the actual delivery performance, are we seeing any improvement and shortening of that delivery cycle based upon our Action Plan? Additionally, we can have informal, interim measurement from our

customers by asking them if they have seen improvement.

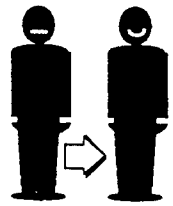
We should make sure our standards are realistic and consistent with our customers' needs and expectations. We do not win any battles for satisfied customers by overpromising and underdelivering.

We need to adjust our internal standards to those of the customer and continuously measure our performance in this light. Our old internal standards—"we've always done it this way"—are no longer relevant and should be discarded. From its inception, our strategic focus on Customer Satisfaction makes the customer our arbiter, not our internal organization.

We should guarantee that our improvement plan is clearly defined and that the organizational elements involved clearly understand the reason for the necessary improvement and their role in making it happen. □

Notes:

3. Beyond Satisfaction . . .



- Make "delighting the customer" your organization's top priority
- Examine existing policies and procedures for their customer "friendliness"
- Free employees to delight customers
- Reward and recognize employees for instances of outstanding service
- Measure some more

34 3. Beyond Satisfaction . . .

As we stated earlier, "satisfied" customers are not enough. We want all our customers to be "delighted." Our entire organization needs to know that this is our number one priority.

This relates directly to the need to communicate our Action Plan goals to the entire organization and to inform them about our progress towards achieving these goals. This widespread communication reinforces the importance of customer delight and builds employee enthusiasm and participation by clearly showing them measurements of improvement against our stated goals.

We also need to continually guarantee that our organization is structured to really address the needs of our customer and the needs of those who directly deal with them. We will discuss this important subject at length in a moment, but here are some basic elements to address.

We certainly need to examine our internal policies for their customer "friendliness." Do we have a stated (or unstated but clearly practiced) "no return" policy? One division in a FORTUNE 50 company had such a policy and in fact prided itself on the fact that they never took any product back!

Are our employees free to really satisfy the customer or are their hands tied by "red tape" and internally focused policy and procedures? At Federal Express, couriers are empowered to spend as much as $250 to satisfy the customer (the average Federal Express package costs $25), while Customer Contact personnel are empowered to credit accounts up to several thousand dollars without higher level approvals.

At least one Federal Express employee even went so far as to rent a helicopter to make certain that phone lines were open during a severe ice storm in the far west. That speaks to empowerment and of employees who are focused on satisfying customers that our organization recognizes have a long term value to our success. □

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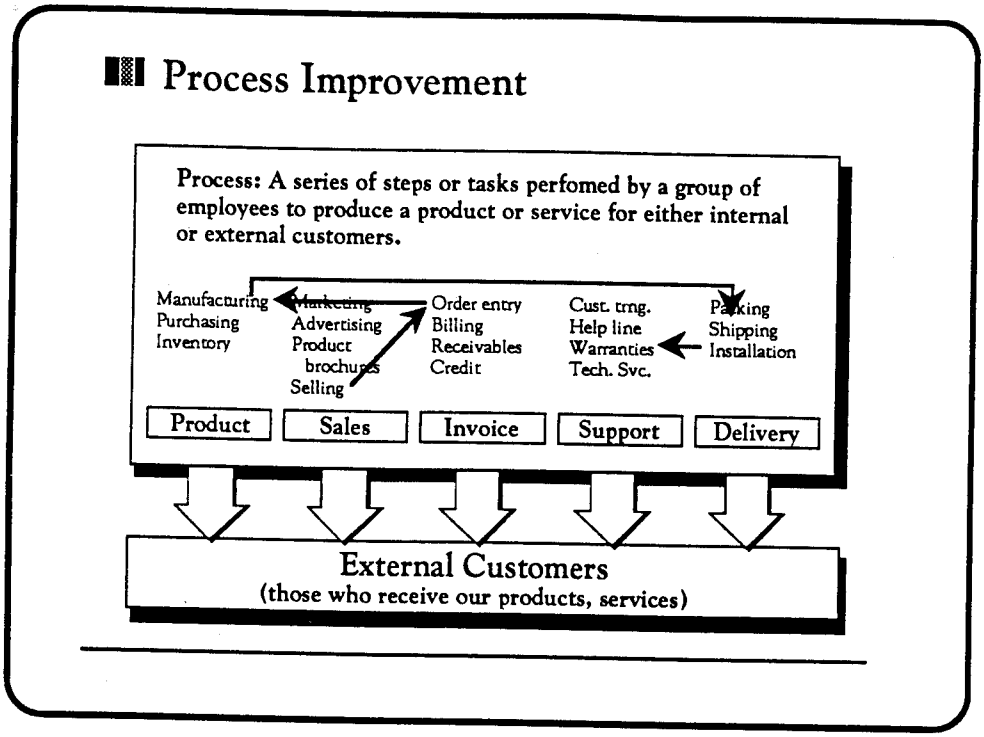

35 Process Improvement

A key part of our Action Plan is **Process Improvement.** We discussed at the outset today that our organization "touches" our customer in thousands of "Moments of Truth" each business day. Some business process is involved at each of these "Moments of Truth."

For example, if an airline attendant serves you an unacceptable meal on your next flight, all the apologies, free drinks, and "niceness" will probably not erase the perception made by that bad meal. Further, the flight attendants themselves can really do nothing about that bad meal, just as they can do nothing about flight delays, late arrivals, or lost luggage. That does not mean they will not be blamed for each of these because they are on the "front lines" with customers.

The responsibility—the "ownership"—of the in-flight meal resides somewhere else in the organization, such as the kitchen or the meal planner's desk. The meal preparation process—or possibly meal delivery and/or storage process—needs to be addressed and improved. This issue will need to be addressed by employees who probably never see the customer, but they have a direct impact upon them, as each of us clearly knows.

So we see that we have a "chain" of internal customers and suppliers who are critical to the organization's goal of de-

lighting our external customer. The sales person taking the order may be the one in direct contact with our customer, but those in manufacturing making the product, those in packing and shipping sending it to our customer, and those in billing all directly influence that customer. Our front line customer contact personnel will feel the brunt of that dissatisfaction if anyone in our internal "chain" fails to meet our customer's needs and expectations. □

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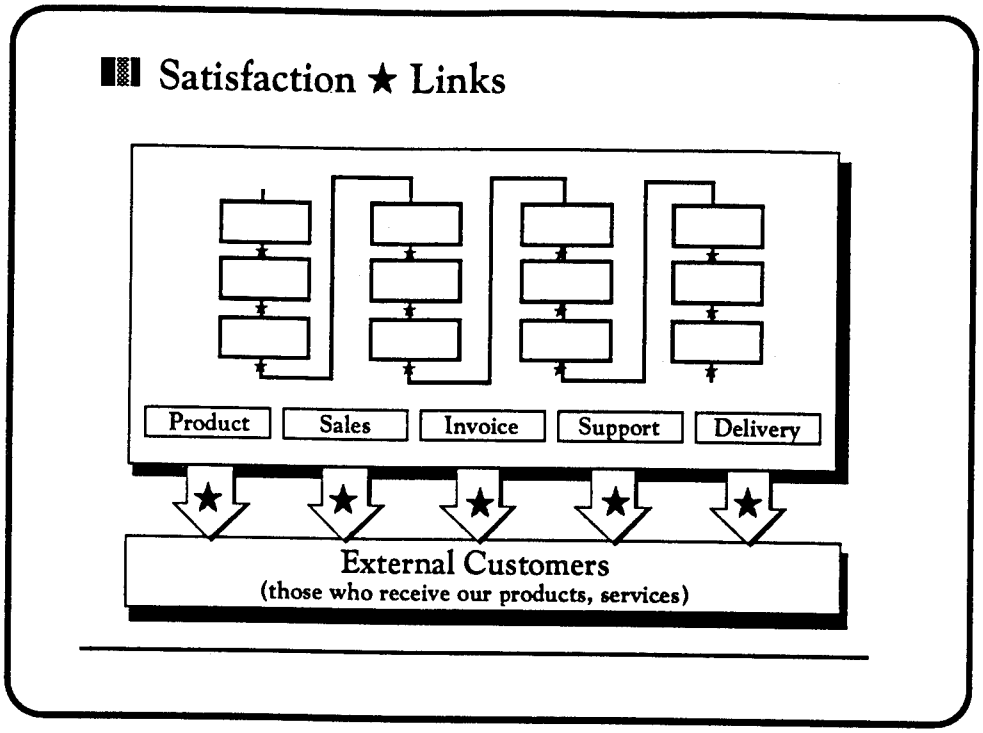

36 Satisfaction Links

In delivering products and services that "delight" our external customer, every internal process needs to operate on the same basis of exceeding customer needs and expectations that we are using externally. Each of our processes must receive from supplier departments an output which meets or exceeds its needs. That department, in turn, performs their value adding work and passes it on to the next function, exceeding their needs and expectations.

Every process should forge a "satisfaction link" with its customer organization. The external customer will be the ultimate beneficiary of this commitment to World Class Customer Satisfaction. □

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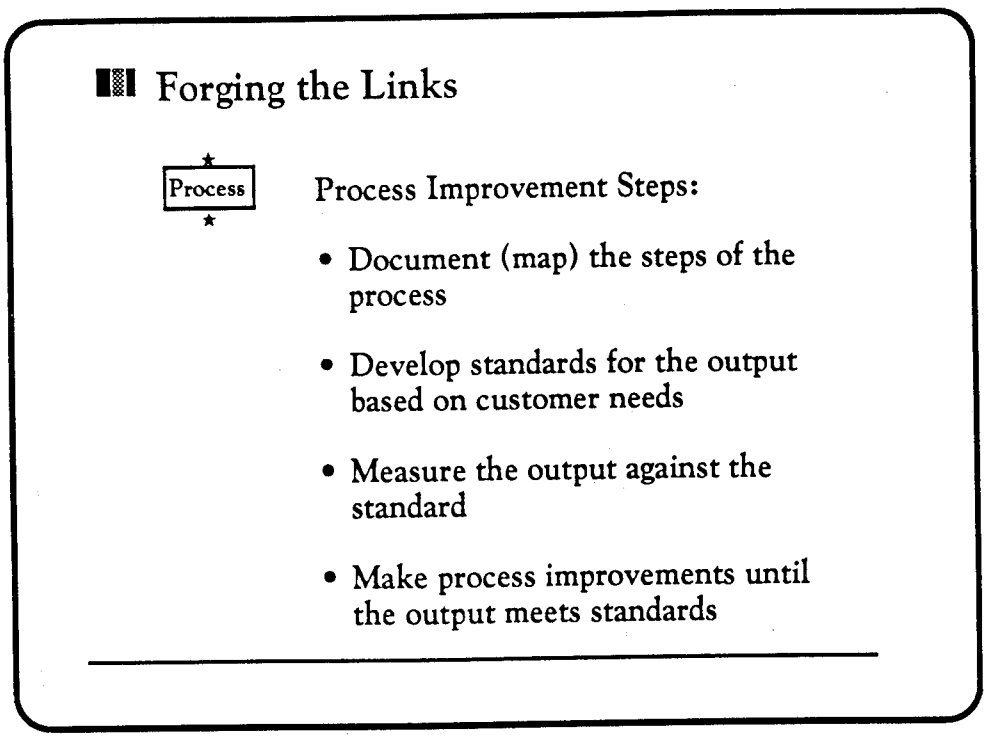


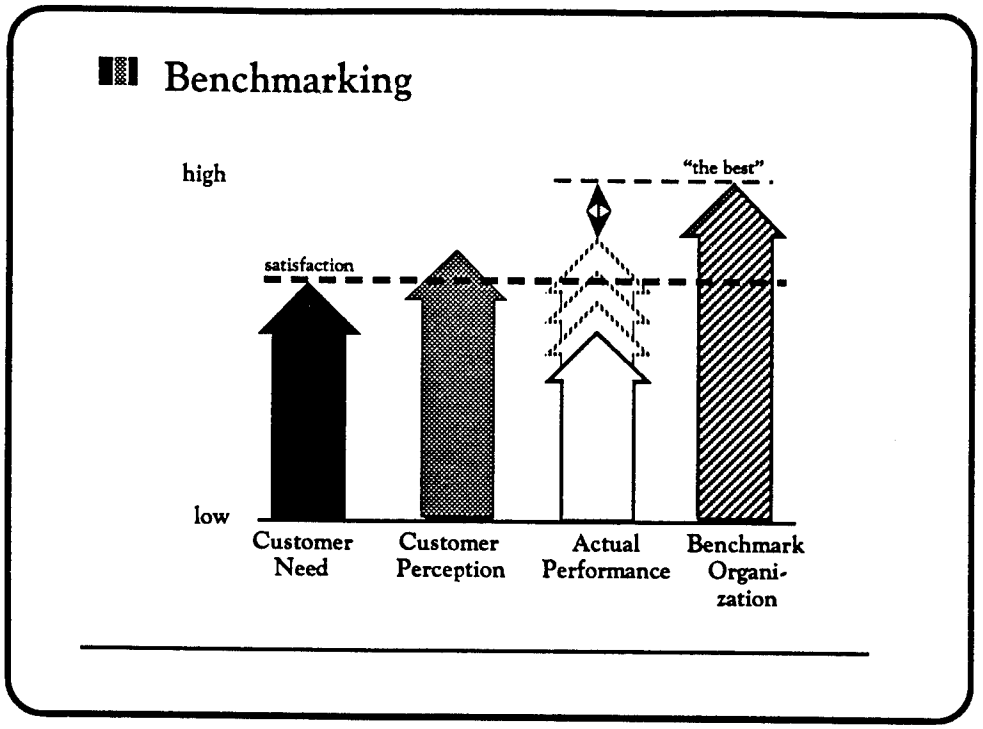
37 Forging the Links

The entire subject of Process Improvement is extremely important and is often referred to as "re-engineering". It is not our goal to cover that subject in-depth here. However, we can summarize some of the key elements of this important program, particularly pertaining to our Action Plan for Customer Satisfaction.

We form Process Improvement Teams in forging the links of our internal processes. These teams will take these steps, at a minimum:

- Document (map) the process
- Develop output standards based on customer needs
- Measure process output against standards
- Improve process until the product or service meets standards. □

Notes:



38 Benchmarking

Once we have identified the internal processes that we need to improve to exceed our customers' needs and expectations, we can learn more about these processes. Of course, we gained an important piece of process learning in just determining (measuring) the actual performance of these processes.

Benchmarking can provide another very enlightening piece of information about these processes. Benchmarking is comparing our processes and practices with the "best in class"—whether in our industry or an organization with a "world class" function.

Benchmarking is a major topic itself, but a few Benchmarking points at this juncture are relevant to our **World Class Customer Satisfaction** discussion.

We are most effective in benchmarking if we narrow the focus of the process we are seeking to improve. For example, benchmarking a sales force would not be very helpful. What part of the sales process is it that we now need to address based upon the results of our customer satisfaction measurement? Is it their product knowledge, their ability to handle billing/financial issues, their use of samples, or their call frequency? Once we have narrowed the focus of our process inquiry, we can then learn who does this

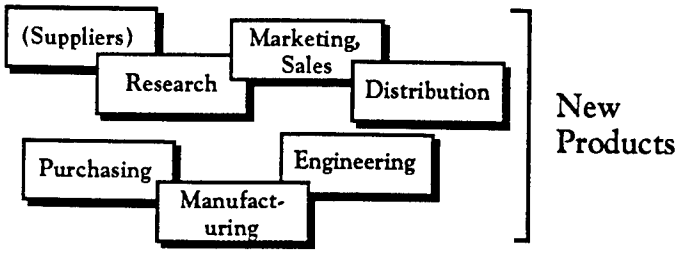
quiry, we can then learn who does this best, both in our industry and who is the overall "best in class."

In developing **World Class Customer Satisfaction**, several specific Customer Satisfaction processes were benchmarked against the "best in class." These practices are presented in the Appendix and should serve as a **starting** point as you begin to address each of these processes.

Most organizations, particularly those that are "best in class" are very willing to discuss their processes with us, so long as we are willing to share some "best practice" from our organization. By learning from the "best," we can shorten our process improvement cycle time and thereby move quickly to start exceeding our customers' expectations. □

Notes:

Quality Function Deployment (QFD)



QFD: A cross-functional system for translating customer requirements into company requirements; yields better products, faster, with fewer errors.

39 Quality Function Deployment

Once our organization has this very clear understanding of our customers' needs and expectations concerning our products and services, we can begin to use this information to not only improve the processes impacting our customers, but we can also begin to improve the existing and new products we are offering our customers.

The process for utilizing this customer information in the improvement of existing products and the creation of improved new products is called Quality Function Deployment. Again, this topic is an entire subject itself, but a few points about Quality Function Deployment are relevant.

Quality Function Deployment is a cross-functional system for translating customer needs, expectations, and requirements into company requirements. The output of Quality Function Deployment is better new products, developed faster and with fewer errors because the "Voice of the Customer" has been built into the design.

Quality Function Deployment has been extensively used in the automotive industry worldwide. Here the prioritized needs and expectations of the customer have been translated by cross functional work groups—Cadillac calls this "simultaneous engineering"—into a finished product designed to "delight" the customer.

The classic example of this type of effort was the Lexus from Toyota. This luxury car was designed to compete with the Mercedes, BMW, and Jaguar at two-thirds their price. The car was developed in two years—GM's Saturn took six—and Lexus has become the most highly rated automobile in customer satisfaction its first year on the market—exceeding ratings for the cars it was designed to compete against.

If we want to achieve that level of customer satisfaction results, we need to keep the voice of the customer very much a part of the Action Plans we develop as a result of our customer satisfaction measurement.

Here are some summary actions to consider as we address the development of our Customer Satisfaction Action Plan:

1. Use the quantitative results of our Customer Satisfaction Measurement to prioritize our actions.
2. Address the needs and expectations to be improved based upon their Customer perceived importance.
3. Examine the business processes involved in the areas to be improved—look for "root causes" (poor in-flight meals are probably not the fault of the flight attendant).
4. Gain employee input on process improvement opportunities—"ask the experts."
5. Provide the organization with clear, prioritized improvement plan objectives and also provide the required resources to accomplish these objectives.
6. Measure results on an ongoing basis. Do not wait until the next major customer satisfaction measurement. □

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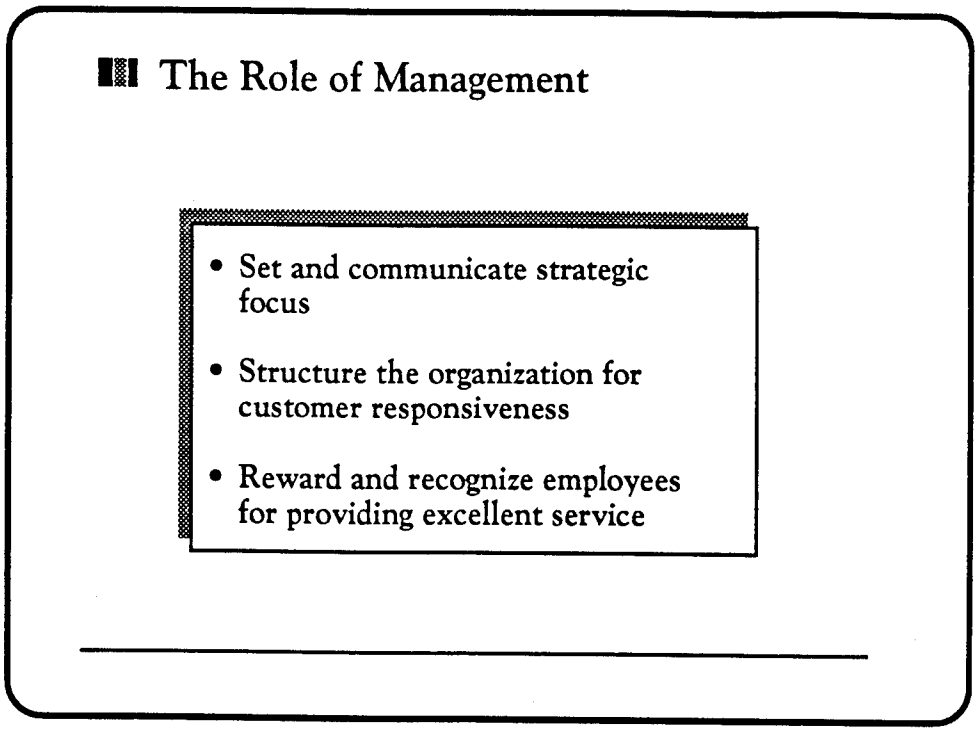


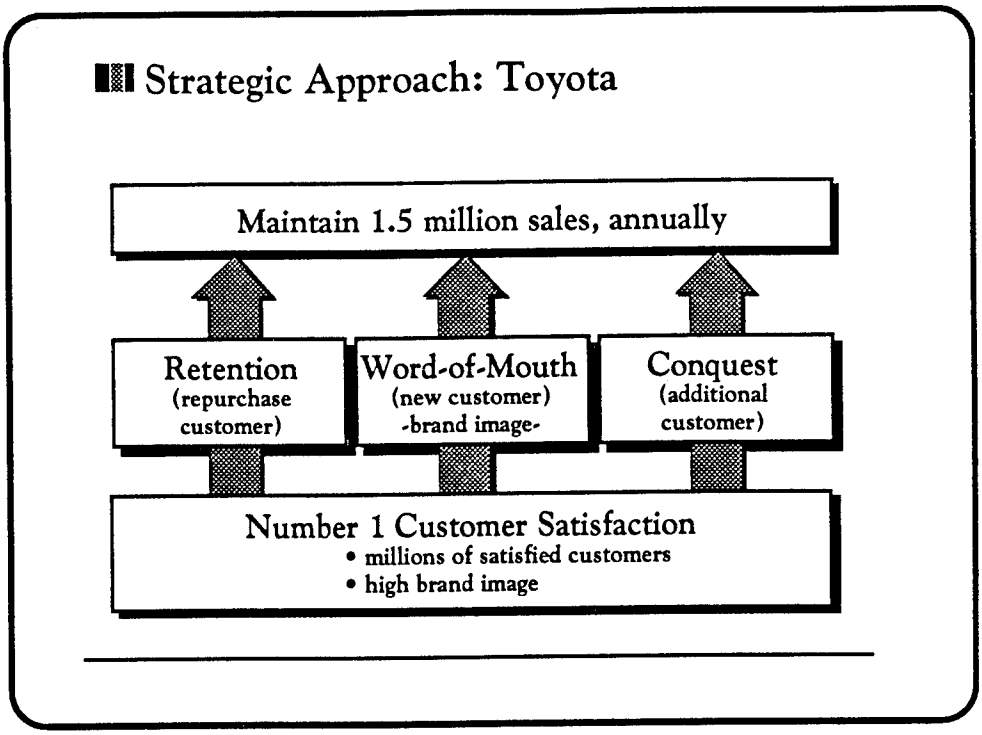
40 The Role of Management

World Class Customer Satisfaction has significant implications, as we stated at the outset. These are management issues and therefore management plays a critical role in World Class Customer Satisfaction.

Management has three basic roles in institutionalizing World Class Customer Satisfaction.

The first is to make Customer Satisfaction a strategic focus of the organization. The second is to structure the organization to make it more responsive to the "Voice of the Customer." The third is to align the organization's reward and recognition system with its customer focus. □

Notes:



41 Strategic Approach: Toyota

Customer Satisfaction is a strategic approach to achieving our business objectives. The best example of this strategic approach is Toyota Motor Sales. (This example is detailed in the Best Practices Examples in the Appendix.)

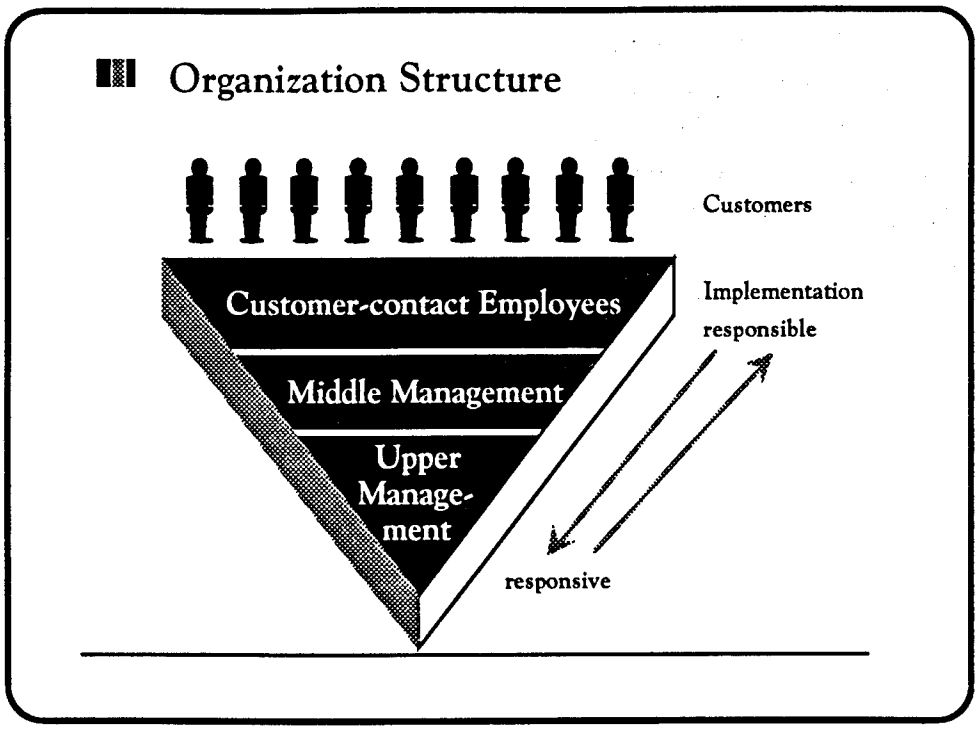
The 1992 business objective of Toyota Motor Sales is to sell 1.5 million automobiles. They are planning to achieve this objective through customer satisfaction. Specifically, they have developed a three element customer satisfaction strategy. The first step involves retaining their current customers through making certain they are satisfied and consider a Toyota for their next car purchase. (Over 90% of Toyota owners will seriously consider a Toyota for their next purchase.)

The second strategic element is the generation of positive word-of-mouth recommendations from current owners to potential owners. Clearly, you have to have satisfied customers if you are going to have any positive word-of-mouth recommendations. Toyota understands the value of both.

The third strategic element is the "conquest" (Toyota's word) of new customers through marketing and advertising to their target audience based upon a clear understanding of the needs and expectations of this audience.

Do you believe the American automotive industry has customer satisfaction as a strategic focus to this degree? If they did, why do we need federal "lemon laws" to protect dissatisfied customers? □

Notes:



42 Organization Structure

The organization that has made **World Class Customer Satisfaction** its strategic focus will also have to structure itself accordingly. This organization must be structured to not only serve the front line, customer contact employee in their "Moments of Truth," but also to assimilate customer information and act upon it quickly. It must be an organization structured to act, not merely to process paper.

Therefore, the traditional organization that is "responsive up" to management must be changed. The **World Class Customer Satisfaction** organization is focused on the customer as the top of the organization. This approach inverts the traditional organizational pyramid.

Management's role is to focus on supporting the initiatives of the customer contact personnel and to provide them with the necessary skills and empowerment to take action to delight our customers. Further, management must ensure that company policies and procedures do not inadvertently hinder its employees. □

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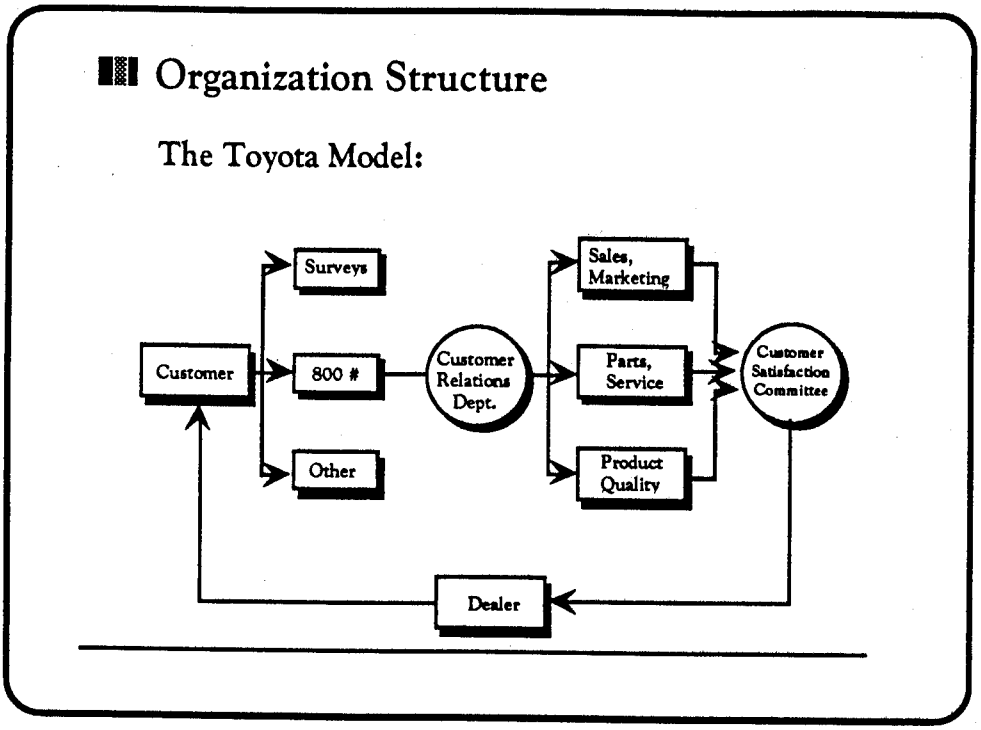


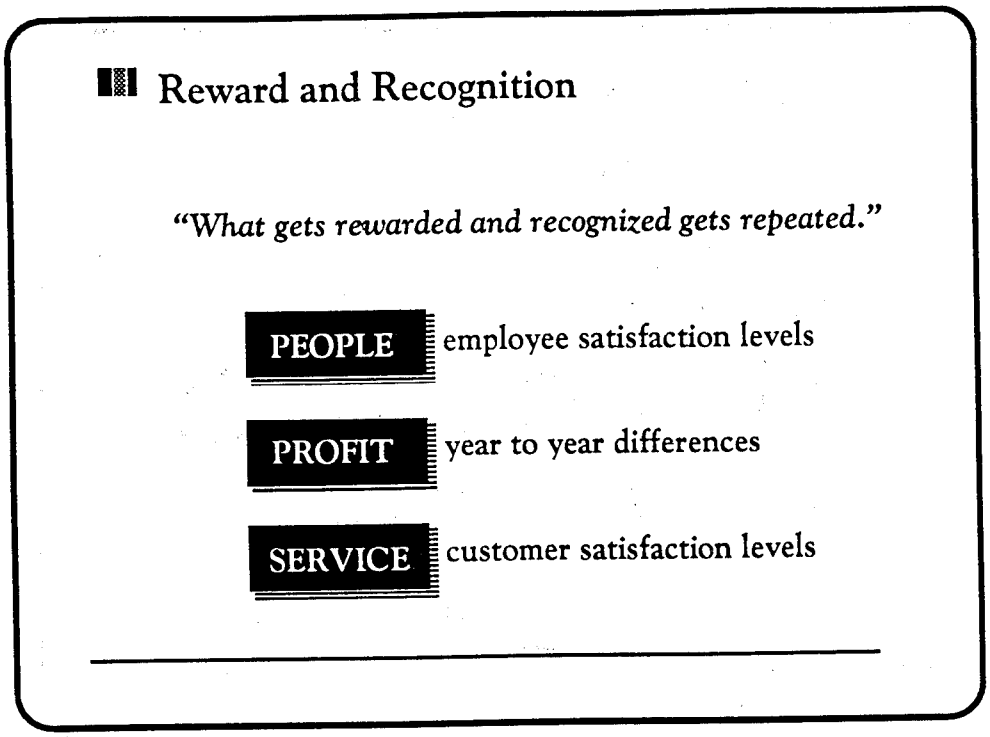
43 Organization Structure (Toyota)

Again, Toyota and Toyota-Lexus are the benchmarks for structuring an organization to focus on its customers.

The "Voice of the Customer" enters the Toyota organization from three different sources—three different customer satisfaction surveys, 800 telephone number contacts, and other customer contact opportunities. This input flows to the Customer Relations Department which proactively shares it with the relevant parts of the organization.

For example, items relating directly to the car itself (doors hard to close) are forwarded to the Product Quality organization. These groups then take the appropriate actions to address these issues and report their progress to the Customer Satisfaction Committee. This committee is chaired by an executive vice president who reports directly to the president of Toyota.

This is an organization structured with the customer in mind. It is little wonder that the Toyota products are among the most customer-preferred in the very competitive automobile industry. □



44 Reward and Recognition

What gets rewarded and recognized gets repeated. It is really that simple. The organization clearly understands where management's priorities are by the actions management takes and few actions are more obvious than rewards and recognition.

Management can talk all they want about teamwork, empowerment, and even customer satisfaction, but if they only reward short-term financial results then that is what the organization will strive to produce, at any cost.

If World Class Customer Satisfaction is a real organization focus, it must be tied to compensation, reward, and recognition.

Federal Express is the benchmark in tying customer satisfaction to organizational rewards and recognition.

Federal Express establishes quantified measures in three basic areas each year. These three areas are People, Service, and Profits.

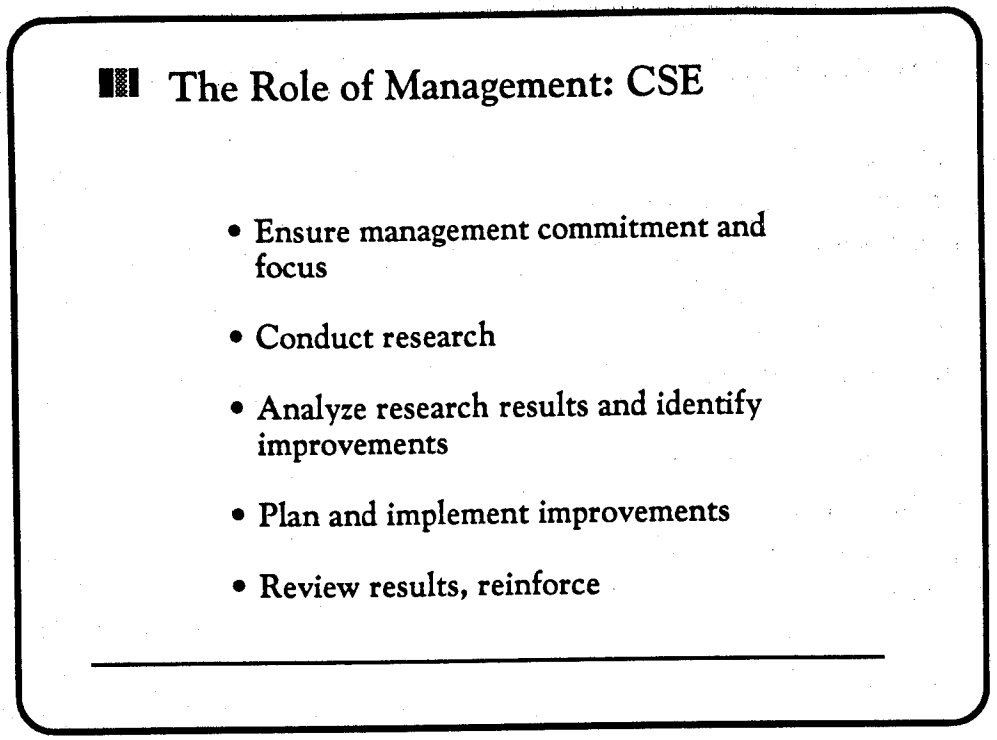
The People measures involve personal and management objectives. Their successful achievement is based in large part on an annual employee satisfaction measure—customer satisfaction of the "internal customer."

The Profit measure is based on increases on the previous year's financial results.

The Service measure is based on the organization's performance in satisfying its customers. The measurement is a compilation of the daily customer satisfaction results that Federal Express senior management reviews each morning.

Failure to meet the agreed upon measures in ANY of the three categories means no one in the organization gets a bonus—including the Chairman! □

Notes:



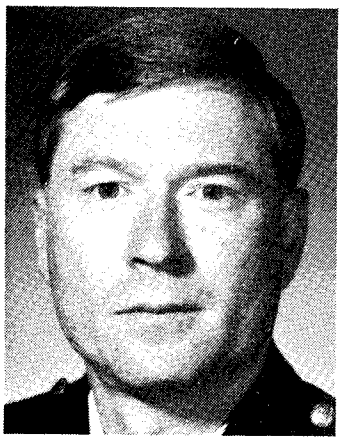
45 Summary: The Road to WCCS

If **World Class Customer Satisfaction** is to be a reality in our organization, the responsibility will rest with management. In every example we have examined today, management has led the way and focused the organization on customer satisfaction. Federal Express, Toyota, L.L. Bean, Nordstrom's, SAS, Milliken, all have management obsessed with satisfying the customer.

Each of these organizations, and all the other world class World Class Customer Satisfaction organizations, know their customers' needs and expectations in incredible depth and breadth. They use their knowledge to improvement their organizations, their products, and their services to make them even more capable of delighting the customer.

And it is a continuing process. It is a continuous improvement process because **World Class Customer Satisfaction** organizations know that the standard is always changing. The "bar" is always being raised. There are new competitors waiting to take their places at the top and waiting—even planning—to take their customers. So these Customer Satisfaction benchmarks are themselves not satisfied with merely satisfying their customers. Their goal is to delight their customer at every opportunity. Our objective should be nothing less. □

IMPLEMENTING QUALITY AT THE WING LEVEL



Maj Les Worley

IMPLEMENTING QUALITY AT THE WING LEVEL

By Les Worley, Major, USAF

The 89 Airlift Wing(AW), Andrews AFB MD, is one of the first Air Force wings to implement the Quality Air Force (TQM) philosophy. In the spring of 1990, we developed and implemented a quality program by first establishing a strong quality support structure.

A successful quality program is dependent on how committed senior leadership is and how well the organization is structured to foster a quality environment. The 89 AW has the commitment of its senior leaders who worked very hard to develop an organizational structure which encourages and promotes quality. The commander began by establishing a Quality Office and our first order of business was to work with and study other government agencies and commercial contractors with expertise in the quality arena. Then, working with the commander, we developed our first implementation plan, which was later followed by an updated plan, which will soon be replaced by a strategic plan. We also established quality councils at the wing, group and squadron levels, putting in place the basic structure necessary to bring about the Quality Air Force movement.

My presentation will examine the following areas which were the building blocks for implementing quality at the 89th:

-Senior Leadership Commitment
-Quality Office
-Quality Councils
-Quality Advisors
-Quality Training Program
-Quality Idea Program
-Strategic Plan

This briefing will not address the conceptual/theoretical approaches to implementing quality, but the real life, get your hands dirty aspects of making quality happen throughout a large organization. The foundation of a quality movement includes the organization's commitment to training and the 89 AW has a reputation throughout the Washington D. C. area for one of the finest quality training programs. We received our initial quality training through Organizational Dynamics Incorporated (ODI) and from that developed our own program. A year later, Air Mobility Command, our major command, developed a course which we adopted. From 1991-1992 we trained over 7000 personnel in a two-day, hands-on awareness course which provided the basic knowledge required to start making work area improvements. Today, we instruct Awareness, Process Action Team, Facilitator and The Seven Management and Planning Tools courses within the wing. After attending this presentation, attendees will understand what it takes to implement quality at the grassroots level.

The 89 AW has a reputation for an outstanding quality program throughout the Air Force, and has been used as a model for several government and civilian agencies. We have helped over 40 organizations including Secretary of the Air Force offices, other major command quality offices, area Reserve Officer Training Corps detachments and the local Chamber of Commerce. Both the Air Force Times and Quality Progress Magazine have published articles citing the accomplishments of the Quality Air Force movement at Andrews AFB.

Implementing Quality at the Wing Level

- Leadership commitment
  - -- Starts at top with the commander and his/her commanders
    - --- Most mid-level commanders will implement Quality because it make sense to do so
  - -- Some will only do the "Quality Thing" because they know it's "important" to their boss
    - --- Many will become believers, some never will

- Leaders must "walk-the-talk"
  - -- Just talking won't do, they must live it
  - -- Attend training classes
  - -- Instruct part of workshop or attend for Q & A
  - -- Empower subordinates
    - --- Different levels of empowerment

Infra-Structure

- "You don't get something for nothing"
- Commanders must provide resources to implement Quality
  - -- Personnel for Quality offices
  - -- Classrooms
  - -- Money for travel, materials, etc
  - -- Time for training and teams
- Establish Quality Councils
  - -- Chaired by Wing Commander
  - -- Selective membership, decision makers!
  - -- Provide direction, guidance and set policy
    - --- Develop Strategic Plan
    - --- Charter PATS
    - --- Approve and implement PAT recommendations
    - --- Approve team awards
  - -- Wing Quality council structure mirrored at group and squadron levels

Infra-Structure

- Full-time quality advisors
  -- Work for commander to help implement Quality Air Force
  -- Instruct, Facilitate teams, assist with assessments/surveys, etc
  -- Direct line of communication between Wing Quality Office and Group Quality Offices

- Quality Training Program
  -- Everyone in organization must receive appropriate level of Quality Air Force training
  -- Awareness training for all personnel (2 days)
  -- Facilitator and PAT training as necessary
  --- Just in time training
  -- Wing instructors train others to instruct Awareness and PAT training at group squadron levels
  --- Wing instructors provide Facilitator training

Quality Idea (QI) Program

- Suggestion program for 89 AW
  -- Only applies to 89 AW owned processes and quality of life issues

- Anyone in wing can submit a Quality Idea
  -- Squadron commanders can approve but not disapprove
  -- Group comanders and wing commander have approval and disapproval authority

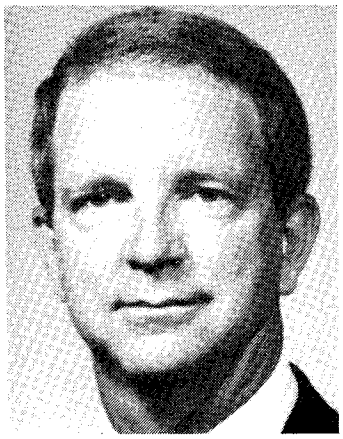
- Quality Idea Program makes it easier to approve an idea than to disapprove it

- Program designed to ensure that good ideas generated at the grassroots level get the attention they deserve

Strategic Planning

- Task: Build strategic plan for wing of 7000 + personnel
  -- 5 groups; 14 squadrons
- Training program built around Seven Management and Planning Tools
  -- Train group staffs first, then begin planning process
  -- Wing staff training and planning process to follow
- All groups involved in strategic planning process
  -- Wing staff to begin in Oct
- Organizations re-examine goals and objectives
  -- Develop new or refine current long-term/short-term goals
    --- Establish objectives
    --- Examine process/customers needs to determine metrics
- Group inputs used in building wing strategic plan

SOME KEYS TO THE SUCCESS OF A QUALITY JOURNEY IN A GOVERNMENT/SERVICE CONTRACTOR ENVIRONMENT



Charles King

Total Quality Management: A Decade of Experience

Ben E. Harrison
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Abstract

N.V. Bekaert S.A., the world's largest independent producer of steel wire adopted Total Quality Management (TQM) as part of its corporate strategy in 1982. By learning and applying the principles of TQM in its 49 manufacturing facilities throughout the world, it has continued to grow and has remained profitable in a period of declining prices and increasing competition.

Although a commitment from top management existed, each plant had to make many adjustments along the implementation route to undergo the required culture change.

Background

In 1880, Leon L. Bekaert started as a one man producer of barbed wire in a small village in Belgium. More than a century later, that workshop has developed into a world wide organization called the Bekaert Group, employing a total of 16,000 people. The Bekaert Group currently consists of 49 manufacturing facilities in Europe, South America, Asia, Australia and six plants in the United States. The joint annual production is approximately 1.5 million tons of steel wire and wire products. After seeing and studying the superior results of their plants in Japan, Bekaert adapted Total Quality Management (TQM) as a corporate strategy in 1982. Incorporating TQM throughout the Group was an evolutionary process that took different approaches at each location.

Commitment

In the early 70's Bekaert built a plant in Japan incorporating technology and equipment which was designed and built by Bekaert Engineering. Japanese managers and engineers were trained in Belgium prior to plant start-up. The plant began with all Japanese managers and some technical support from the Bekaert Engineering group. Within three years of start-up the Japanese plant's productivity

was surpassing all other plants in the Bekaert Group in the production of Steel Cord, a product which is used to construct steel-belted radial tires.

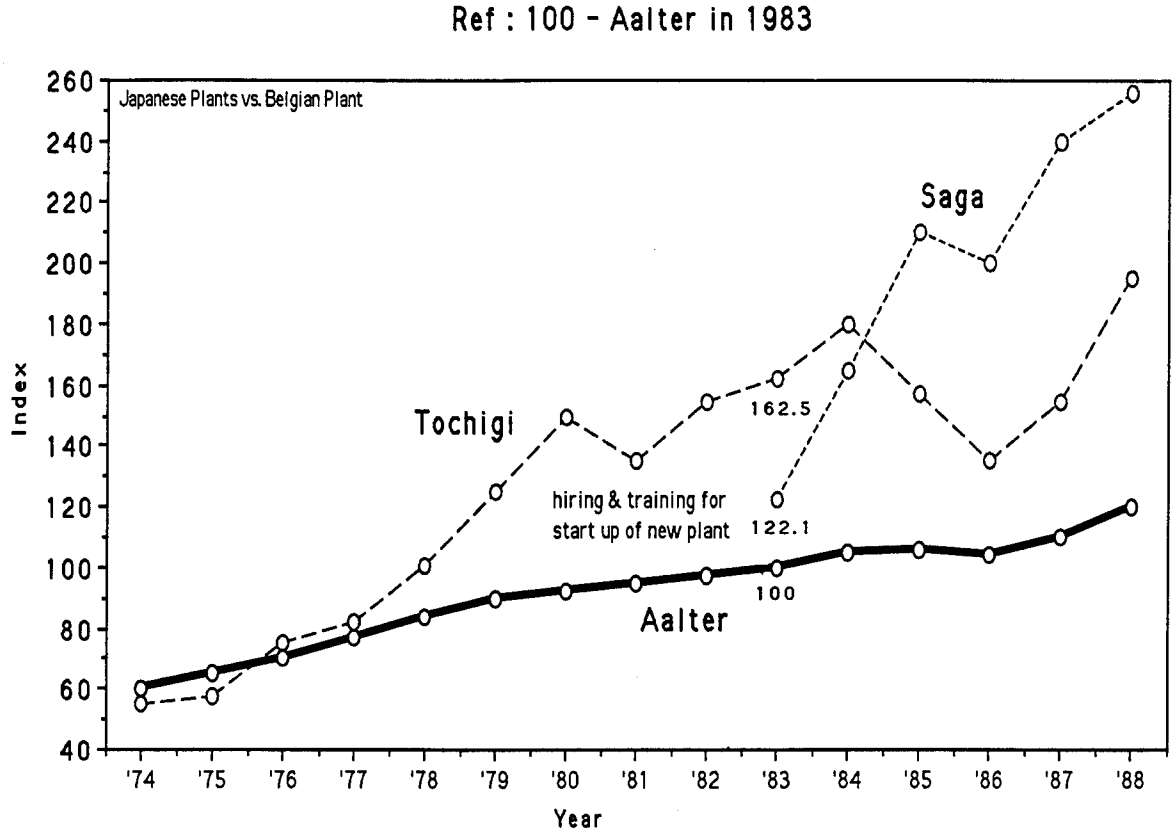

Fig. 1

Figure 1 shows the relative productivity of the two Japanese plants compared to the best European plant. After studying the techniques used to achieve this remarkable improvement, the Bekaert Group determined that TQM would become a necessity for long-term survival. In 1982, Bekaert adapted Total Quality Management as part of the corporate strategy.

Total Quality Management was defined as:

> "The continuous improvement of everything we do throughout the whole organization using well-known systems and with the participation of everybody."

This means involvement from top to bottom in all departments.

Figure 2 shows the conditions which are required to gain commitment from anyone or any organization.

Conditions for Commitment

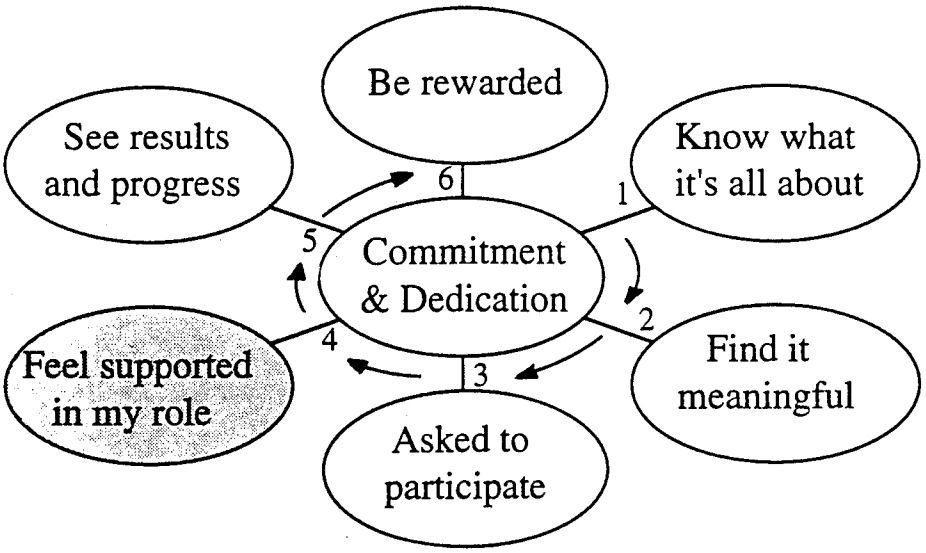

Fig. 2

The first three conditions can be accomplished through training and the involvement of groups or individuals. Support (the fourth condition) for each business unit, each plant or each individual must come from a variety of sources.

Support

In the beginning of the TQM effort, a Japanese professor and member of the Deming Award Selection Committee was engaged to mentor the TQM process and help steer Bekaert through the evolution which was to follow. This professor still visits the plants in the Bekaert Group to evaluate the whole TQM approach, to evaluate progress, and to provide feedback.

Key support was and is provided by Bekaert Associates, Inc. (Bekaert-Stanwick in Europe), the consulting team of the Bekaert Group. Bekaert Associated assists in the areas of Quality Planning, training requirements, stimulating projects and advising top management on the long-range TQM process.

During the early years it was realized that to sustain progress, it was necessary to establish a TQM coordinator at each level of the organization:

- Corporate
- Major Business Unit
- Manufacturing Plant
- Other Facilities

These people serve as a source of support for their organization, assist in developing the Quality Plan, provide training as required to expand TQM in each location, advise the location manager concerning the TQM process, and serve as the secretary for the TQM Steering Committee. The Steering Committee is ultimately responsible for guiding the TQM process and directing the TQM coordinator at each location.

By providing support at every level. The commitment of each unit and growth of the TQM process is assured. As results are demonstrated in areas such as:

- Decreased customer claims
- Reduced scrap
- Reduced rework
- Reduced fractures
- Increased run time
- Increased employee involvement
- Increase in quality indicators (Ca, Cp, Cpk)

the commitment continues to grow.

Obstacles Encountered

As with any organization, change does not come easily and every location faced many obstacles. A standardized approach was attempted, but the results did not turn out the same at each location. The culture at each plant and in each country was different. The different cultures had to be uniquely addressed and implemention had to fit with what was appropriate.

As a result, each location progressed at a different rate. This rate depended upon the personality and commitment of the unit manager, whether it was union or non-

union, the average education level, and the starting point for basic areas such as housekeeping and orderliness.

Obstacles at most locations:

- Common complaints at all levels were that TQM was an additional task and there was not enough time to do their jobs.
- In the beginning, TQM was often "delegated" to the lower levels of the organization. Projects were expected to be completed by the shift supervisors and operators with little involvement or direction from their managers.
- "TQM will not work here because we are 'different'."
- "TQM is only for the production departments and doesn't apply here."
- "TQM is a 'special' program and not integrated in our daily work."
- After the initial six months and the first projects completed, the effort nearly stopped because they felt the tasks were complete.
- Emphasis was placed only on Statistical Process Control (SPC) without accompanying it with improvement projects and team problem solving.
- There was a lack of basic understanding within the management ranks.

As these obstacles were encountered at various locations, they all had to be addressed in unique ways.

Critical Success Factors

Despite many obstacles, TQM has persisted and grown at all locations. There are several factors that have contributed to the overall process of Total Quality Management throughout the corporation.

First and foremost, there has been unwavering support from the CEO. TQM was introduced in 1982 as a Bekaert policy. The following three years significant efforts were put into training at all levels, publicity campaigns, recognition of TQM teams, and trips to the Japanese factories for many key managers. In 1986, Total Quality Management was announced as a basic strategy for the Bekaert Group by the Chairman of the Board. A TQM update became a regular part of the annual report, and TQM plans became a major part of each unit's annual plan.

During this time the consulting group provided support as required to the individual units. This support assured that all the units continued to expand their TQM efforts.

Second, TQM is applied to all levels, from the Board of Directors to the operators on the shop floor. By everyone being involved, it becomes easier to view TQM as a way of doing business rather than a project that may be short-lived.

As TQM progressed throughout the Bekaert Group, it was considered as the only way to achieve leadership and maintain growth. TQM also became the common language in a multinational/multicultural corporation. Presently, all interplant meetings and Business Unit Technical Meetings include time for sharing TQM projects and results.

Lessons Learned

Many lessons have been learned over the past decade. An organized plan was not set forth ten years ago that got us to the level we are today. In fact if we could start over, the existing level of TQM integration could have been accomplished in less time due to the lessons that have been learned. They are:

1. The leader of the unit (whatever size) must be committed and willing to spend significant amounts of time involved in the TQM process.

2. In order to change a culture, the priorities within the culture must be changed. The priorities must become continuous improvement, people involvement and quality in general. To change the priorities, the things that are measured and rewarded must be changed.

3. Patience is required. A culture does not change because the boss says it will. It takes years of demonstration before TQM becomes a normal way of operating. This does not mean that positive results will not come from the initial efforts.

4. A practical and effective approach is necessary. Success early in the program builds enthusiasm that will sustain the efforts through the first years.

5. As much attention needs to be focused on the behavioral aspects as on the technical aspects. Teams and teamwork do not come about naturally but must be taught. How to conduct a meeting, roles of participants and how to reach consensus is as important as the seven basic tools.

6. Support for the process must be available at each level in the form of a facilitator. A facilitator helps keeps an organizational unit as well as the problem solving teams focused on the process.

7. Improvement in TQM must be built into the annual plan and measures put in place. Managers must understand that progress in TQM is integral to running the business.

8. Involve suppliers in the quality process. Develop improvement plans with them.

9. Perseverance is required. There will be lulls in the process. Support and activity must be used to re-energize.

10. Gaining and sustaining commitment to the TQM process must be part of the strategic plan. Support for the process must be provided, and it can come from different sources:

- Internal
  - Facilitators
  - Committed Leaders
  - Steering Committee

- External
  - Education
  - Consultants
  - Mentor

Conclusion

"Bekaert Outsmarts the Recession Using TQM" was the headline of a recent article in the Quality for Europe magazine. The article demonstrates the value of TQM when it is consistently applied as a corporate strategy over many years.

Results:

- 15% cut in expenditures since 1985
- Productivity increases from 15% to 35%
- Winner of the European Foundation for Quality Management in the Spanish plant

Bekaert group managers have come to understand that TQM is an important and vital pillar in the company's strategy. Implementation throughout the organization has strongly contributed to the company's competitiveness in the global markets in which it operates.

TOTAL QUALITY MANAGEMENT: A DECADE OF EXPERIENCE

Ben Harrison

SOME KEYS TO THE SUCCESS OF A QUALITY JOURNEY IN A GOVERNMENT/SERVICE CONTRACTOR ENVIRONMENT

Charles H. King
Director, Total Quality Office
Arnold Engineering Development Center
Arnold AFB, TN

"Toward New Horizons"

"Never again will the United States ride the coattails of other countries in the progress and development of the aeronautical art." With these words, President Harry Truman dedicated Arnold Engineering Development Center June 25, 1951.

The Center President Truman dedicated quickly became the free world's largest and most advanced aerospace ground test facility. Nestled in a remote area in southern middle Tennessee, AEDC -- with its enormous wind tunnels, engine test cells, space chambers, ballistic ranges, and other major test facilities -- has played a vital role in the development of virtually every military aircraft and weapon system since 1951.

AEDC's service is testing. Its product is information -- data which represents knowledge that reduces risks -- performance data about aerospace systems, attainment of which could endanger live and machines if testing were conducted in actual flight.

AEDC exists because of the vision of General of the Air Force Henry H. "Hap" Arnold. Before World War II came to a close, General Arnold became alarmed by the rapid German advances in aerospace technology and their deployment of rockets and jet aircraft. He saw his role as more than the Commanding General of the Army Air Forces during the war. "I had another job," he later wrote. "That was to project myself into the future...and determine what steps the U.S. should take to have the best air force in the world 20 years hence."

Throughout his career, General Arnold believed that U.S. test facilities should lead rather than merely keep abreast of technological developments. He was a staunch advocate of long range planning who constantly called for "vision and flexibility" when planning for the future of the Center. As a result, AEDC has been able to remain in the vanguard of a rapidly expanding technology.

AEDC: A National Asset

Located at Arnold Air Force Base, Tennessee, AEDC is part of Air Force Materiel Command. It is not, however, a typical Air Force base.

AEDC employs more than 3400 people and is comprised of four major components -- the

Air Force with its military and civilian segments; a major contractor responsible for the Propulsion Test portion of the mission; a second major contractor responsible for the Flight Dynamics Test portion; and a third contractor who provides Mission Support to the other two and the Air Force. In addition, the Mission Support contractor has three major subcontractors on site. To top off this challenging array of stakeholders on "Team AEDC," there are thirteen unions representing almost half the contractors' employees.

Today, Arnold Engineering Development Center serves as the world's premier aerospace ground test and evaluation capability. The Center has 53 test facilities, including aerodynamic and propulsion wind tunnels, rocket and turbine engine test cells, space environmental chambers, arc heaters, ballistic ranges, and other specialized units, supported by advanced computational capabilities.

Essential to the nation is AEDC's mission:

- Test and evaluate aircraft, missile and space systems and subsystems, simulating the flight conditions they will experience during flight;

- Conduct in-house research and technology programs to develop advanced testing techniques and instrumentation, and support the design of new test facilities; and

- Acquire, maintain and modernize advanced facilities as necessary to accomplish the Center's testing and research and development mission.

AEDC serves a wide variety of customers including all of the Department of Defense weapon system acquisition and testing community, the laboratory community, Air Force logistics centers, NASA, DNA, the FAA, other U.S. government and allied foreign agencies, the U.S. and international aerospace industry, and academia.

Of the 3400 people at AEDC, only about 400 are Air Force military or civilian -- an unusual workforce at the very least. There is full integration of the AEDC team, however -- military, civilian, and contractor -- throughout the workforce in the accomplishment of the Center mission. Members serve together on a wide variety of teams -- test teams, integrated product development teams, quality improvement teams, planning teams and steering committees.

It is a proud workforce too. Operation Desert Storm was the latest proof of the value of superior technology in combat. AEDC people take pride in the fact that every aircraft and missile system the U.S. used in that conflict was tested here. AEDC truly made the contribution General Arnold and President Truman envisioned.

Our Stepping Stone to the 21st Century -- Total Quality

AEDC was founded and has succeeded for forty years in ensuring the existence of quality

in America's aerospace weapon systems. AEDC's livelihood is the conduct of tests and the development of test technology to demonstrate that quality is built-in to America's aircraft, space and missile systems. However, failure to respond to changing realities would take the Center down a path of dwindling resources and potential demise.

To make sure this illustrious service to the nation continues, AEDC embarked on a journey toward a cultural transformation and an exciting future. This evolution of the AEDC culture is creating an environment of improved work processes, organizational structure and cultural attributes.

AEDC has always had facilities with tremendous test capabilities -- many of which are unmatched anywhere in the world -- and a stable, highly qualified workforce. But in the late 1980's, Center leaders identified improved teamwork and continuous process improvement as the ingredients needed to move AEDC from a facility for aerospace testing to *the facility of choice for aerospace testing.*

Creating a quality culture in any organization is difficult, but to do so in three separate private companies at one time -- while simultaneously changing the management style of one of the most conservative institutions in the world...the U.S. military, seemed a pretty large mountain to climb. Yet, AEDC had to come together as a team...living separately possibly meant dying together.

Improving teamwork has required AEDC to influence change in its culture, in short, to become a quality organization. The quality evolution began in 1989. A Center Commander's experience at a quality seminar led to a consultant being selected later that same year to train AEDC leaders in the principles of Total Quality Management.

The foundation of the resulting AEDC evolution rests on the quality policy:

"Complete commitment to continuous improvement
in everything we do involving each one of us."

The cornerstones are AEDC's goals, which it shares with its higher headquarters, Air Force Materiel Command;

* Satisfy our customers' needs...in war and peace

* Enable our people to excel

* Sustain technological superiority

* Enhance the excellence of our business practices

* Operate quality installations.

AEDC has achieved a true cultural transformation in its emphasis on Team AEDC. The leadership of the Center, military and civilian, government and contractor, has shown active, involved commitment to continuous improvement and a team concept. With this commitment, AEDC took several key steps to facilitate its cultural evolution.

Team AEDC

A quality council and quality steering committees, at various levels of the organization, were formed. These groups provide the policy and guidance necessary to sustain and enhance Center process improvement activity. A Strategic Management Group was formed of senior managers from each organization, including the unions. This group meets quarterly in an open forum, creative, problem-solving format -- all equals in casual dress, no uniforms or ranks, first-name basis. This group focuses on the 40-year AEDC Strategic Plan and on specific issues affecting the Center and its customers. Inclusion of all stakeholders in these key deliberative processes has aided immeasurably in building trust and team spirit. The creative atmosphere provided in these sessions has stimulated rapid development of powerful plans and ideas. The enthusiasm generated among the participants has resulted in broad dissemination of the new culture through the workforce.

Tools used to enhance teamwork have included self-directed work teams, quality training in team problem solving techniques, business process management teams, internal culture surveys, cross-functional project teams and specific teambuilding seminars. In addition, AEDC has developed the AEDC Teamworks Adventure course where work groups, under the guidance of trained facilitators in an outdoor "ropes course," tackle initiatives which would be impossible to complete as individuals. These exercises vividly demonstrate the value of planning, focus, process improvement and working together to maximize both individual satisfaction and group achievement.

Training

AEDC has made extensive use of a wide range of training to plant the seeds of total quality in its people. Although the Center's total quality journey clearly incorporates philosophical principles from Deming, Juran and Crosby as well as other lesser known writers and advocates of quality, initial training of the senior management and union leadership was provided by the Juran Institute. Based on instructor training provided by outside sources, AEDC developed a number of its own total quality training courses to be taught by in-house personnel. Hundreds of people have been trained in those courses. Middle managers down to the "lead man" level are being trained by AEDC facilitators certified by the Covey Leadership Center in the "Seven Habits of Highly Effective People." Numerous managers have been trained in the Quality Air Force self-assessment process. Teambuilding training is provided in classroom seminars and the outdoor AEDC Teamworks Adventure course.

Facilities

A real commitment to effective teamwork has to include provision of suitable facilities. AEDC has made extensive use of appropriate off-site facilities through rental of economical state park meeting rooms and free use of local college auditoriums and short-course facilities under cooperative alliances. In addition, management has shown solid support by investing in the Teamworks Adventure course discussed above, specially designed and equipped training rooms in the headquarters building, and a 21st century Leadership Center in which the creative Strategic Management Group Sessions referenced earlier are held.

Techniques

AEDC has forged ahead on its quality journey by using a broad array of tools and techniques. Early forays into the world of continuous improvement included the use of problem solving skills by quality improvement teams. Quality planning teams soon followed. Business process management teams are on-going efforts to institutionalize the continuous improvement culture. Customer surveys, employee surveys, personal interviews and town meetings conducted by the Commander have provided invaluable feedback from both internal and external customers. Quality in Daily Work sessions have enabled company general managers to talk with all their employees in small group settings. The Commander's staff meetings now include contractor general managers and union leaders.

Strategic Plan

Reflecting on the center's 40-year history, the AEDC commander determined that, a few years ago, the center faced a choice of two possible paths. We could continue to operate "as usual" and allow ourselves to be buffeted by whatever external forces came along, or we could work to create our own future. AEDC used the Strategic Management Group to determine our current "state," envision our future "state" 40 years in the future and work our way back through what it took to get there. Considering vision, principles, goals, objectives, current and potential business areas and both the internal and external environment, the Strategic Management Group created a "living" strategic plan which provides a path for Center initiatives toward the year 2031.

Alliances

The military, economic and socio-political environment in which AEDC must thrive is decidely different now than just a few short years ago. We see an AEDC which grows by serving national security, as part of a network of partnerships and alliances with U.S. and allied governments, industry, educational and community organizations. AEDC is using

the principles of teamwork and trust to strengthen relationships with our customers and other federal partners as well as seek new, non-traditional business opportunities. Successes achieved include a significantly closer partnership with our sister service, the Navy; alliances with two major U.S. commercial aerospace developers; and an alliance with two higher educational institutions in the local area.

Principles

The success AEDC has achieved through the implementation of these tools and techniques can be related to four principles upon which our cultural transformation is founded. These principles, originally developed by the AEDC Mission Support Team are teamwork, people growth, agreed upon expectations and continuous improvement. Certainly there are others, such as trust, integrity, commitment, etc, but we believe these four are particularly important to AEDC.

Teamwork begins when a collection of individuals merge into a group which has a common purpose. It is characterized by unselfishness, mutual respect, and a willingness to place the interests of the group above self interests. Team members recognize their interdependency on the special skills and contributions of each other. Individuals bring diverse backgrounds and perspectives which initially influence the goals of the group. Over time, the goals and needs of the individual are evolved and changed by the influence of the group, eventually arriving at an alignment of group and individual goals. Successful teamwork results in a whole that is greater than the sum of its parts.

People growth is a vital part of a productive workforce. "People" means every member of an organization, each person on the payroll. "Growth" means that every worker starts a job with a basic outline of their responsibilities and is encouraged to help formulate and evolve the way these responsibilities are filled. When the manager/worker relationship is nurtured with mutual respect and clear and open lines of communication, a sense of pride, ownership, and common commitment develops in the workforce.

Agreed upon expectations are the starting point for any successful partnership or team effort. Clear and constant communication among team members is essential to achieve agreed upon expectations or goals. Goals must be challenging in order to stimulate the creative nature of the workforce, but should also be realistic and attainable. In order for resources to be managed effectively, goals or expectations must be prioritized. While some team members plan and develop goals and others provide the execution of the plan, there is a mutual responsibility to be open, honest, and flexible in all activities.

Continuous improvement is a concept which, when accepted as part of the culture of the workforce, constantly draws the efforts of the provider toward the goals of the customer. This concept features an alliance between provider and customer which encourages open communication and reasonable risk taking, without fear of reprisal, and allows delegation

of authority to workers while offering support to decisions. When employees are encouraged to be innovative and creative in the performance of their jobs, efficiency and job satisfaction can be maximized. In order to sustain the momentum achieved by these methods, planning and budgeting for training and continuous improvement projects ensures a steady progress toward complete customer satisfaction.

Next Steps and Future Directions

Founded on these principles and with committed leadership, AEDC is well on its way toward a successful cultural transformation, one where teamwork, empowerment, strategic planning and "buying-in" to organizational goals and objectives are part of a new "business as usual."

Confirmation of AEDC's progress in its quality transformation journey is its selection as one of only three winners throughout all of the federal government of the Federal Quality Institute's prestigeous 1993 Quality Improvement Prototype Award.

Stewardship of AEDC's people and national assets demands that we continue the journey. Through it we are creating a vibrant, bright and productive AEDC of value to the nation, keeping General Arnold's vision alive for another 40 years.

IS QAF DESTINED FOR FAILURE?

Capt Kenneth Theriot

Is QAF Destined For Failure?

By
Captain Kenneth R. Theriot

"Quality Air Force," the US Air Force's version of what is known in industry as total quality management, is defined as "a leadership commitment and operating style that inspires trust, teamwork, and continuous improvement everywhere in the Air Force."[1] Total quality management was born in the manufacturing industry. Despite this fact, many service organizations have seen great success by implementing quality systems. AT&T Universal Card Services and Ritz-Carlton are two recent service category winners of the Malcolm Baldridge National Quality Award. This is good news for the Air force, which is essentially a service-oriented organization; there is much we can learn from successes in civilian industry and use to enhance Air Force quality impementation. Not all organizations succeed in their TQ efforts, however, and it would be foolish not to heed the lessons from those organizations who have failed. In his book, An Ounce of Application is Worth a Ton of Abstraction, J. Michael Crouch points out that "the number of these organizations is estimated at fully 80% of all who have undertaken TQM!"[2] Because of this, many people have begun to feel that the concept of TQM is not valid. They say it's just the latest management fad and will soon pass. But "the bad experiences endured by organizations that have misapplied the TQM concept no more invalidates the concept than the injury sustained by a person who suffers an allergic reaction to being wrongfully treated with penicillin invalidates that drug's tremendously beneficial value."[3] There are several barriers and pitfalls to implementation that "post-mortems" have shown to be common causes of TQ failure. I believe the two most important which we in the Air Force should concern ourselves with are: ***Too Little Alignment of Articulation and Action*** and ***Lack Of Culture Change.*** I believe QAF **can** work (and indeed **is** working in some instances). My intent is to stimulate thought and highlight some pitfalls which, if avoided, will greatly improve our chances of successfully implementing QAF.

Articulation vs Action

Tom Peters said, "They watch your feet, not your mouth."[4] This is just another way of saying that it is more important for managers and supervisors to model behavior than to articulate it. As TQ instructors, we have been teaching that the reason the quality circle movement didn't catch on was that in general, there was no true commitment which would nurture a team-based corporate culture. Most managers jumped on the bandwagon and started quality circles, but offered no team training, or empowerment to the teams. They were going through the motions but not actually modeling the behavior they kept preaching about. They didn't walk the talk. The philosopher George Santayana said "Those who cannot remember the past are condemned to repeat it."[5] We should take a close look at our recent history and ensure we learn from it.

I began as the full-time TQ advisor at my base in August 1991. This job has been a rewarding experience; however, I'd like to relate some base-level frustration experienced by me, our staff and reported by students and colleagues during the last two years. At the time, the Air Force Quality Center had not started offering courses. My training consisted of lots of reading and benchmarking of information (perhaps begging is a more applicable term). The Deputy Commander for Resources at my base had worked previously in the total quality business in the Air Force Logistics Command (AFLC). He was a rich source of information and resources, and

worked closely with me to educate me through his experience. After a few months I attended some courses at an AFLC base. Thus prepared, I set out on the TQ journey. At first, nobody knew quite how to handle the situation of having a full time office which didn't exist on any official records. There were no manpower slots, so technically ***I*** didn't exist on any official record either, except as a supply officer occupying a position in the supply squadron, supposedly doing supply work. I felt like an outlaw. Letters and phone calls came from command headquarters, and even as high up as the Pentagon saying "you can't have a supply officer with a duty title such as Total Quality Management Officer." One former IG inspector told me it was fraud, waste and abuse to do what we were doing. Eventually, base-level TQ offices became fairly common, but the supply squadron still had a ghost captain not working in a slot which could not be back-filled. We were told we had to "take it out of hide." We looked for ways to change my Air Force Specialty Code (AFSC) , but there was nothing to change it ***to***. There would be no career field established for those individuals working full time in the TQ arena, nor any provision for keeping a trained QAF advisor and/or facilitator working to advance TQ in the Air Force. I have even been told that it is dangerous to my career to continue working as a QAF instructor/facilitator full time. When I leave this base, the commander cannot expect a trained replacement for me. He will have to find someone else to "take out of hide" and start the training process all over again. This is wasteful and expensive, not to mention time-consuming. Meanwhile, I will likely go back to the logistics career path where I will have limited opportunities to pass on the information that I have acquired.

Then there is the trouble with reporting. I am a supply officer whose supervisor is the wing commander. This causes havoc when it comes to determining which orderly room will provide us with administrative support. I cannot transfer to the Mission Support Squadron (MSSQ) because my AFSC doesn't allow it. All of this is compounded when we add more people to the equation. I have two NCOs on my TQ staff. One of them is a Security Police asset, and the other is from the Medical Squadron, whose orderly room is 12 miles away. This is not to mention all the minor problems such as establishing an organization and account code to purchase supplies, or obtaining the Security Police Squadron Commander's signature on a performance report, because **on paper,** our other NCO is still there. The list goes on and on. Is the rationale of "not sending the mistaken impression that quality is only for those in the quality office" being accomplished? Or are we simply sending the message that TQ is temporary and if the "nay-sayers" ignore it, it will eventually go away? Regardless of the intent, the perceived message at base level often is "they must not be serious about TQ since they *say* we should have TQ offices, but they won't actually authorize them." By providing commanders with a common methodology and regulatory guidance on how to man a TQ office at base level, the Air Force could ensure alignment of articulation and action, and avoid mistaken perceptions which could prove harmful to our implementation efforts.

I understand that quality should be ingrained into our culture. Theoretically, an organization implementing TQ eventually has little or no need for in-house quality advisors or instructors since education will be institutionalized. But institutionalization is years down the road. What do we do in the mean time? I have just mentioned the word "culture." Former Nashua CEO, Bill Conway, describes culture as "the way everybody walks, talks, thinks, and acts every day in every way."[6] I have thought of culture as the "prevailing attitude or climate of the organization." These climates have strong inertia. Only strong and focused plans can change their direction. If what we are looking for is a "total quality culture," then what we need is a

culture change. Successful implementation hinges on this concept. If we accomplish this transformation, our chances of making QAF work increase tremendously.

Lack of Culture Change

J. Michael Crouch offers an entire chapter's worth of causes for organizations' failure to implement a TQM process. At the heart of the problem, he says, is management's incomplete understanding of the "two-part nature of the journey."[7] There are two dimensions which must be given equal attention:

1. **The technical improvement dimension, and**
2. **The cultural, or human dimension.**

Most organizations are focused mainly on the first dimension. The visible aspects of a TQ effort are usually things like the quality council, quality classes, and process action teams (PAT). We frequently get so caught up in counting PATs that the number of teams we have becomes the measure of how well we're implementing TQ. Crouch states that "Out of every hundred so called TQM efforts launched, about 70% are in fact nothing more than enhanced problem solving efforts aimed solely at eliminating errors or improving processes with a little lip service given to 'changing culture'."[8] In a recent letter to Quality Progress magazine, there was a statement which I feel may characterize the feelings of many Air Force personnel. This kind of misconception could lead to the one-sided TQ implementation mind set which prevents culture change:

> The quality system is only one subsystem of a properly integrated management system. Philip Crosby reminds us of that: "Executives have to worry about three things: finance, quality, and relationships" ("Forecasting the Future of Quality," Suzanne Axland, February 1993, p.21). Each of these is a subsystem of the total management system and each has complex subsystems of its own. Quality is important and will become more so in the future, but as quality practitioners, we should be careful not to imply or think that it is the only consideration.[9]

In point of fact, Philip Crosby strongly advocates participative management, organizational change, and a management system different to the top-down, bureaucratic approached we've used in the past. He states, "improving quality requires a culture change, not just a new diet."[10] A wide-spread misunderstanding of this type could be a major pitfall in bringing about a culture change. Those who see quality as just a "subsystem" of the existing management system would not see a need for change on that kind of scale and would therefore be likely to see a total quality effort as nothing but PATs and perhaps a quality council. For them, X + TQM = X'. But X + TQM should equal Y. Dr. W. Edwards Deming's fourteenth point is "Put everybody to work to accomplish the transformation."[11] The key word here is **transformation**. Imagine a linear scale of perception with "quality requires culture change" on one extreme, and "quality is a subsystem" on the other. We can gauge where our organization falls on this scale by observing what indicators we use to measure TQ implementation progress. If our indicators do little more than relate how many PATs are operating, how many people have been trained, or how much money has been saved, there may be some indication of a misunderstanding regarding the two-part nature of a TQ transformation. In this case, a quality process has to be sustained by sheer adrenaline, and few of us have that much energy these days.

Another possibility which could lead to ignoring organizational culture is a lack of incentive to make changes. First of all, it is generally quite difficult to change anyone's behavior, even if they know that their current behavior is not beneficial. George Bernard Shaw said, "Progress is impossible without change, and those who cannot change their mind cannot change anything."[12] But we can almost guarantee a culture will not change if the organization does not change its day-to-day operating style and make it O.K. to change, indeed encourage it. If current reward systems are the same as they were before TQ was implemented, people will keep doing what they always did. If on the one hand, management says, "Total quality management is our strategy for the future," but on the other hand the performance appraisal systems and promotion process remain the same, where is the incentive to change? A recent article in "Total Quality Newsletter" stated "Giving away power to gain power becomes easier for managers to do when their raises and promotions depend on it."[13] This was offered as one of the ways to get middle management support for a TQ effort. If people know their boss and their boss's boss are committed, they will fall into line. It is taught, even in the military, that workers tend to emulate the behaviors of their superiors. If anyone in the supervisory chain chooses not to buy in to the TQ management system, then everyone downstream from there will find it difficult, if not impossible to commit themselves. The problem is that the supervisor had a choice of whether or not to support the TQ initiative. Even the most successful organizations who have implemented TQM (Federal Express, Cherry Point Naval Air Station, Xerox, Florida Power and Light, etc.) have made career progression dependent upon supporting the quality initiative after allowing a reasonable amount of time (about one year) for managers to get used to the idea. Philip Crosby recounts an incident where a general manager fired two extremely influential people for not participating in the quality effort. The manager tried to reason with them, but in the end they were sent away. He sees this as a positive thing because personnel realize management is serious; a negative influence was eliminated.[14] Crouch states, "Ultimately TQM is not optional. There comes a time when, as the saying goes, 'You've got to fish or cut bait'."[15] When the message that people see is *"You can 'do' TQM, which flies in the face of just about everything you've been taught and will require lots of team meetings, measurements, and sharing power with your people; or you can just keep doing what you're doing,"* how can we expect anyone but the mavericks and risk takers among us to accept the former option? The military does not traditionally reward these types of people. In this case, we face a pick-and-choose attitude. Some units within the organization choose to buy in, others don't. One does not know what to expect from one unit to the next. Furthermore, those who do "buy in" are faced with reversing their new attitudes when reporting up the chain or face negative consequences. For example, what would happen to a commander who decided to stop submitting any quarterly award nominees in an attempt to foster a stronger team effort?

When there is action in the name of "TQ", such as quality council meetings, off-sites to generate vision statements, process action team meetings, TQ training classes and briefings, etc. without a corresponding move to alter the underlying culture, quality simply becomes "extra work." The lack of culture change leads to a perception of anything to do with TQ taking time away from "real" work. Total Quality Newsletter conducted a survey of its readers in November of 1992. Sixty five percent of the respondents agreed that quality efforts are perceived as extra work. "The results also show that the notion prevails across the entire employee base; everyone from line workers to first-line supervisors to middle and upper managers."[16] This leads to the much-used statement: "I believe in TQ, but I don't have time for it," or "I have to do my quality

work, then I have to do my work work." When presented with these comments, we should call to mind the fable of the woodsman:

> There was a woodsman who had a new ax. The first day, he was able to chop down 20 trees. With each passing day, he worked longer and harder, while chopping down fewer trees. A friend wandered by and suggested, "why don't you sharpen your ax?" The woodsman replied, "I'm too busy. I've got to chop down more trees!"[17]

The key to overcoming the perception of quality being extra work is not necessarily to tell fables, but to find the link between our "work" work and our quality work. This is easier to say than do, but one thing is certain. Only management can make it happen. Quality "gurus," Dr. W. Edwards Deming, Dr. Joseph Juran, and Philip Crosby, are in agreement on this point.

One other factor concerning culture change that I would like to mention is the concept of empowerment. Earlier I mentioned gaining power by giving it away. This is one definition of empowerment. Much has been written about this concept and its relationship to TQ. The key to making a participative management system work is empowerment of employees. To this end, many companies have realigned their organizations along process lines rather than the pyramid-shaped bureaucracy of the past. Dr. Sheila Sheinberg has stated that "empowerment is impossible in organizations that speak of 'staff and line,' 'rank and file,' or 'chain of command'."[18] I do not agree that empowerment is "impossible," but we may want to consider that it may be more difficult, and therefore require more effort, to bring about empowerment due to our very structure.

To answer the question, "Is QAF destined for failure?" we must look to both the successful and unsuccessful organizations who have gone before us. When management aggressively commits its resources to all aspects of quality, and where a quality-friendly culture is established and nurtured, the TQ process will succeed. The same attempt given lip-service (and no real support) by management, and allowed to founder in a sea of traditional attitudes and reward systems will fail. Which is it to be for QAF? If we take a hard look at these factors in our own quality efforts, we will find the odds stacked in our favor. The Air Force may be different from Ritz-Carlton or AT&T, but not so much that we can't make QAF become our strategy for the future.

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NOTES

[1] AFP 50-34, p. 238.
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[3] Ibid.
[4] Peters.
[5] Santayana, Ch. 12.
[6] Crouch, pg. 30.
[7] Ibid, p. 28.
[8] Ibid.
[9] Luyt, pg. 12.
[10] Crosby, pg. 15.
[11] Deming, pg. 86.
[12] Sheinberg, pg. 1.
[13] Van Ness, pg. 7.
[14] Crosby, pg. 145.
[15] Crouch, pg. 163.
[16] Busse, pg. 1.
[17] Mayer, pg 11.
[18] Sheinberg, pg.1.

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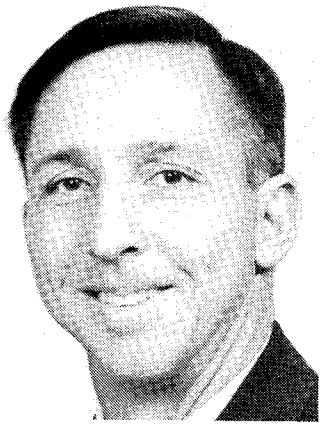
BENCHMARKING DURING THE "QUEST"



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Benchmarking During the "Quest"

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ABSTRACT

Organizations within the Air Force want to benchmark. These organizations realize the importance to quality improvement that benchmarking plays. However, analysis of benchmarking practices from across the Air Force reveals the need for improvement of these practices to meet the realities of the 1990s. Three critical elements to the success of benchmarking in the Quality Air Force are:

1. Understanding our current processes before benchmarking.
2. Providing benchmarking training.
3. Having a plan in place to organize and manage benchmarking.

INTRODUCTION

During the "Quest for Quality" many teams have been formed and trained. These teams now understand how to be successful at process improvement and have actually improved many processes within the Air Force.

Accurately recording these improvements in a common format is part of the benchmarking process that can lead to "breakthrough" improvement. However, benchmarking--like any other quality approach--is not a panacea. There are some critical considerations to make before undertaking benchmarking activities. This paper explains benchmarking and three critical elements to successful benchmarking in today's Air Force.

TEXT

During the "Quest for Quality" many teams have learned what quality means to themselves and their organizations. As we will see during this first Quality Air Force symposium, these teams have demonstrated beyond a doubt that quality improvement is working. Where is this leading us and what is next? The answer is "benchmarking."

Think with me for a moment about the Air Force today. Currently, we see the impact of quality in everything we do. We are seeing quality in our daily lives. As we continue to use the Shewhart cycle (Plan-Do-Check-Act) we continually find incremental ways to increase quality.

These incremental efforts have had a positive effect. Individuals responsible for change are believers in the power of their individual contributions. They realize they are not just chipping away at rocks with small hammers, or endlessly pushing carts uphill. They realize their efforts combined with the efforts of others like themselves are capable of building cathedrals.

Boundless opportunities in technology are knocking on our doors today. For example, changing technologies will help us replace our paper products with data bases, laser discs and bar-coding systems. This will include regulations, technical manuals, professional educational materials, health records, and personnel records. However, to get the most from these existing technologies we must learn to think collectively.

Process action teams using the seven management and planning tools create the synergy required to identify methods for process improvement. These teams document their current processes and demonstrate successes through incremental improvements. Once this has occurred their organization may be ready to lay the foundation required for benchmarking to be an effective approach to "breakthrough" improvement.

Many teams are being told to conduct benchmarking studies. Unfortunately, the main driver for conducting benchmarking has not often been the actual readiness of an organization to benchmark. An organization should not benchmark unless it has well documented processes and has internalized a high comprehension of the basics of quality.

Instead, the high point value assigned to benchmarking by the Malcolm Baldrige National Quality Award (MBNQA) is driving many decisions to benchmark. You might ask "the Air Force cannot apply for the MBNQA so how can this be?" The answer is the Secretary of the Air Force Unit Quality Award (SAFUQA) was created from the MBNQA.

Some teams have documented results demonstrating great success through benchmarking studies. These teams have learned that benchmarking is an effective tool; however, very few of these teams fully comprehended the true potential of benchmarking. Organizations must be cautious not to be overly concerned with their organizations scored performance. The primary concern of an organization should be whether the foundation which will support benchmarking has been laid correctly.

Benchmarking, as defined in the Quality Air Force glossary, is "The process of measuring products, services, and practices against the toughest competitors or those known as leaders in

their field." This is a continuous process, as is the Shewhart Cycle or Deming Wheel. Additionally, benchmarking is a sharing of information between mature organizations which understand that, in order to remain the world leaders in specific processes, they must think *win/win*.

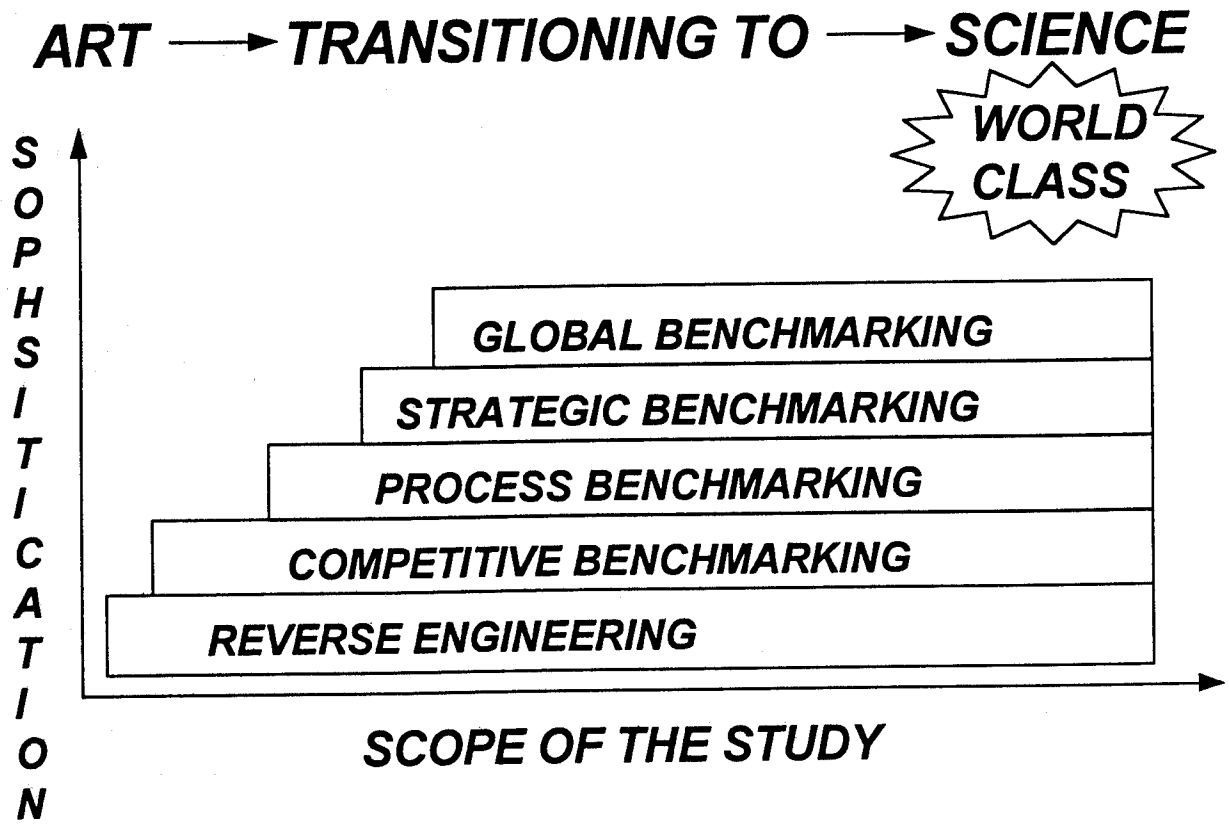

FIGURE 1

The objectives of benchmarking for an organization should be to create organizational consensus for change, to identify breakthrough processes, and to accelerate the rate of change. The most commonly known form of benchmarking is competitive benchmarking, but in actuality people are thinking of reverse engineering (see figure 1). The earliest form of benchmarking "reverse engineering" is the foundation of the entire benchmarking sophistication model. Reverse engineering conjures in our minds the last episode we may have watched of "007" or the latest "Tom Clancy" book that we might have read. Consequently, benchmarking is often thought of as a secret weapon.

Using reverse engineering, one organization purchases a competitor's product and actually takes it apart, and through detailed inspection comes up with the enablers (see figure 2), that make their competitor's product "world class." Today, competitive benchmarking does not take place in dark secretive rooms. Organizations are realizing that, in order to stay on top, communication between competitors is not just good practice but is required.

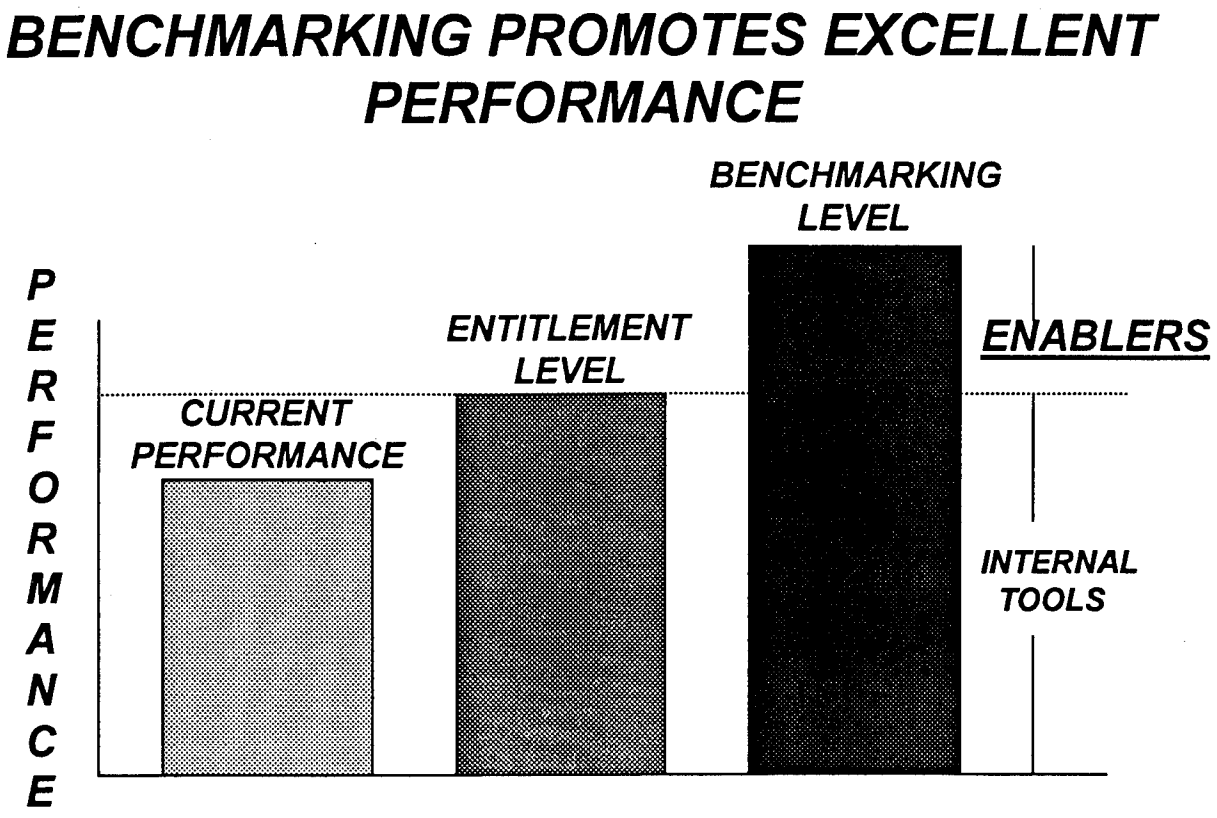

FIGURE 2

More and more organizations are beginning to think *win/win*. They are forming strategic alliances. Therefore, process benchmarking has become what most private organizations are doing today. Process benchmarking occurs when comparing similar processes. These processes do not necessarily fall within the same industry.

The greatest potential for the Air Force today lies in process benchmarking. The potential results of process benchmarking are "golden nuggets" of opportunity. We will find these results through the sharing internally of best practices as identified through our process action teams successes.

Strategic benchmarking and global benchmarking are additional forms of benchmarking. Strategic benchmarking builds on process benchmarking by viewing processes while considering the next three to five years. Global benchmarking is currently being done by only the top five to seven per cent of organizations currently doing benchmarking. Global benchmarking is the highest form of benchmarking.

Any benchmarking study, whether it be competitive, process, strategic, or global, should consider critical success factors (CSFs). Critical success factors are the things that have to go right if your organization is going to be successful. Examples of customer CSFs are: delivery, quality, performance, price, and problem resolution. Examples of business CSFs are: Return on investment, market share, and growth. Examples of employee CSFs are: health benefits, retirement benefits, and educational benefits. Using a dual scale of importance and performance is useful in determining which CSF should be used.

CRITICAL ELEMENTS TO BENCHMARKINGS SUCCESS

Before seeking "breakthrough" opportunities, organizations must first fully understand their current processes. The first rule of benchmarking is to have a well-documented process before you ever begin benchmarking. This will help ensure that the costs of true benchmarking studies (averaging $60,000 according to the International benchmarking Clearing House) will not be wasted.

The second most critical element prior to implementing benchmarking efforts within an organization is to provide the necessary training. This typically includes the quality councils followed by just-in-time training for benchmarking teams. The Air Force Quality Center at Maxwell Air Force Base, in conjunction with The American Productivity and Quality Center's International Benchmarking Clearinghouse, has developed a two-day benchmarking course for the Air Force.

According to the Air Force Quality Center's course descriptions, the benchmarking course is designed to provide a methodology of the benchmarking process to include aligning benchmarking opportunities with organizational strategic quality plans; scoping of the benchmarking effort; collecting data to quantify and qualify benchmarking efforts; aggregating, analyzing and norming data; and finally the adaptation of the benchmarked process. The intent of the training is helping organizations achieve the process knowledge required to accelerate continuous process improvement through benchmarking.

From a global Air Force perspective, we have in place the first two critical stages from which to launch benchmarking teams. A third element required before implementing a benchmarking program is for the organization to have in place a

method for organizing and managing the benchmarking efforts. The documentation package, available from the Air Force Quality Centers benchmarking course, is a common methodology for documenting each benchmarking team's effort. Presently, the Air Force Inspector General and others are considering exactly how benchmarking will be organized and managed throughout the Air Force.

CONCLUSION

Benchmarking, like any other quality tool or methodology, is not a panacea. Jumping into benchmarking to early will hurt organizations more than help them. Processes must be well documented prior to entering any benchmarking activity.

Benchmarking practices must follow a structured well-documented approach. The Air Force Quality Center recommends the four step "Plan, Collect, Analyze, Adapt" model that is taught in their benchmarking course. Additionally, the documentation package that is part of the benchmarking curriculum is a potential common communication linkage to the Quality Air Force.

Further work must be done on planning and organizing the methods for managing the Air Forces benchmarking efforts.

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BENCHMARKING WITH YOUR CUSTOMER, UTILIZING BENCHMARKING TO BUILD CUSTOMER - SUPPLIER RELATIONS

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"BENCHMARKING WITH YOUR CUSTOMER, UTILIZING BENCHMARKING TO BUILD CUSTOMER-SUPPLIER RELATIONSHIPS

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Benchmarking is a necessity for those established companies that hope to remain competitive in the future. It can also be used to improve the business relationship between a customer and a supplier. This paper describes how a benchmarking activity improved both the primary area of interest, turbine engine installation time, and in the general business relationship between the two firms, were documented. The trust and understanding that was established during the Benchmarking activity will be discussed along with the resultant business opportunities that have developed since the benchmarking activity took place

Overview and Introduction- Sverdrup Technology Inc. (SvT) in conjunction with our Air Force partner has successfully utilized Benchmarking techniques that were of significient benefit to Arnold Engineering Development Center (AEDC) and our test customer, United Technologies, Pratt and Whitney (P&W).

Sverdrup Technology Inc., is a technical contractor for the Unitrd States Air Force (USAF) performing propulsion testing at the Arnold Engineering Development Center. AEDC is a national test facility for Aerodynamic and Engine Propulsion technologies. Most of the aircraft designs along with the propulsion systems that have been developed by the U.S. Air Force have been tested at AEDC. AEDC has also performed work for other government agencies and commercial clients. There are over 40 active test "cells" at AEDC providing testing in aerodynamics (wind tunnels), ballistic ranges and altitude testing for both full scale jet turbine engine and rocket motor propulsion. Two more facilities are in the building process. The J-6 rocket test cell will be ready for use this year. The DECADE radiation test facility is currently in the early stages of construction.

As is the case with most established organizations, the changing market place is forcing AEDC to look at how it conducts its business and has challenged AEDC to review who it's primary customers are. In the past, Sverdrup focussed on the local Air Force personnel as our primary customer were evaluated and rewarded on local perception of performance. Accomplishing tasks, and projects on schedule was

paramount to nearly all other evaluation factors. In recent years, more emphasis has been placed on cost and user satisfaction; thus, encouraging a more external focus.

In 1988, federal regulations changed allowing the end users of our test services to use other or their own facilities to satisfy the ground testing requirements of government procured weopon systems. Due to this change, the end user's satisfaction has become much more prominent and important. The relationship between the local Air Force and Sverdrup has also changed. A partnership has developed between the two organizations when it became apparent that survival of the center was threatened.

Cost of testing pressures built up during this period, and the threat of loss of business to other facilities was apparent. AEDC reacted by incorporating modern management methodologies. Benchmarking was examined and initially accepted as an area that SvT would try and then evaluate. The first attempt to formally use Benchmarking was unsuccessful because of the approach taken. A Quality Improvement Team was given an objective to include Benchmarking as part of its work. The team's focus was too diverse and its other objectives distracted the team from doing formal Benchmarking activity.

Meanwhile, Sverdrup along with Air Force Project Managers, were seeking to develop a closer working relationship with Pratt and Whitney, one of the world's largest jet aircraft engine manufacturers. Pratt and Whitney has been a major source of revenue for AEDC with its military engines. AEDC's capabilities and reputation were not widely known in the commercial engine division and relations between AEDC and P&W commercial divisions were not close.

Fortunately for AEDC, P&W was seeking a way to altitude test a new family of jet turbines that required large amounts of air mass flow. Very few facilities in the world has the capability to perform these tests at the high air mass flows required. Pratt &Whitney had the option of using the existing facilities at AEDC or building their own. AEDC recognized the potential of this business and decided to pursue it.

One of P&W concerns centered on the amount of time AEDC needed to install an engine the first time in a test cell. This process is tedious, complex, and very intensive in labor utilization. Normal cell installation times for new engines such as the P&W 4084 have taken approximately

six weeks to bring in, inspect, instrument the engine, instrument the test cell, install, hookup, and checkout the engine. While all installations require these activities, AEDC was taking much longer than P&W claimed they could do the same work. This is important because of the overhead charges that are accumulating against the project. The longer a project is open and running, the more expensive it is because of the applied overhead. Six weeks of installation time is six weeks of project time. Any way to shorten the installation process will shorten the project by that same amount of time.

Shortly after the decision was made by Pratt & Whitney to pursue testing at AEDC, the AEDC test team and P&W representatives began "to address the estimated engine installation time. Constant communication by the Sverdrup Project Manager and the P&W liason resulted in good understanding between the supplier and the customer. A perception of the need to analyze the differences the P&W and AEDC test facilities and the installation processes involved.

Seven employees from the AEDC test team were selected to travel to the Pratt & Whitney test facility located at Willgoos, CT. The members of the team consisted of the Air Force Project Manager, and six Sverdrup employees, one from each internal organization involved in the process.

It is significient to mention that all team members were selected for their knowledge and expertise in applicable process techniques. The team was tasked with the goal of comparing the P&W versus AEDC installation process for possible improvements to either or both.

Upon arrival of the Benchmarking team at the Pratt & Whitney facility, a "kick-off" meeting was conducted. The purpose of the meeting was three fold.

1. Establish ground rules about which areas of the facility that the AEDC team could access.

2. Confirm the activities which would be performed.

3. Establish a time line for accomplishment of the activities.

The team was organized into a two shift operation so that twenty hours of every twenty four could be observed.

A seperate mechanical log book and electrical/instrumentation log book were kept continuously by appointed team members to thorougly document the processes they observed. Documentation was very detailed and all encompassing. The types of tools used, and comparison of work practices at AEDC and P&W were also noted and documented. A daily turnover meeting was held between the first and second shift crews by the AEDC Benchmarking team to ensure a transfer of knowledge. Discussions to assure understanding of the observations of each member were held daily. The on site visit lasted for seven days.

After the Benchmarking team returned to AEDC, an official trip report was written detailing the significant differences in the installation processes and practices of the two installations. Management acceptance of the findings was obtained. Functional goals were established, action plans were formulated within each organization (owners of the process) to implement the needed changes, and a time table for accomplishment was constructed. All recommendations were implemented.

Direct Results- The direct savings associated with this project is at the program level. Due to the efforts of the Benchmarking team and others, the installation time was reduced from an estimated six weeks to eleven days resulting in the shortening of the program by thirty one days. The customer, Pratt and Whitney, was extremely pleased with the performance of the program. Ray Lemaire, Manager of Pratt & Whitney's commercial engine business,- Engineering Operations, stated, "This is a significient milestone. It shows the ability to bring a commercial engine into a government facility." He went on to say, "Bringing a new engine to a facility that we had no experience with was an unknown quantity. There was a lot of concern. Those concerns were put to bed when the engine arrived in September and you people mounted it and got it running in ten days." He further stated," This has been a very successful program. It's made believers out of a lot of people. Be proud of what you have done because it is a very significient achievement." Estimates for the reduction of program costs are conservatively placed at over $20 million.

The success of the venture has encouraged AEDC to expand the activity. Recently, AEDC was the recipient of a Benchmarking visit by the Naval Air Warfare Center Aircraft Division. Liason personnel have been exchanged. A Navy representative is now resident at AEDC and an Air Force officer is located in Trenton, New Jersey to facilitate information exchanges.

The key results is the 20 year agreement that has been signed with the commercial division of Pratt and Whitney to develop the 4000 series of engines. AEDC and SvT were able to prove to P&W that they can do the work. This 20 year agreement is valued at $387 Million Dollars for the facility. Testing at AEDC has been agreed upon with Rolls Royce, to test the Trent 800 engine- a comparable turbine in weight, size and thrust. Knowledge gained has also been applied to several military engines as well. Another indirect result of this Benchmarking project is the change of focus our Sverdrup Design Section has undertaken. Consideration of user interfaces, connection, and support requirements are now paramount in decision making on design approaches rather than designing based on AEDC`experience and preferences.

Conclusion and Lessons learned- AEDC has found that Benchmarking with its customers on similar business processes not only can enable productivity gains but can also cement the basic business relationship between a customer and a supplier providing an opportunity for both parties to gain. One major lesson learned was to establish a team to specifically obtain benchmark information and not to make it a part of a larger mission. Another Lesson Learned was to keep the effort focussed on a specific process, not allowing it to bet broad and unfocussed. The Benchmarking effort should be the primary focus of a team, not one objective of many.

HIGH PERFORMANCE TEAMS

Dr. James Watkins

HIGH PERFORMANCE TEAMS

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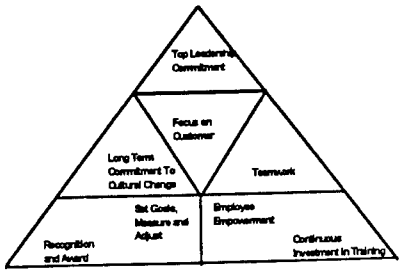
ABSTRACT

This article is a blueprint for constructing high performance teams (HPT). It is not about groups or average teams. It focuses primarily on the people processes needed to reach HPT performance which can lead to quality production. The paper reviews the Quality Air Force model. It demonstrates the linkage between an organizational culture and a new, effective HPT model. It is my view that the interpersonal or people aspects of high performance teamwork is often feared, avoided and stalls the high performance team building process. A model is provided for constructing a HPT and for ensuring a team's collective commitment to higher performance. The purpose of this paper is to give leaders, facilitators, and teams the edge in TQM.

INTRODUCTION

Steven Covey's book, Principle-Centered Leadership, indicates that business, manufacturing, and service organizations are increasing at an exponential rate because quality is widely seen as the key to American economic survival and success (Covey, 1991). General Electric's Jack Welch was quoted in USA TODAY, "You are not a hero in GE for being a lone ranger with only your ideas; you must be about shaping a culture of openness, ideas, and teamwork."

Dr. Sheila E. Widnall, the new Secretary of the Air Force, emphasized the importance of TQM, specifically continuous improvement and teamwork (AIR FORCE TIMES, August, 1993). General Merrill McPeak, Chief of Staff, United States Air Force, and his Quality Council have mandated the use of teams. Dr. Joseph Juran and numerous TQM authors have continued to espouse that understanding customer's needs, and developing process controls through teamwork are critical success factors.



The quality tree is made up of many branches. We often see the results in the leaves of quality. But what are the roots of a successful or failed TQM effort? It is the individual who is the most fundamental ingredient in the performance, production, process and providing customer value. Ironically, Deming indicated that leadership and the people have somehow been lost in the forest of quality (Covey, 1991) (Figure 1).

An individual in a high performance team understands him/herself, others, and the team's dynamics; in average teams they often do not. This interpersonal knowledge is skillfully used to build collaborative relationships within the team and to link them with others on the HP team. When doing so, the team energy moves from one person to two people, and then to all team

members, who provide the synergy to finally reach targeted products, services, and goals. Covey says "In TQM, you cannot continually improve interdependent systems and processes until you progressively perfect interdependent and interpersonal relationships." (Covey, 1991). The new TQM paradigm is focused on the person, on the dynamics that is going on within the team membership, and on the methodologies used to create a desired state of performance. Without high performance team behavior, the challenge of providing customer value through creative ideas will likely fail.

Groups and teams are everywhere. High performance teams are not. And building one is an art. Once the members, facilitators and leaders learn to focus on first constructing a solid base on which the team can grow, the team building process is much easier. Team members want their anxieties lowered. They need information about each other, about direction, and about how they will do business on the team. This paper addresses some of the more difficult aspects of building high performance teams. It is these subtleties and the sequence of moving intentionally from the person to the building of the high performance team that is important here.

After nearly twenty years, hundreds of team or group sessions and numerous discussions with colleagues and participants, the author began to recognize some of the common behaviors that make or break a high performance team.

Several premises form the framework of this paper:

1. High Performance Teamwork works.
2. The individual is the most important productive unit on a high performance team.
3. Relationships are only in twos.
4. Members must first deal with the people stuff before they can deal with the process or product stuff.
5. HPT members eventually excel in focusing on behavior, facts, and synergy.
6. A HPT is a critical vehicle for individual
7. There is great value in differences on a team.
8. People support what they help to create, so involve them.

It should be pointed out that HPT is not the only answer to obtaining quality success. Research continually supports the fact that high performance teams out performs average teams, groups, or individuals. McGregor (1960) observed that there seemed to be many more ineffective teams and wondered why. In his book, The Human Side of Enterprise, he found the following reasons: (1) We have rather low expectations of the groups. (2) We do not know the ingredients of an effective team. (3) We tend to ignore or smother the conflict which is inherent in groups. We believe that the success of the team depends solely upon the leader. (5) We do not pay attention to group maintenance or process needs. (6) Effective teams are impossible within a Theory X management style (Parker,1990).

I believe that to achieve the level of high performance, a team must accomplish four things, in this order:

1. Build an understanding of where the team is headed.
2. Build an interpersonal understanding of each member.
3. Build a system to ensure that the team's processes carry them through the tupical stages of team building.
4. Build a quality communication system that reflects positive team energy.

TEAM DEFINITIONS

Some distinction should be made between a group, a team, and a high performance team as it applies to this paper. According to Katzenback and Smith, a working group's performance is a function of what its members do as individuals. They come together to share information, perspectives, and insights; to make decisions that help each person do a better job; and to reinforce individual performance standards. The focus is always on individual goals and accountabilities. Working group members do not take responsibility for results other than their own. Nor do they try to develop incremental performance contributions requiring the combined work of two or more members (Harvard Business Review, March-April 1993). Parker indicates that a group of people are not a team. A team is a group of people with a high degree of interdependence geared toward the achievements of a goal or completion of a task (1990).

Katzenback and Smith refer to a team as a small number of people with complementary skills who are committed to a common purpose, set of performance goals, and an approach for which they hold themselves mutually accountable. According to these authors, committees, councils, and task forces are not necessarily teams. Groups do not become teams just because someone tells them to do so. The entire work force or organization can never become a team (1993). Individual and mutual accountability are hallmarks of teams. They are discrete units of performance.

The Air Force Quality Center's definition of teamwork is a "spirit of interdependence, where we work together to find improvement opportunities, develop actions, and support accomplishing the plan. Teamwork evolves in an organization as people identify: Who am I? Who are you? Who we are? What do we do? How do we do it?" (1993).

"A high performance team is focused. All members are clear about purpose, roles, values, expectations, functions, and goals. Members appreciate and use their differences. They attempt to maintain a non-judgmental environment. Their attitude, investment, and communication reflects a collective commitment to each other's success and toward using quality processes to achieve desired results" (Watkins , Pitt and Cody 1992)

THE ORGANIZATIONAL HIERARCHY

It is important to place high performance teams in context within the organization. The Organizational Hierarchy (Figure 2) demonstrates the various levels and their relationship to each other. Highlights of each of these will increase the perspective of how they interrelate. Let us begin with the bottom level of the hierarchy.

Fig 2. The Organizational Hierarchy

INDIVIDUAL

I am now convinced that in team work, four primary motivations count most to individuals. These are the individual's needs, fears, values and goals. They drive us. Until these are understood by the individual and by others on the team, the team will engage in activities that often stall the team building process. Again, it is important to emphasize that the most essential ingredient in the quality process is the individual. When you do not understand me or I do not understand where you are coming from, the relationship and the team loses it's potential.

RELATIONSHIP FORMATION

Relationship formation is the next level on the hierarchy. There are three important messages here. First, relationships are always in twos--never in threes. Second, building a relationship follows a definite pattern. It moves from an initial contact, and then to a commitment to continue the relationship, to communicating at a safe level. This involvement facilitates greater risk-taking which occurs first at a knowledge level, then at a feeling or emotional level, and finally at the behavioral level. Awareness between the two is further enhanced as a result of risk sharing. Trust follows. But the most important and desirable behavior is that of honesty because it is on this process that the relationship continues. Once an individual feels trust and honesty, they are in the best position to receive authentic feedback and can make choices about their behavior (Watkins, 1974).

HIGH PERFORMANCE TEAMS

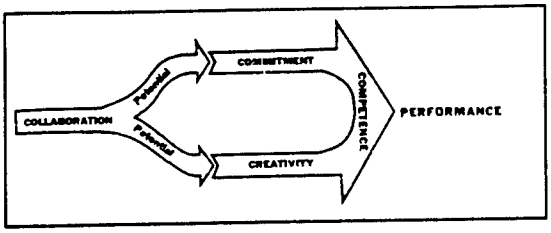
High performance teams have been previously defined. What are some of their properties? According to McGregor (1960), the atmosphere can be sensed within a few minutes of observation. It tends to be informal, comfortable, relaxed and devoid of obvious tensions. Most people participate. The task or objective is well understood and accepted. Everyone's ideas are given a hearing (Parker 1990). The author has observed that a disagreement is healthy providing it is not suppressed or taken personally too often. Most decisions are derived from consensus, where the decision is often quite obvious. People are free to express their feelings. There is little personal attack. Leadership is not dominate. The team is self-conscious about its own operations.

Synergism and the high performance teams go hand-in-hand. Steve Buchholz and Thomas Roth, writing in "Creating the High Performance Team" (1987), define synergism as the simultaneous actions of separate entities which together have a total effect that exceeds the sum of their individual effects. Have you ever been part of a team where you feel this synergistic energy? It is physical, spiritual, social, and emotional. The high performance team members can feel and often talk about this energy and of the spirit or power of being collectively committed to an expressed end. The power of this team process combines energies which help the team to perform and produce at a higher level when challenged or doing difficult tasks. Risk, openness and effective behavior are quite noticeable. Yes, two plus two often equals five on a High performance team.

HIGH PERFORMANCE MANAGEMENT

Further up the hierarchy ladder is high performance management. Essentially, the organization must create and continually change their technical (knowledge-skills), sociological (quality of life), techosystem (what is done with skills and knowledge), and their psychological (growth-developmental) systems in order to meet performance and production objectives. "Most successful teams shape their purposes in response to a demand or opportunity put in their path, usually by higher management. This helps teams get started by broadly framing performance expectations. The best teams invest a tremendous amount of time and effort exploring, shaping, and agreeing on a purpose that belongs to them both collectively and individually." (Katzenback, 1993).

Jay Hall, President of Telemetrics International, has done extensive research in quality, management, leadership, and organizational climate. He has indicated "the real problem is the organizational environment; conditions of work created by managers, which prevent people who wish to do well, from doing so (1992). Dr. Hall's competence process model is provided (Figure 3).



HIGH PERFORMANCE LEADERSHIP

High performance teamwork requires new leadership. Historically, leadership theory has progressed from Taylorism to Hersheyism, with much in between. New leadership must be about vision, self-confidence and deciding. It is about empowerment to increase the organization's power. It should be steering and hitching oriented as the many leaders go about linking many high performance team systems.

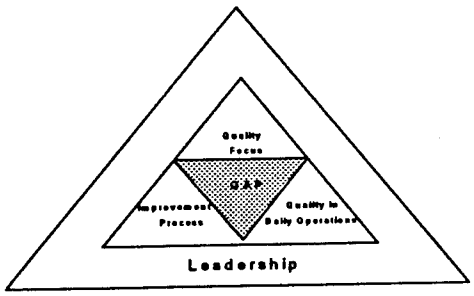


Fig 4. QAF System

The Air Force Quality Council has provided a model and a plan for implementing leadership. Its focus is on building a Quality Air Force. It integrates leadership, quality focus or policy deployment, quality in daily operations, and improvement processes.

(Figure 4). Included are the vision, mission, goals, and objective, prioritized team efforts, organizational alignment, process management, standardized improvements, and problem solving.

In his book, Principle-Centered Leadership, Steven Covey refers to his seven habits: (1) be proactive. (2) Begin with an end in mind. (3) Put first things first. (4) Think win-win. (5) Seek first to understand before being understood. (6) Synergize. (7) Sharpen the saw which is a principle of continuous improvement (Covey, 1991).

ORGANIZATIONAL DEVELOPMENT (OD)

The last level of the hierarchy. A major challenge to the individual, the team, to managers and leaders, and to the team's internal and external customers. It is about the degree to which there is a shared philosophy, hands-on management, growth and success, quality, worth of people, risk-taking , being the best, and fun at work (Marshall Sashkins, 1984).

Dr. Peter Vaill, a futurist, addresses OD in terms of high performance systems. Some of these system characteristics usually meet several of the following criteria: (1) performs excellently against an extreme standard, against their assumed potential, and against where they were earlier, (2) they are judged as being better than other comparable systems, (3) are doing more with less, (4) are perceived as a model by others, (5) are fulfilling a high level of their cultural aspects, (6) teamwork is focused, (7) the organization fosters innovation, (8) they have jelled even though they cannot explain how, (9) they have found the answer to intense human interdependence, trust, and loyalty (19).

ORGANIZATIONAL CULTURE

This hierarchy when operationalized will produce a culture. This topic of culture has heated up. It is confusing (Schein, 1985). The most important function of high performance leaders in a high performance organization is to manage and/or change the culture. Schein points out that culture and leadership are two sides of the same coin and neither can be understood without the other. "Culture is learned, evolves with new experiences, and can be changed if one understands the dynamics of the learning process". He believes that culture is a pattern of basic assumptions--invented, discovered, or developed by a given group as it learns to cope with its problems of external adaptation and internal integration--that has worked well enough to be considered valid and therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems" (Schien, 1986).

When all of these parts are jointed and they come alive, a culture exists. By culture, this author means organizational values, power, rewards, norms and standards, and needs. It sometimes is referred to as the organizational environment. To change a culture, it usually takes many, many years. But to do so, those working within the organization must walk around talking what they want the culture to be and they must be doing it. You will know when it has changed when the new behavior is habitual. For instance, a new person might ask, "Why are you doing things this way?" A reply might be, "this is the way we have always done it in this organization." The evidence of a lack of teamwork will be observed when certain things happen. Problems go

unresolved. Leaders respond slowly to new ideas. Mistrust is the norm and internal competition creates win-lose situations. The primary method of getting things done is individualized through power, position, and lack of collective commitment.

THE CHALLENGE

Recognizing the importance of teamwork is easy. Figuring out how it relates to cultural development is very complex. Achieving a high level of high performance teamwork isn't easy. Connecting many high performance teams within an organization's hierarchy and using teams to build a quality culture is extremely complex.

Deep within the stages of forming, storming, norming, and performing rests the challenge for HPT facilitators, leaders, and members. It requires finding and creating delicate linkages between quality technology, humanistic approaches, innovation, and team dynamics. It requires reducing the gap between words and behavior. It means understanding behavioral concepts and allowing for full use of strengths and the minimization of weaknesses. It means being willing to follow up and reinforce learning and development of the team while looking for process weaknesses and barriers as opposed to focusing on changing the bad people. It means listening in new ways and for creative ideas.

As we acknowledge the important research contributions of behavioral scientists in the 1970's and even 1980's, it is evident that a comprehensive model of effective teamwork is needed because it is essential to building a quality learning organization. Parker speaks of having positive norms, process behaviors that build teams, being informal and relaxed, ensuring a concern for production, and being sure about goals and expectations (1990).

Katzenback and Smith have provided a concept (team performance curve) to help understand the subtle differences between a group and various teams. A working group has no significant incremental performance need to become a team. A pseudo team could have a need or opportunity but has not focused on collective performance and is not really trying to achieve it. A potential team, for which there is significant performance needs, is really trying to improve its performance impact. A real team is a small number of people with complementary skills who are equally committed to a common purpose, goals, and working approach for which they hold themselves mutually accountable. A high performance team meets all the conditions of a real team and has members who are deeply committed to one another's personal growth and success (1993).

THE HIGH PERFORMANCE TEAM STAR MODEL

After years of participation, facilitation and reflection, the author, with the assistance of his university, business, and governmental colleagues, and Mrs. Ann Minton, a model was developed to build high performance teams.

The Star Model for HPT is based on five fundamental premises. First, members must have a solid base on which to build direction and to interact. Second, if the interpersonal or people stuff is not dealt with the members will nearly always have to revisit these issues. Third, the

members must understand themselves, others, and the situations in which the team is functioning. Fourth, behavior should be focused sharply on what is seen and what is heard. Finally, there must be collective commitment to the goal, to individual development, and to understanding most of all team dynamics. This can provide a path to synergy, competence, performance, and quality production.

When presenting the Team Star team building model, each point of the start will be discussed as to outcome. Methodology will be summarized. Examples will be given of exercises that facilitate team development. Instruments that are used to increase self-other-situational awareness will be mentioned. (Note: instruments are used to speed up the team process. They are safe, rather non-threatening and are used for team building, not for psychological reasons.) (Figure 5).

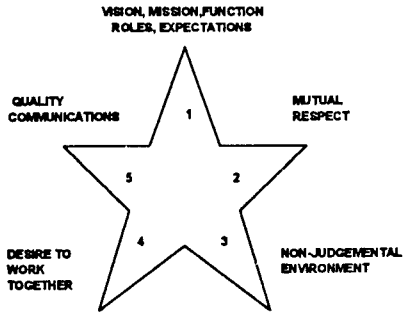


Fig 5. Team Star Team Building Model

Point One (Goals, Functions, Roles, Expectations)

Point One of the Star focuses on establishing the foundation for the teamwork. After some initial "get to know you exercise", the members begin to work toward a clear understanding of the team's goal and how it relates to the organizational mission or direction. It is important to ensure that the vision of the person who charted the team communicates that vision to the team.

Critical questions must be answered. What are the expectations and parameters that have been established by the process owner? What are the parameters and boundaries in which the team must function? The next piece of work is to determine the more internal aspects of building the team base. What are the roles and functions of the members? What are the expectations of each other as team members? It is very important to discuss how each member feels about being on the team and to determine the baggage (past history) each person brings to the team. They need to discuss what they believe about teams and team building. A method for rewarding effort is often forgotten. How are we going to reward each other and be rewarded for our successes? Finally, the members need to develop some rules of engagement (ROE). It is essential that everyone know how they are doing to do business or how the game is being played. These are established in point one to provide a solid direction or content base and to enable the team to return to this point should the process become unclear later on.

It takes about four hours to accomplish these work products for a team of seven to ten members. No instruments are used in point one of the HPT star model. To measure the team's success at this time, determine if the member's anxiety has been lowered and if there is sufficient information out concerning the initial stability factors of the team. It is necessary to mention that the next four points focus on increasing interpersonal understanding, typical work behavior patterns, and using high quality communication skills.

Point Two (Mutual High Regard)

Establishing mutual respect for individual differences is the work arena for point two.

Four critical interpersonal pieces of information need to be generated--the member's needs, values, fears, and goals.

Begin with interpersonal needs. Most people are familiar with Maslow's hierarchy of needs. Have a brief discussion to define needs. Why are they important? A needs assessment instrument is introduced to assess the member's needs. The FIRO-B (Fundamental Interpersonal Relationship Orientation-Behavior) by Dr. William Schutz, 1989 is given. It consists of fifty-four, easy-to-take questions and it measures the individual's comfort zone in terms of Inclusion, Control, and Affection needs. The instrument is either hand or machine graded and the concepts discussed.

It is important to tell the members that "all of the instruments used in the star model are not tests but vehicles to increase self and team understanding. There are no right or wrong answers and it is not the facilitator, leader, or team's desire to change the individual.

At this juncture of point two, a team composite is started. After the individual has studied his/her scores, they are given the opportunity to voluntarily share their scores as they place them on the composite. Telling others about their typical needs will enable the other members to determine how the individual probably will behave on the team. Keep in mind that this method can be a developmental experience. It enables the person to reflect back on their interpersonal needs and how comfortable they are in being or not being included, controlling or wanting structure, or the degree of intimacy they might provide or desire.

Interpersonal needs tend to be the "WHAT's" in life. The "HOW's in life or on a team tend to center around interpersonal values. The team is asked to identify what values are, where they come from, and how they can impact on teams. Sometimes a values exercise is used to generate a quick glimpse of the person's top values. It is an attention-getting device and used to demonstrate that values are those things in life that one prizes, chooses, and acts upon. Therefore, values create daily energy for decision-making.

A values instrument is given, hand graded, processed by the facilitator and then studied by the individual. The Massey Values Instrument (1981) is often used. It is composed of forty questions and assesses four values: traditional, in-betweener, challenger and synthesizer. Individuals discuss their value systems and how they might apply to the team. These scores are voluntarily added to the team composite.

Frequently, team members neglect talking about the fears, anxieties, or concerns that they bring to the team. These can be brainstormed or written on cards and discussed. Discussion of these concerns is found to be a subtle vehicle to bring the team much closer and at a more rapid rate. Many of these anxieties are common but when shared they become less threatening. Many often say "I was afraid to talk openly about these because I thought I was the only one who had these fears."

Why are personal goals important in team building? It is developmental. During the team processes, members can help each other reach some of their goals. i e: "I have a goal on this team

to be more open with you." A teamwork opportunity has presented itself where members can help each other grow. Here we find another example of not just talking about collective commitment to each other but of actually doing something if personal feedback is given to the individual.

In point two of the star model, the focus is on the often over-looked and fundamental aspect of behavior. It takes about four hours to complete these four aspects, but without the interpersonal base for mutual respect, the team labors during its later stages.

Point Three (Non-Judgmental environment)

All teams encounter conflict and this is healthy if it is controlled. Point three attends to developing mutual respect in non-judgmental ways. Pseudo or average teams often do not survive continual conflict. High performance teams recognize that judgement is always present because people just naturally judge. They do so because judgement is simply a position. The challenge for teams is to intentionally work to reduce the judgement, particularly where hidden agendas and power are of issue. Jay Hall's research regarding the competence process indicated "If we truly want total quality in our organizations, we must manage our organizations in a way which minimizes interference with the human potential." His model for achieving this objective is to increase collaboration, commitment and creativity (1992).

The Thomas Killman Conflict Resolution instrument (1974) is used to assess how members typically handle conflict. This twenty-eight question instrument is completed by the team members and is self-graded. The concept of conflict is discussed as it relates to the importance of raising the standard of being non-judgmental.

Again, each person talks about how they handle conflict and what behavior is probable on the team. Individual scores are voluntarily posted to the team composite.

Point Four (Desire to Work Together)

In addition to the team building a solid directional base, (point one) and a solid knowledge of their typical interpersonal behaviors (points two and three) the team must develop an understanding of the skills and talents they bring to the team. Hold a brag session. Have members list what they are most proud of and tell how they can be most effective on the team. It is surprising what positive results this exercise will have on performance, production, and the human dynamics. Technical expertise, positive attitudes, commitment and behavioral investment forms a strong partnership in teamwork.

Point four focuses on building a positive attitude, which is a mental state. It focuses on building personal commitment which is emotional in nature, since it a forerunner to individual decision making. It also focuses on investment which is behavioral.

The Personal Performance Profile, (Geirer 1990) which is a superior instrument used to determine how the individual typical behaves on the job or other situations, reveals four patterns:

dominance, influence, steadiness and compliance to standards. This twenty-item questionnaire is given, graded, and the concepts discussed. Members like talking about their work. This instrument has many attractive features. As a result of processing the instrument, members can determine the extent to which they exercise all four of the patterns. They are provided with a system for modifying their behavior in different situations. This enables the team to select the team member with a needed style to perform a particular function. It beautifully permits the member to learn when his/her strength might become a weakness. Team players are given an opportunity to voluntarily display their scores on the team composite. Completing Point four of the Star Model takes about three hours.

Common understanding of the issues in Point One, the interaction of building mutual trust and non-judgement attitudes, as well as typical work behaviors, cannot arise without high quality communications. Covey believes that certain attitudes and behaviors are essential to clearing communications lines and attitudes that assume good faith, sincerity and sanity and are important. Caring about the relationship and wanting to resolve differences in perceptions are positive attitudes. Listening and speaking to understand and to be understood enable dialogue (1991). At Point five, the team talks about communication models. They flush out typical communication blockers to quality teams. Then they briefly revisit each point of the Star to shine up any aspect that remains uncertain, especially those areas mentioned in Point One. Now that the members are well on their way to building a high performance team at a much faster rate and with many of the latent killers of team effectiveness out of the way, they can focus on generating rules of engagement, building plans, and doing productive work with a much greater comfort level. Point five takes about two hours to complete.

SUMMARY

To free human potential, fear must be reduced. I have found that collective commitment can reduce fear and is vital to creating high performance teams. There must be collective commitment to the following: goals, roles, understanding values and needs, rewarding each other, norms and standards, direction, and to each other's success. The focus should be on both the development of the individual and on the high performance of the team.

The lack of team effectiveness will become a serious organizational problem in any movement that is designed to change the culture. Imagine being a member of a high performance team where there is collective commitment to each other's success and to the team's goal. Roles and expectations would be clear. Quality communications would free potential and the opportunity to adjust the team's processes. Mutual respect, decision-making, and individual development would be a high priority. The high performance team star has proven to be a meaningful vehicle to use on the journey to quality.

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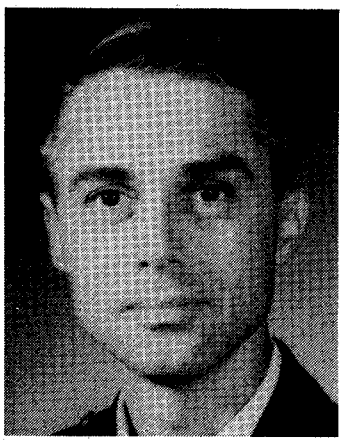
A TALE OF TWO TEAMS



Capt Michael Lamb

A Tale of Two Teams

Capt Michael W. Lamb, Sr.

Nothing can take the place of practical experience out in the world.
- A.B. Zu Tavern

Abstract

The proliferation of quality activity, training, and awareness has led to the formation of many Process Action Teams (PATs) or Quality Improvement Teams (QITs). From the perspective of the facilitator, experience comes through "trial by fire." There are currently many efforts to publicize the results of team activity across many of the major commands; however, little has been published about the team dynamics and activity from the perspective of the facilitator. This paper will discuss two teams' interactions and dynamics and delineate some of the "success" factors from using a systematic team building and development model.

Background

Twentieth Air Force was reactivated in September 1991. We began our "quality journey" in January 1992 with the formation of our Quality Council which immediately began work on their strategic planning. Shortly afterwards, we changed commands to Air Combat Command as Strategic Air Command was deactivated. On 1 July 1992, Lt Gen Arlen D. Jameson assumed command. In August 1992, an Organizational Climate Survey was conducted throughout. This survey instrument was a modified version of the same survey that has been used for surveying Air Force members at large, and at HQ ACC. The results of the survey were enlightening as the "first" survey taken by the staff. The survey consisted of 50 questions that were rated from 1 (Strongly Disagree) to 7 (Strongly Agree). Categories examined were Job, Training, Support, Supervision (3 levels), Communications, Pride, Recognition, Group Effectiveness, Climate, and Overall Average. The results were compared with other ACC and Air Force results. The survey was designed to help us gain some insights into how our people feel about their jobs, workplace, and leadership. This was the baseline from which we would kick off our continuous improvement activities. The following is a summary of the survey results:

Organizational Climate Survey Results

	USAF	ACC	20AF	
Job	4.67	6.23	5.29	
Training	4.45	5.22	5.40	
Support	4.72	5.39	5.28	
Supervision			5.72	(Immediate Supervisor)
Supervision A			4.83	(Deputy Director level)
Supervision B			4.62	(Director level)
Supervision Total	4.82	6.02	5.06	
Communications	4.67	5.64	3.96	
Pride	5.00	6.59	5.57	
Recognition	4.09	5.90	5.29	
Group Effectiveness	5.46	6.21	5.88	
Climate	4.73	6.10	4.85	
Overall Averages	4.73	5.92	5.15	

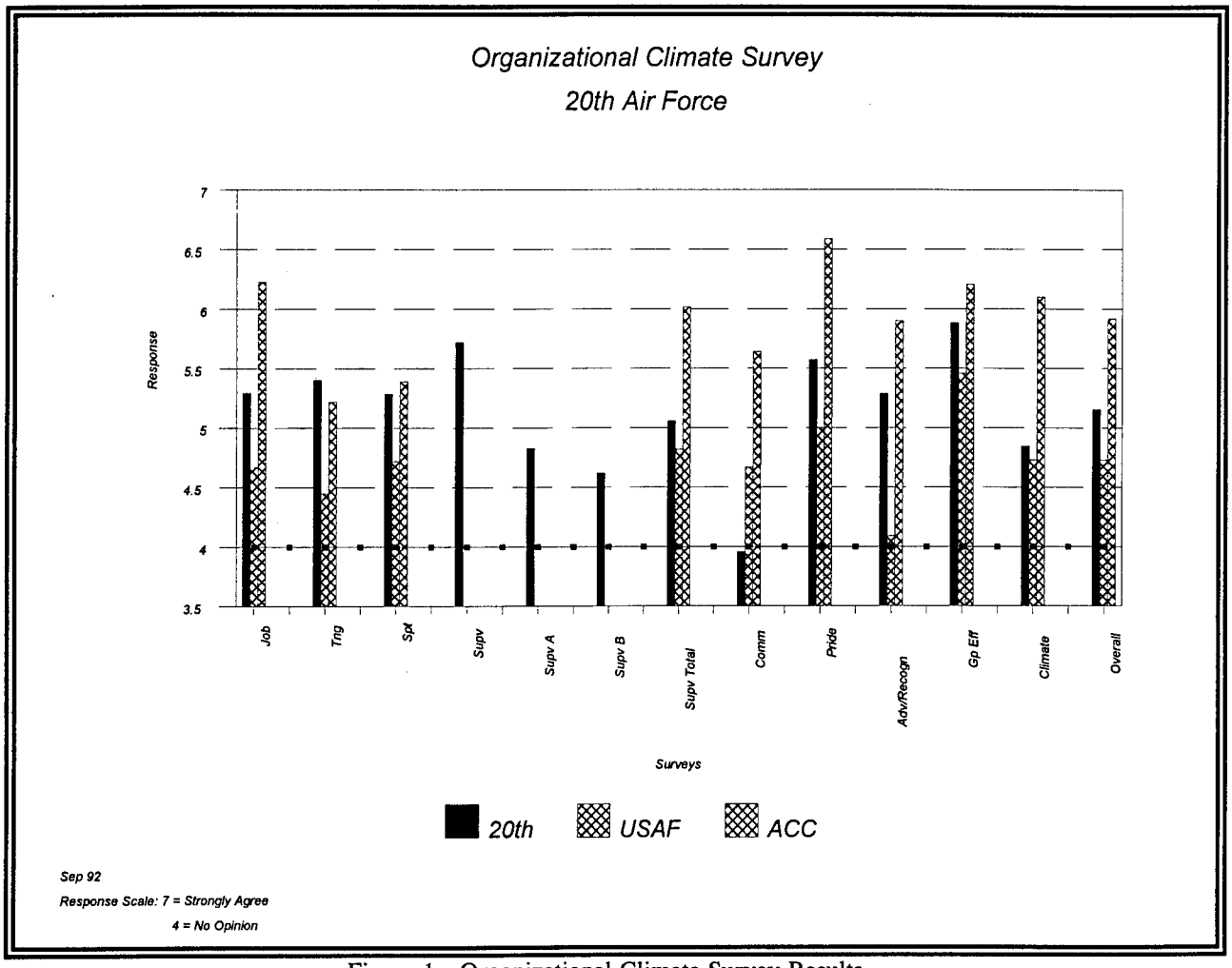


Figure 1. Organizational Climate Survey Results

The results were indeed enlightening for our organization that had only been in existence for just one year. We asked ourselves the question, "Well, how did we do?" The single indicator, an average of all the categories, showed our climate appeared to be better than the average Air Force organization, and in some cases, significantly better. Of course, that was something we anticipated as a staff agency. But that doesn't mean things are perfect. By comparison we were well below the ACC averages in almost every category.

With that in mind, we asked ourselves "What can we work on?" Communications was by far the most glaring problem. Information sharing and communications needed improvement. We began asking probing questions such as: "How does information get out to the work areas?"; "Where are the bottlenecks to information flow?"; Or, "How do we improve taskings and suspense's?" The QC decided to take a two-fold approach. First, we would enhance communications through quality training; that is, to train everyone together as a team about the quality improvement movement and methods. Second, a team would be chartered to take a look at the communication processes and determine areas towards improvement. This team was formed within the Logistics Division.

As training occurred, there was more attention focused towards quality improvement in many activities throughout the numbered air force. As part of this movement, Operations began to take a serious look at many of its processes throughout the seven missile wings. At a conference, many areas were discussed with continuous improvement in mind. One area seemed to garner the attention of all the wings and headquarters staff: the Standardization and Evaluation process. This is a process that affects every single missile crew member across the spectrum and has undergone many metamorphic changes; some were far from the intended and regulatory purpose. Thus a team was chartered to examine this process. However, the

team membership would include members from throughout the missile wings in order to ensure "buy-in" from everyone as well as take into account each wing's slant on this process.
The facilitator was the same for both teams. This tale is about these teams and the differences between them, the different approaches taken, and observations from the perspective of the facilitator.

Team Charters

Each team was specifically chartered within one of the divisions. Team membership was discussed from the perspective of the problem, experience, and leadership. As facilitator, I was called upon to advise on the team composition and guidelines. The Comm team was chartered to analyze the communication processes and identify any areas towards improvement. The membership came from within the Logistics Division and note that all members were senior noncommissioned officers.

The initial information they were armed with included all the survey results from the Organizational Climate Survey of the headquarters Staff. Only one member had any previous team experience and the remaining had only a "heard about it" exposure to total quality management. Their charter was basically an open ended contract to examine all associate processes. Note that this type of charter is one that has been commonly used throughout the Air Force to charter quality improvement teams. The format is straightforward; however, I have found that a charter given to a team with a "social contract" approach has been more effective as it gives the "marching orders" to the team as well as define the support mechanisms. This approach also broadly defines the roles and expectations from the process owner as to what, where, when, and why the team has been chartered. The "how" is generally defined as using hard data and the quality tools with the "rules of engagement" (ROE) defined by the team itself. This was the charter for the Communications team:

COMMUNICATIONS QUALITY IMPROVEMENT TEAM CHARTER

PURPOSE: I hereby establish the formation of the Communications Quality Improvement Team (QIT) to analyze and improve all processes associated with LG Communications and Organization within the Directorate of Logistics, Headquarters, 20th Air Force. The LG QIT members work for the good of the whole LG. They are empowered to carry out improvements to these processes. The Communications QIT will remain in force as long as it effectively performs its intended purpose or until I revoke this Charter.

MEMBERSHIP: Membership is assigned as follows:

Capt Lamb	Facilitator	QI
MSgt Allen	Member	LGBM
MSgt Brownell	Member	LGBM
MSgt Gonzales	Member	LGR
MSgt Green	Member	LGR
MSgt Humfleet	Alt Team Leader	LGBM
MSgt Lee	Member	LGBM
MSgt Minjares	Team Leader	LGR
TSgt Norman	Member	LGBM

The QIT will be led by the team leader, MSgt Minjares. Members may appoint associate members to assist in analyzing and solving process problems as required. In addition, consultants may be included as needed to assist the QIT.

DECISION MAKING: Group consensus in decision making is highly desirable. Brainstorming, freewheeling, and open honest discussions are encourage prior to making decisions. Only members may vote with only one vote per member. Alternates may only vote if the primary representative is absent. Associate members and others may not vote on issues before the QIT. Two thirds of the voting members must be in attendance to have a vote on a decision.

MEETINGS: Meetings shall be held as needed, but not less than bi-weekly. Meeting minutes will be taken,

coordinated and distributed.

QIB/QIC INVOLVEMENT: The QIT will keep the LG Quality Improvement Board (QIB) informed of its activities and progress through the minutes and periodic briefings. The QIB will keep the Quality Improvement Council (QIC) informed through periodic briefings. Briefings should be scheduled when the QIT is unable to achieve consensus on an issue, when resources are needed, or when the QIT has reached key points.

The LG QIB membership is as follows:

Col Renninger	LG
LtCol Johnson	LGB
Maj Hebert	LGBM
SMSgt Apilado	LGBM
SMSgt Pippins	LGR

WARREN H. RENNINGER, Colonel, USAF
Director of Logistics

Figure 2. Communications Team Charter

The StanEval team was similarly discussed as to membership, ground rules, and leadership. The process to be analyzed was one that can be considered a political issue in that there were many involved with the process and many levels of "process owners" along the way. However, the overall process owner resided at the numbered air force. The team membership consisted of operations oriented people; however, it was decided that if any improvements were to be gained, then membership should also include each wing so there could be a total "buy in" to any solutions. Thus the team was formed with leadership from the headquarters and additional membership from each of the missile wings. This would present a challenge to the facilitator and team leader in terms of geographic separation, team communications, and other facets in team dynamics. The initial team charter was:

STAN-EVAL QUALITY IMPROVEMENT TEAM CHARTER

PURPOSE: I hereby establish the formation of the StanEval Quality Improvement Team (QIT) to analyze and improve all processes associated with Standard Evaluations as conducted by every wing within 20th Air Force. The DO QIT members work for the good of the whole 20th Air Force. They are empowered to carry out improvements to these processes. The StanEval QIT will remain in force as long as it effectively performs its intended purpose or until I revoke this Charter.

MEMBERSHIP: Membership is assigned as follows:

LtCol Simmons	Team Leader	DOM
Capt Oetinger	Member	DOM
Capt Weil	Member	3901 MES
Capt Geydesen	Member	3901 MES
Capt Moony	Member	4315 CCTS
Capt Lamb	Facilitator	QI

The QIT will be led by the team leader, LtCol Simmons. Members may appoint associate members to assist in analyzing and solving process problems as required. In addition, consultants may be included as needed to assist the QIT.

DECISION MAKING: Group consensus in decision making is highly desirable. Brainstorming, freewheeling, and open honest discussions are encourage prior to making decisions. Only members may vote with only one vote per member. Alternates may only vote if the primary representative is absent. Associate members and others may not vote on issues before the QIT. Two thirds of the voting members must be in attendance to have a vote on a decision.

MEETINGS: Meetings shall be held as needed, but not less than bi-weekly. Meeting minutes will be taken, coordinated and distributed.

QIB/QIC INVOLVEMENT: The QIT will keep the DO Quality Improvement Board (QIB) informed of its activities and progress through the minutes and periodic briefings. The QIB will keep the Quality Improvement Council (QIC) informed through periodic briefings. Briefings should be scheduled when the QIT is unable to achieve consensus on an issue, when resources are needed, or when the QIT has reached key points.

The DO QIB membership is as follows:

Col Smith	DO
LtCol Maasjo	DOM
Maj Arnold	DOX
Maj Lomax	DOMC

JACKIE C. SMITH, Colonel, USAF
Director of Operations

Figure 3. Stan-Eval Team Charter

Team Dynamics

Each team was unique to not only the processes which they were chartered to analyze, but also different in their perspective and approaches. The StanEval team was composed of individuals who were all operations oriented, trained, and experienced. The Comm team was composed of individuals who were maintenance oriented, trained, and experienced. Just from their respective backgrounds, you could predict their problem solving approaches would be widely different.
The team leader and facilitator met prior to each team meeting. A part of these meetings was to discuss the meeting agenda (Fig 4), specific topics, facilitator roles and intervention, tools and techniques, and observations. The Comm team was allowed to free wheel, while the StanEval team was kept to using a strict systematic approach.
The first team meeting is the one which sets the tone for all other meetings and activities. This akin to the old adages about first impressions, you only get one chance. The Comm team began their team building by first setting up their ROEs, or group norms. Decision making was to be accomplished by consensus; however, the group makeup would later prove this a somewhat difficult task. Each member first introduced themselves and expressed their knowledge level of quality management, personal concern from the survey, and expectations of this team. We determined to illuminate each member's understanding of each other and that of group dynamics by giving them some training that included some tools and techniques and then had each member take the Teiger Assessment and Personality Test (TAPT) which was a subset version of the Meyers-Briggs test. This took about 15 minutes to accomplish, followed by an hour discussion of personality types and interactions. The team was composed mostly of strong willed extroverts (ESTJ, ENTJ). The team leader was typed as an introvert along with one other member. As facilitator, it became apparent that intervention would become necessary should the extroverts steamroll the team leader. Thus the ROEs were stressed and adhered to throughout the team life cycle. An interesting sideline to the Comm team was the observation of the "been there, done that" syndrome. That is, these members already knew what the tools and techniques were because they were so straightforward. In addition, the team (as an entity) wanted to reach to solutions as soon as possible. In fact, the survey that resulted in the team charter was discussed at length after the team charter was reviewed. Each member had their own personal slant to a solution and what they thought was really the problem. As facilitator, I had to play devil's advocate by asking them to discuss all ideas with an

MEETING GUIDE				
SUBJECT:			DATE:	
LEADER:		TIME: Start	Stop	
TIMEKEEPER:		LOCATION:		
SCRIBE:		FACILITATOR:		
OBJECTIVES				
MEMBERS				
AGENDA	IS (Info share)/ IP (Info Process)	RANKING	TIME REQD	CLOCK TIME
WRAP-UP				
LOOSE ENDS:				
TASKINGS:				
NEXT MEETING				
DATE: TIME:	LOCATION:			
AGENDA ITEMS				
NOTES				

Figure 4. Meeting Agenda Worksheet

open mind and support claims or positions with factual data.

Team members then went back to brainstorming all possible problem areas and began to prioritize them in context of problem impact. This brought the team out many of its floundering stages; however, the brainstorming brought out the domineering participants again. The problems presented by team interactions basically fell along their personality types; that is, the introverts were too easily stifled, including the team leader. Gate keeping was the solution used and allowed for valued inputs from the quiet participants. In describing team efforts at brainstorming, the pace was sporadic and hectic. One individual had decided on his own course of action and to his own solution and the "rush to solution" was on. It was determined that the real problem must be that the job definitions did not match actual performed duties. This conclusion was based on the "frustration factor" each member had each experienced from having to perform other duties outside of their expertise. Being a "one deep" organization meant each of us had to cover other's work when they were out of the office.

Again, to bring them back from a trip to Abilene, it was pointed out that factual data was needed, not feelings. The team decided, by brute force consensus, impatience, and a rush to solution to acquire data over a four week period. A check sheet that detailed one's day hourly was developed and each member would write down what specific duties they performed. In addition, each person would bring back their interpretation of their job description and actual description as listed in their performance reports. At the conclusion of this data collection, they would break out their duties by percentages as to what was within their job descriptions and those duties that were not. Clearly, it appeared the team was still at the storming stage and heading off to Abilene as no one offered objections or spoke up. As facilitator, I felt the only way to get the message across about using a systematic approach was to let the team fail and thus get them back together on common ground. The team concluded by their developing the next meeting agenda and assigning a secretary for minutes. Minutes were published and provided to each member and the process owner.

In contrast, the StanEval team took a cautious approach. First, the team leader met with the facilitator several times prior to the first team meeting. Discussion included using a systematic approach, "just-in-time" training, teaching and using methods such as process flow charting, and developing the team. The team leader felt it was essential to any success to utilize a systematic approach based upon facts because of the sensitivity and far reaching aspects of this process. He felt that it would take a small series of incremental improvements before any large scale improvements could be accomplished. This was necessary to overcome the resistance to total quality management and the inertia towards the required paradigm shifts regarding any changes.

Some other areas of concern were the geographic separation of the wing representatives on this team. This would be the first time we brought together a team from various locations for the various team meetings. There had been some previous activities that brought such team membership together but all the required data was provided and the team life was of short duration. We would also be using teleconferencing and other electronic means of keeping team communications open. All members first met together in December 1992. This was a three day, off site team meeting. As part of the systematic approach, the process owner opened this meeting by explaining the importance of this team, the team charter, the boundaries, and the empowerment given to the team. Next the team leader began to explain, in more detail, their charter. During the charter review, the team developed a team mission statement, an opportunity statement, and some goals. It was decided to use the six step process detailed by Air Combat Command (our major command at that time, see Fig 5).

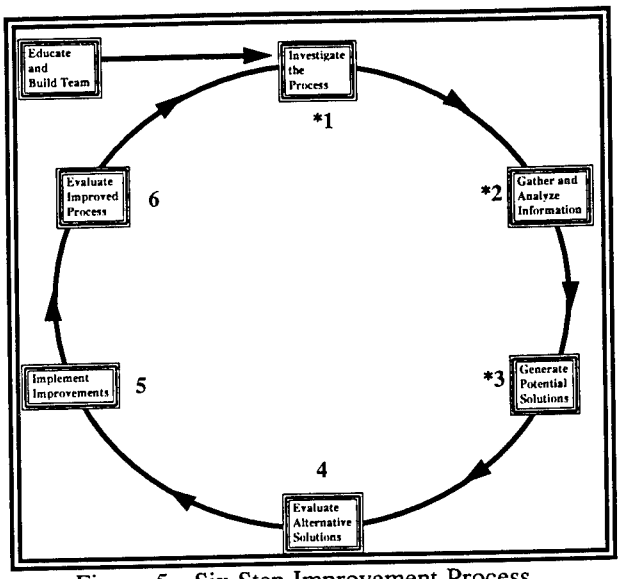


Figure 5. Six Step Improvement Process

Team building began with the four square picture introduction. Each member took a sheet of poster size paper and folded it twice so as to make four squares when unfolded. Only pictures were allowed to be put into the squares. One square was something about the individual, one square was what the individual needed in terms of support, one square was what makes the individual a pain in the neck, and the last square was something personal about the individual.

With this initial team building exercise, the next agenda item was training. Another difficulty experienced with a geographically separated team was to develop a common core of training and understanding. Fortunately, Air Combat Command had developed a series of initial awareness courses that were being used by most of our wings. As the Quality Advisor for the numbered air force, I also collected the various lesson plans from each of the wings and in turn sent copies of each to the other wings. What we were not sure of was the depth and understanding as most wings were now conducting awareness training across the board either wholesale or beginning with their senior leadership.

This "just-in-time" training session covered the basics of Deming and Joiner. We also covered some of the basic tools such as flow charting the process. In my many experiences with teams, I have found that the training most people receive is usually not used for some time. For example, in many of the awareness courses we cover all the tools and techniques. Some try to give exercises or case studies to reinforce the understanding; however, most people (at this point in the quality journey) return back to their job and wait some time before they are given an opportunity to be on a process action team. Most have yet to have the experience as a team member at all! Just like any other activity, if you do not practice you will lose the ability. Hence, many facilitators spend a large portion of their time retraining. I have found it far easier to train a team with very little background in quality tools and techniques. This "just-in-time" method has proven far more effective. The technique basically calls for training at the moment the team needs that particular tool or technique, give them an example or case study to work with the tool, and follow immediately with the team using it in "real life" so to speak on the processes they are chartered to improve.

The StanEval team leader led the team in discussion of the six step process towards improvement. From there the team discussed the process and developed a basic block diagram outlining eight basic steps. As part of the effort, each team member discussed their respective process flow at their wing. The overall process was then detailed in 32 pages of flip chart paper that covered the entire room. At each step the team reviewed their charter, mission statement, opportunity statement, and goals. Each time, the regulatory definition of the process was reviewed. This facilitated and focused the team consistently on their stated purpose.

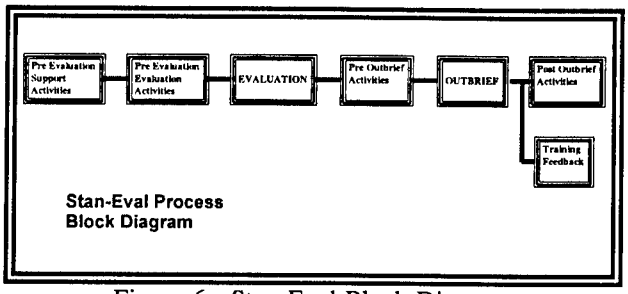


Figure 6. Stan-Eval Block Diagram

The flowcharting expedited the understanding of the process and included each wing's interpretation. From there, the team could see clearly the bottlenecks, non-value added steps, time consuming and overworked areas (such as script developments), and so on. Questions arose as to identifying areas that the team could focus their attention towards incremental improvements. As discussion continued, the team found that there were many steps that they could recommend immediately for "stroke-of-the pen" changes that would reduce costs and time. When they began deeper investigation, they found many steps were non-value added and had just simply been carried on for the reason "we always did it that way."

To keep this in perspective, we focused the team back on the six step process for improvement. The team had identified the process and now needed to gather some facts and figures on the overall process. Questions developed were "how long does it take to really develop a script from start to finish?", or "why couldn't there be a script bank among all the wings?", or "how much time is spent on filling out some forms and what really is that information used for?", and so on. The team felt that they should look at each step and identify three critical areas of interest and then develop metric packages to collect data. This would allow combining needed information into an overall package and keep from overburdening data collectors. Using nominal group techniques, they decided what the three critical areas were for each section. From my vantage point, the team was basically self-facilitating. As a matter of

fact, I basically acted as scribe as the team began to develop their metrics. As they did this, one member observed they had identified also "stroke-of-the pen" items and the team made a separate list for presentation back to the process owner and quality council for action.
As with the other team, minutes were kept, typed, and distributed to the members and the process owner. From this point on, the team was in the performing stage. Subsequent meetings and teleconferences began with an agenda, a review of the charter, mission statement, opportunity statement, and results to date. Each member was given the opportunity to voice concerns or changes to any of these. The key that made this process work so well was not so much the team building, or unique closeness among ICBM Missile Crew members; but, the use of a systematic approach. This team focused quickly and identified the process up front. They detailed the process with a flowchart methodology that made understanding clear and concise for anyone who looked at their charts. From there, the ensuing steps were much more easily undertaken.

Approach Contrasts

From the perspective of the facilitator, the hit and/or miss method used by the first team is clearly a facilitator nightmare and in many cases the fast track road to Abilene. I observed the first team as being in a rush to end their existence, reach for a programmed solution, and spending their time floundering. It was more reminiscent of one attempting to find the proverbial needle in a haystack by throwing out the straw as fast as one could and not realizing they were throwing up the same straw over and over again. After the four week collection period, this team began to analyze their data. It became apparent to them that this was just a "snap shot" of time and not really an indicator of what was really happening. So began the re-education process and the team taking a systematic approach. With several members trying to push the team to conclusion, this was the only way they would be convinced that a systematic approach was appropriate. The interesting note to this team effort was that the process owner was well versed in the arena of quality. As he read the minutes, he saw areas identified through the team meeting minutes and made some "stroke-of-the-pen" changes. As the team progressed, they too noted these changes and that reassured them of team worth and true empowerment. When a process owner listens to the team and takes actions, it is a far better example than any case study, lesson, or speech.
The second team began from the start with the systematic approach in mind. All their activities, training, and development centered on a systematic approach. The "just-in-time" training was reinforced with their actual use of the training by the team when analyzing their problems and finding solutions. Detailing their metric packages made data collection an easy activity that baselined the process and will continue to be used as changes are made and benchmarks are identified. One tool that also proved extremely effective was the "root cause" method. That is asking the five "whys" until you have reached the root cause. With a regulatory definition of their process, they also kept asking if this or that step was meeting the stated regulatory requirements. If not, root causes were determined and the team began to identify potential improvement areas.

Team Relations

While it could be argued that a military process action team is unique in some respects, the team dynamics and relations are no different. In the first team there were several barriers to team cooperation that resulted in some necessary conflict resolution. There were some member vs. member conflict and member vs. team leader conflict. Some members had come to the team with prior disagreements and preconceived solutions to their perception of the problems. Often, several members would be talking at the same time; hence, effective listening was not occurring. Due to inexperience in participative concepts and group processes, these same members would attempt to take lead of the team. Intervention required training in effective listening skills almost to the point of using a "parroting" method of discussion. That would require each member to restate the other's viewpoint to that owner's satisfaction before offering up any further ideas. Also observed was the characters "sniper" with little digs here and there and nonplaying teasing. Forcing the team to stay on the agenda as well as forcing members to base their conclusions on factual data reduced the effects of the sniper. On the opposite side we also had our "clams" that were reluctant to discuss issues. Here, the training on effective listening techniques helped immensely as members became more patient and facilitated the flow of comments. The team members began to make it a point to be sure to hear from each member. In this team were also some "wet blanket" and "bulldozer"

behaviors. Until the team had seen some "stroke-of-the-pen" changes, their outlook was cautious and pessimistic. After the changes, the team outlook changed and began to norm and occasionally perform as a unit.

The second team has yet to reach some significant storming stage. In fact, this team went from the initial stage of forming right into norming the first day of their three day off-site meeting. The second day they began to perform and became self-facilitated as the team began to see the overall process as detailed by their flowcharts. Time spent in advance of team meetings with the team leader was also a factor why there were no significant road blocks for this team. However, it has taken special efforts and nurturing by the team leader to keep communications open with team members when they meet via teleconference. Effective communications and listening skills exercised by the team leader have contributed greatly to their success thus far. Again, we discussed these issues and planned for these activities and any contingencies that could possibly arise. The team leader was effective as he "walked the talk" with each team member. We have also found increased awareness and "buy-in" from the wings as the team meetings have been rotated about the wings. This allowed each wing to offer facilities for the meeting as well as bring in their experts to meet face-to-face with the team as they were gathering data and details on specific sub-processes.

Lessons Learned

From the perspective of the facilitator there are many lessons to be garnered that can be used in any other team. First, the facilitator needs to have his/her tool kit available. This tool kit would include mini-lessons on the various tools and techniques such as brainstorming, affinity diagrams, nominal group technique, flowcharting, root cause analysis, cause and effect diagrams, and the various charts used to analyze data. I have taken my longer lesson plans from the various awareness and team courses and broken out mini-lessons that take upwards to one hour maximum with the team applying the training directly to their efforts immediately. Other tools you should have are a ready book on various warm-ups, team building activities, and "off the wall" activities. These "off the wall" activities are those I use when the team has appeared to be stalled, overloaded, lacking enthusiasm, or is stymied. I use activities that jump start their thinking so to speak and that generally are not directly related to their process action team activities. These also include "break" activities. Some of the best sources are from books with icebreakers, games that trainers play, etc.

Second, use "just-in-time" training. This requires meeting with the team leader up front and discussing the team membership and needs. As the team progresses and you see the possible need for a specific tool, offer it up to the team and conduct the training right then. Be flexible and apply what the team is working on within your lessons.

Team building is keystone to success. I have found that it is important to begin the first meeting with some member introduction exercise regardless of whether the team is familiar with one another beforehand. The team is new to analyzing that particular process for which they were chartered to improve. The usefulness of personality typing has been helpful when members have a better understanding why they act they the way they do; but you must exercise caution that typing is not used as an excuse for behavior. It only explains why a person may behave in a situation, not condone nor condemn. This is a useful tool towards building effective communication and listening. There are many other facets of interactions that the facilitator may use in the observation of the team and it can also help in determining appropriate interventions. There are many types of tests that one can use to "type" the team membership. I will not advocate one over another except to say that you should select that tool that best fits the needs of the team and also meets any time constraints (i.e., a 15 minute test with immediate results vs. a 1 hour test that takes a week to return and hours to discuss).

In our culture we are afraid of failure. As a facilitator, I use failure as a tool. We should not be afraid to fail if we learn from the mistakes. I have let teams fail in endeavors because that was the only method by which they could learn. Often when the team failed at a given step, they stepped back and then leaped forward from their new understanding. Process owners should be aware that failure will be a natural process at times as teams seek improvements. This is why we often prototype or pilot projects. We learn from failure often as much as we learn from success. As facilitator you must see failures as learning tools and be up front with process owners that may react rather than understand. Letting a little failure teach a lesson is important in the exercising of true empowerment.

Last, the team that is geographically separated can work. The lessons learned are that the team leader and facilitator must form a close knit team unto themselves. A lot of planning and coordination

from both make this team effective. The team leader must be well versed in quality subjects as well as be an effective communicator. We found that to make these teams successful that it has been helpful to rotate the meetings to the various locations. At each location the local experts were called upon to discuss data, detail processes, or provide perspectives. This increased our overall "buy in" to solutions later on. This also gave a sense of pride and contribution from that respective wing to the team effort.

Conclusion

The proliferation of quality activities and training has led to the formation of numerous process action teams. For each team there has to, and should, be a facilitator. Too often, and in haste, we just go out and train a group of people and call them expereienced. We have done this with many of our facilitators. Some have had no experience, some have been on teams, while most that are trained sit quietly on the sidelines waiting for an assignment to a team. Thus a "baptism by fire" experience curve exists. By publishing our team's activities as facilitators we can further educate our fellow facilitators and reduce that learning curve somewhat. These two teams are just an example of the dynamics and interactions that occurred. Their efforts were diverse and diametric; but the lessons learned reinforce those steps necessary for success. The facilitator must establish rapport with the team leader, meet prior to meetings to discuss the team efforts and membership, be prepared with their tool kits, and ensure that the team uses a systematic approach.

The "baptism by fire" method has become necessary as we are just at the start of this "quality journey" and have no large group of experienced facilitators. To garner experience, you can shadow active facilitators at team meetings and discuss team dynamics afterwards. Or you can be a part of training as an instructor or shadow a class and observe them. In the many case studies we use in training courses, we find a facilitator's golden opportunity. Finally, you can start a facilitator network. First, in your squadron, group, or wing. At your meetings, share experiences about past or present teams. Discuss intervention skills, practice techniques, or teach mini-lessons. Keep yourself current on the latest tools and techniques, and readings. Last, when you have been facilitating a team I would challenge you to keep a journal of that team's activities and interactions. Then write these down for use as a case study used in training or for a paper to share with other facilitators.

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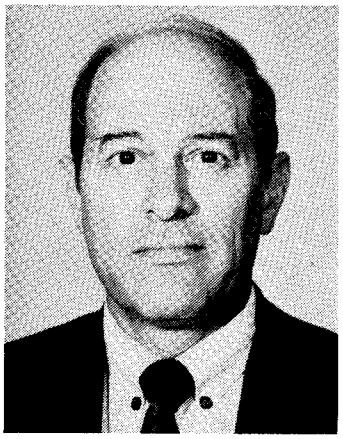
PREPARING TEAM IMPROVEMENT RECOMMENDATIONS



Roland DeRose

PREPARING IMPROVEMENT TEAM RECOMMENDATIONS

Prepared Especially for the First Annual

1993 Quality Air Force Syposium

October 19-22, 1993
Montgomery Civic Center
Montgomery, AL

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Introduction and Overview

- Envision the CEO and Quality Council endorsing the acceptance of the improvement/action team's data.

- Choose early efforts in visible areas that are critical to success.

- Address critical issues that are important to customers.

Success or Failure?

- Opportunities that

-- Had a good chance for success.

-- Were visible throughout the organization and, preferably, important to external customers.

-- Would significantly improve the lives of workers and supervisors.

- Selected process was neither so large that you were doomed to failure , nor so small that no one would notice the improvements.

Goal of your Recommendations:
For the Quality Council to Accept the Findings of PAT(s)

- Recommendations should contain:

--Results of analysis and interpretation of data collected.

-- Evidence that data was reviewed by the Quality Advisor using subject matter experts from both inside and outside of the organization.

Accept the Findings of PAT(s) (cont'd)

- Presentation to the Quality Council will be a sales pitch.

-- PAT members must be prepared to deliver it.

-- Charts and graphs may be hand-drawn or produced by software.

-- Butcher paper charts can be effective.

-- 35 mm slides and photographs are also useful.

-- Videos may also be effective, especially before-and-after the improvement process.

-- Length of report is based on the process evaluated, but normally it consists of about ten pages, plus data and analysis charts.

Sample Report for Quality Council Review

- Agenda for meeting

-- Organization's strategy of dedication to quality improvement.

-- Description of process (process owner; when team was formed; copy of contract between process owner, team members, and Quality Council).

-- Team's purposes

---To make recommendations to the Quality Council that contain hard and soft data collected and analyzed.

---To request Quality Council approval for the team to implement

---To request 30 to 120 days of further analysis of the "new" process by the team.

Background of Process

- History (why process owner formed the team)

- Current process (flow charts, etc.)

- Analysis of flow charts (cause and effect diagrams, Pareto charts, histograms, bar charts, pie charts, run charts) of the current process.

Background of Process (cont'd)

- NOTE: Any measurement made must stand on its own merits.

-- What data was collected?

-- Why?

-- Where?

-- When?

-- How?

-- By whom?

-- Next step?

Description of New Process

- Should be a direct result of data collected.

- Can include customer surveys, revised flow charts, data from other organizations currently using similar processes, and customer interviews.

- Cost savings anticipated.

- Trial period length.

- How trial will be monitored.

- Effect on other processes while trial is in progress.

- Other tangible improvements (i.e., morale, perceived customer satisfaction, improvement of marketshare, reputation of company, etc.).

Description of New Process (cont'd)

- Request for Quality Council's commitment to the improvement desired
  -- Importance of this feedback

- PAT's expectations during this improvement process

- Learning experience that took place and will continue during the evaluation period.

- Pitfalls encountered.

- Future PATs

--Additional assistance needed.

-- Attitude of supervisors toward team improvements.

Summary

- Management sets up the team for success by getting the culture of the organization ready for change.

- The team's presentation at the end of the project is critical and should include:

-- Mission statement of the team

-- Achievements of the PAT or major findings

-- Suggested next steps

-- Conditions found when the team started

-- Investigations and analysis done during the team process

-- Outcome of experiences of members (i.e. impact)

Summary (cont'd)

-- Savings (examples of real, tangible, and intangible benefits)

-- Impact on overall system(s)

-- Roadmaps for future teams

-- Suggestions to leadership

-- Acknowledgements (recognition of management and its goals)

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FACILITATING THE TQM STEERING COMMITTEES

Mary Fornoff

FACILITATING THE TQM STEERING COMMITTEE

ABSTRACT

The Steering Committee, which oversees an organization's Total Quality Management (TQM) Program, has a critical impact on the success or failure of that effort. This body is responsible for planning the implementation of the TQM program and ensuring management's involvement, ownership and support.

Individual who facilitate this process with the Steering Committee play a key role. They assist the group in achieving its goals by facilitating the process, coaching, consulting, training and acting as a champion for change. This paper will describe some simple, yet effective methods facilitators can use in supporting the Steering Committee through the Awareness, Assessment, Planning, Design and Implementation phases of TQM .

AWARENESS

The first goal of the Steering Committee is to determine the scope of the TQM program for its organization. They need to know about TQM. Thus the facilitator's first role is to provide education on TQM values and concepts, and on the implementation of these principles in other companies. The Steering Committee training should include the following concepts:

- Customer Driven Quality
- Leadership
- Continuous Improvement
- Employee Participation and Development
- Fast Response
- Design Quality and Prevention
- Long Range Outlook
- Management by Fact
- Partnership Development.

In addition, the Steering Committee needs to know how other organizations have used these principles to affect change. Analysis of the Malcolm Baldrige National Quality Award winners can provide a good source of information and show how these organizations have:

- Created quality values with their employees and integrated these into the day-to-day way of doing business.
- Used information systems to improve operational performance.
- Developed strategic planning processes that incorporate customer requirements and quality improvements.
- Trained and developed employees to be able to meet the company's quality objectives.
- Maintained its customer focus and satisfaction.

These descriptions give "life" to the TQM values and concepts. They provide a necessary connection between theory and application.

The Malcolm Baldrige National Award winners from 1988 to 1992 are:

- Milliken and Company
- Xerox corporation - Business Products and systems
- Motorola Corporation
- Westinghouse Electric Corporation - Commercial Nuclear Fuel Division
- Globe Metallurgical
- Federal Express Corporation
- Cadillac Motor Car Company
- IBM - Rochester
- Wallace Company, Inc.
- Marlow Industries
- Zytec Corporation
- Solectron
- AT&T - Network Systems Group
- Texas Instruments, Inc. - Defense Systems &Electronics Group
- AT&T - Universal Card Services
- The Ritz - Carlton Hotel
- Granite Rock Company

Information about these winners can be obtained by contacting the individual companies directly.

ASSESSMENT

When the Steering Committee becomes aware of its possibilities, they can realistically assess the quality functioning in their organization. The facilitator can manage this assessment process by developing a tool that evaluates the organization's quality practices in terms of:

- Leadership
- Strategic Quality Planning
- Human Resource Utilization
- Customer Satisfaction (Internal and External)
- Customer Relations (Internal and External)
- Quality Assurance of Products and Services
- Communication
- Management
- Employee Involvement.

The Malcolm Baldrige National Quality Award's criteria is an excellent basis for the development of an assessment tool.

Another simple assessment technique, the Force-Field Analysis, is used to determine the forces that promote quality and the forces that hinder quality within the organization. Forces can be people, departments, structures, systems, current practices or beliefs. Non-quality forces need to be identified
and resolved.

PLANNING

When the Steering Committee knows what is attainable and has assessed their present functioning, they can begin the work of designing a TQM strategy for their organization. This involves creating a vision of the expected outcomes for the program and developing strategic goals to attain the vision.

The facilitator can use several techniques to help the Steering Committee create a vision for the TQM program. One method is:

1. Have the members picture themselves in the company three years in the future, and ask them to write a description of what they perceive in terms of values, products, systems, processes, etc.

2. After each member has written a description, have each member read their description to the group.

3. As the members are reading their descriptions, the facilitator records the key themes on a flip chart.

4. After the members have finished, the facilitator leads a discussion on the key themes.

5. The Steering Committee then develops a vision using these themes.

After the Steering Committee has created a quality vision, they can begin to develop quality strategic goals. The following facilitation process can be used to develop these strategic goals.

1. The Steering Committee members are asked to individually write 3-5 goals that would enable the organization to achieve its quality vision. Each goal is to be written on a separate 5" X 7" index card.

2. After the Steering Committee members have recorded their goals, the facilitator reads each card and tapes it to a wall. Similar cards are grouped together. At the end, all card should be placed under broad categories.

3. The facilitator then discusses each broad category with the group and they develop a broad goal that incorporates the individual member goals.

4. The broad goals are then listed on a flip chart and the group is asked to prioritize using a weighted vote procedure.

5. After the results of the weighted vote, the Steering Committee is asked to discuss the results and reach a consensus on the 3-5 most important strategic goals for their organization.

6. Next, the Steering Committee selects a sponsor (a member of the Steering Committee) who will be responsible for the overall implementation of that strategic goal.

DESIGN

After the strategic goals and sponsors have been selected, the Steering Committee needs to define the scope of the projects and appoint members to the implementation teams. Each implementation team, chaired by a Steering Committee member, will be responsible for developing an action plan for its strategic goal. Each action plan must include definable, measurable, and time-phased plans and activities. If the scope of the strategic goal is large and complex, sub-teams can work on different aspects of the plan.

In this phase, most teams will require training in Process Improvement. The facilitator's role in this phase can be to research TQM training programs, evaluate the programs in terms of the organization's needs, and make recommendation to the Steering Committee. The facilitator also needs to gain consensus on:

- Who will be trained first.
- The content and scope of the training.
- The use of internal or external resources for course development.
- The need for Train-the-Trainer courses
- The timeline and mileposts
- The training budget

IMPLEMENTATION

At this step, the teams have been trained and are working on projects that will move the organization towards achieving its strategic goals.

The Steering Committee, at this phase, is responsible for:

- Providing and approving the time needed for training, team meetings, and celebration of successes.
- Making decisions for the organization that support TQM Core Values and Concepts.
- Providing direction and support for the Implementation teams.
- Dealing with resistance to the TQM strategy.
- Attending team meetings.
- Establishing a reward and recognition system for TQM efforts.
- Investigating other TQM programs (ISO 9000, JIT, Partnering, etc.)
- Communicating TQM values and successes to the organization.

The facilitator's role is to assure that the TQM efforts stay on track through coaching the Steering committee on their responsibilities and encouraging them to "champion" the process.

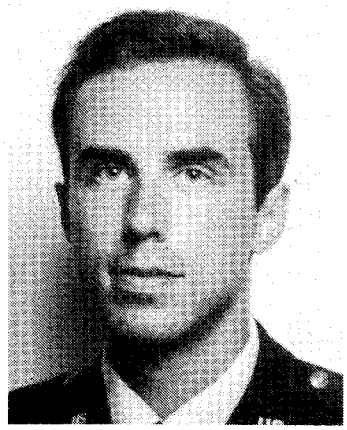
The facilitators can:

- Provide a communication link between the teams and the Steering Committee and communicate the team's problems and successes.
- Encourage communication with your customers about the organization's Quality movement.
- Conduct focus groups to determine where additional areas for improvement are.
- Arrange site visits to other TQM organizations.
- Track the progress in reaching the strategic goals.
- Investigate expansion of the TQM program.
- Identify additional training needs.
- Investigate more efficient ways to organize the data to manage TQM.
- Help identify the need for more teams.
- Assure that all results are being documented.

CONCLUSION

The role of the Steering committee facilitator is complex. It involves providing training and coaching on TQM values and concepts, team building, developing assessment tools, researching TQM programs, and advising and championing the process. While challenging the role of the facilitator provides an opportunity for leadership, creativity, and personnel development.

USE OF A TAILORED, STRUCTURED SYSTEM FOR IMPLEMENTATION OF TOTAL QUALITY



Capt Gerald Eldering

Use of a Tailored, Structured System for Implementation of Total Quality

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Abstract

Military organizations need to use a structured system to implement Total Quality because personnel are not experienced with quality methods and tools. A structured system gives users a clear understanding of how to plan for quality, and organize, measure and improve processes.

The system must be tailored to each organization's culture, values and structure. Tailoring should be done by a group of the organization's members who first develop expertise in Total Quality implementation. The 89th Operations Group has developed an example of a structured implementation system.

In this paper I will illustrate the value of a structured implementation system by showing the need for such a system and explaining what a structured system is. I will discuss how a system is designed, show an example of use of a system in the 89th Operations Group, and list successes and failures from that experience.

Background

A structured system of implementation is a set of clear, distinct steps that an organization follows to progress from a "pre-Quality" culture to "Total Quality" culture. It is a combination of a model and an implementation plan, and serves as a road map from simple awareness of quality to application of process improvement models. While models for improving a specific process are frequently used, the broader structured systems are less common.

The system must:

- Encompass strategic planning, customer identification and alignment, metric development and process improvement.
- Recommend tools to be used for each step.
- Be used by every section or division of a unit.

Many civilian companies that are active in the quality movement have developed programs which are structured implementation systems. Boeing Corporation's Departmental Task Analysis, and Xerox's Quality Improvement Process (QIP) and Problem Solving Process (PSP) are two examples.

Need For A Structured System

The structured system of implementation overcomes many of the forces restraining implementation of Total Quality in the Air Force. Many units current implementation plans do not address these issues.

Restraining forces:

1. The Air Force culture is built on a strong sense of tradition, stemming from a

long history and a critical mission. Many of the paradigms found in a typical squadron are based on this sense of tradition.

2. The motivation for change in the Air Force is weak. The Air Force, especially the 89th Airlift Wing, has a history of success. With this success in mind people ask the question "Why change what already works?". Air Force personnel can not be motivated to change by threats of business failure, or promises of competitive advantage, or promises of financial reward through profit sharing.

3. Air Force personnel do not have experience using the tools and concepts of Total Quality. Employees in many civilian companies have worked with statistical tools, facilitation techniques or other progressive management concepts, and are therefore more open to the cultural change.

All of these factors combined create a culture greatly resistant to change, and therefore a structured method of implementing change is needed.

Overcoming the Resistance with the Structured System

The structured system of implementation enables an Air Force unit to overcome resistance by appealing to member's sense of discipline and intelligence. Military discipline ensures that personnel will use the system if the task is clear and they are directed to. Once people use effective quality planning and process improvement methods, satisfactory results will drive them to continue to use the tools. Many quality advisors have seen a situation where an "old timer" takes a dim view of Total Quality Management until he sits on a PAT and sees a reduction in the workload and an improvement in quality. Air Force personnel are very proud, and want to do the job the best way; they simply need experience using the quality tools. The structured system gives them that experience.

Design Of A Structured System

To better understand the value and makeup of a structured system of implementation, we should consider the steps involved in designing such a system. It is assumed, in this case, that a wing, group or squadron is designing a system. Structured systems can be developed at the Air Force Headquarters or major command level, as was the QAF Continuous Improvement Process, but must be assimilated using similar steps to those discussed below.

1. Assign a design team - The unit commander or quality council should set up a team of unit quality experts to develop the system.

- The team should research various models.
- The team must consider what improvement efforts have been made, and the culture of the unit.
- The team must develop a time line and method of monitoring implementation.
- The team should apply the PDCA concept when developing the model.

2. Design a system of distinct steps - The system should include steps for strategic planning, customer identification and alignment, metric development and process improvement.

3. Tailor the system - The system must be tailored to the culture of the organization. As many authors profess, the "cookie cutter" approach of copying another organization's system will not work. Cultural differences between organizations will doom this approach to failure. Other systems can be used for reference, or in part, if cultural differences are considered. The development team must consider the following aspects as a minimum:

- How familiar is the organization with quality terms and tools?
- What tools are taught and used?
- What is the educational level of the organization members?
- How open are the members to change?

4. Develop a method of control - Set time lines for use of the system, but take care that the time line does not drive supervisors to "square filling" or "delegation". Ensure the commander and the quality council are committed to the control methods. A simple Gantt chart would be very effective.

5. Relax the structure over time - As sections gain experience with the model and gain a true understanding of the meaning of a Total Quality culture, withdraw the structure and give the sections flexibility in the application of tools.

Experience In The 89th Operations Group

Experience with a structured system of implementation in the 89th Operations Group serves as evidence of the need for such a system. While the Group has still far to go in the cultural transformation, squadrons and sections that used a structured system had much greater success than those that did not.

The use of a structured method of implementation in the 89th Operations Group began with the strategic planning process. Captain Scott Morgan, assigned to the 1st Helicopter Squadron and currently working in the Wing Quality Improvement Office, lead the Group Quality Council through a series of steps to develop group goals and objectives. These steps used tools including Affinity Diagrams and Tree Diagrams found in Goal QPC's Memory Jogger Plus. The clear, actionable steps that Capt Morgan used with the Group were then applied by each squadron quality council to develop goals and objectives.

Following the development of goals and objectives, I designed a series of steps for the work sections in each squadron to use. These steps helped each section understand the squadron's goals and objectives and begin improving processes. The steps included customer/supplier identification and alignment, metric development, and prioritization. I used concepts that I had learned in AFIT's Statistical Process Control course, in the University of Maryland MBA Program and from Capt Morgan.

This method has been successful in the 89th Operations Group. Sections have clear steps to take and have fewer questions about what to do next. While some people still have doubts and don't understand all of the tools, they are learning a great deal by working through the steps. As sections gain experience they are becoming more creative with their application of quality tools.

The 89th Airlift Wing, through the guidance of the Wing Quality Improvement Office began application of a structured system of Total Quality implementation in the spring of 1993. The rate of progress in implementation has improved dramatically since then.

Successes and Failures

When examining the experience of the 89th Operations Group it is important to consider elements of success and failure.

Elements of success:

- Sections found the system simple and easy to use.
- The system provided people with the "big picture".
- People who didn't believe in the Total Quality concept began to see value in the concept.
- Sections quickly began to adapt and innovate while applying the quality tools.

Reasons for failure:

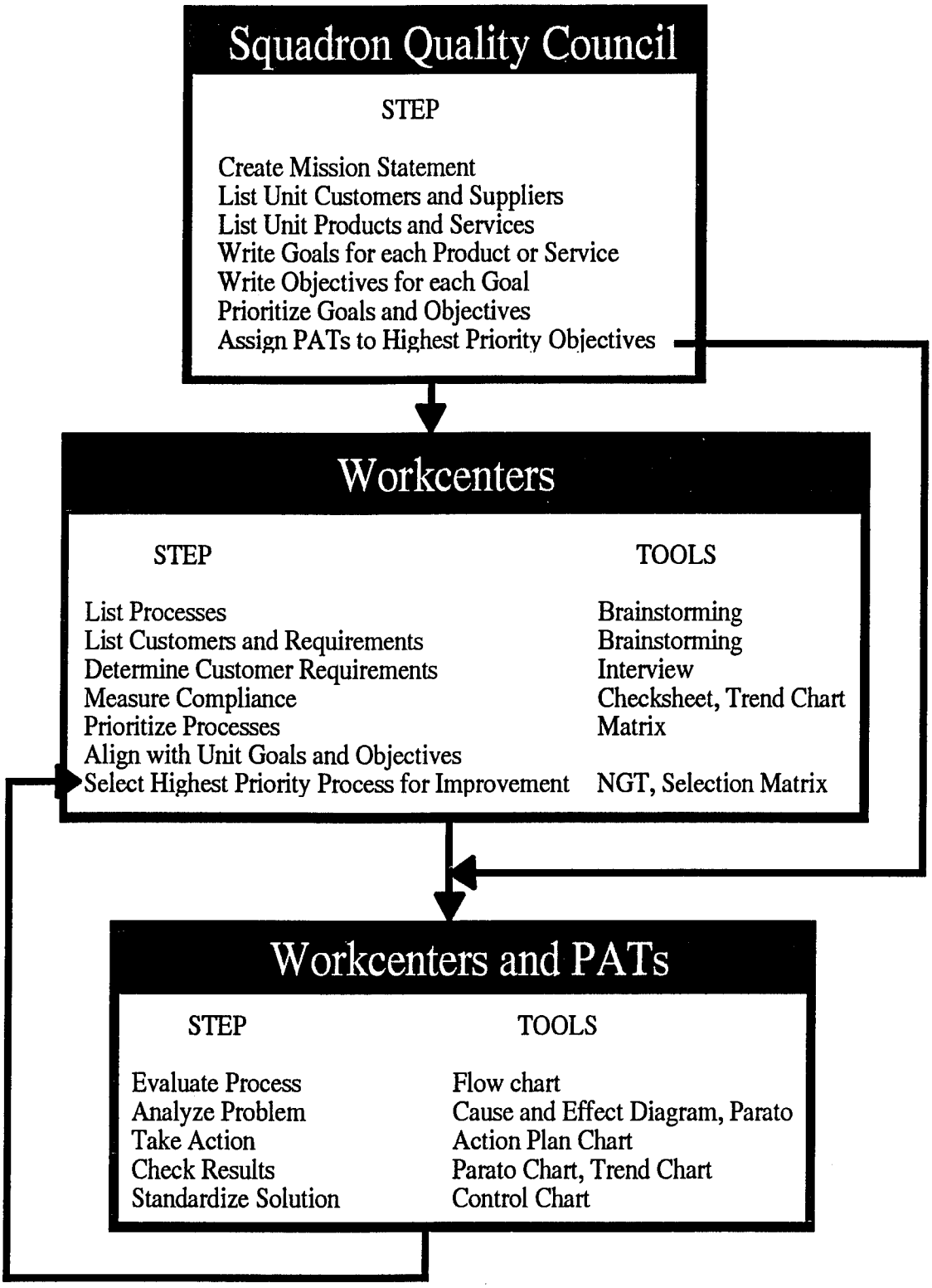
- Some commanders did not assertively support the system, and as a result progress stopped.
- Some units did not have enough well trained facilitators to support the process.
- Many people had not used the tools since their initial training, months earlier.
- Some sections quit as soon as they had any difficulty.
- Some units did not effectively monitor the application of the system.

Summery

In this paper I have demonstrated the need for the use of a structured system of implementation and explained how the system overcomes resistance to change. The system must be tailored to the culture of the organization. The experience with structured systems in the 89th Operations Group serves as evidence of it's importance and provides valuable lessons about this method of implementation.

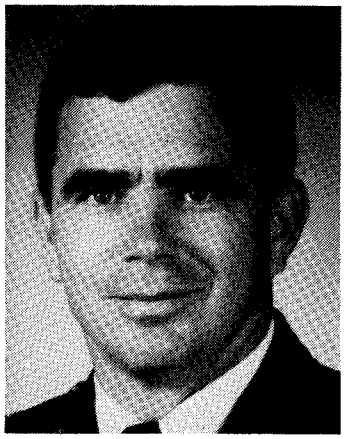
Wings, groups and squadrons in the Air Force need to use a structured system of implementation, tailored to the culture of each organization. With the exception of Process Action Teams, most Air Force personnel are simply trained and told to "go forth and improve". Only after gaining experience with quality tools through use of a structured model will the Air Force culture change enough to warrant this kind of mandate.

Structured Implementation System



This example illustrates a structured system that a typical squadron might develop. This system includes implementation steps for the squadron quality council, PATs and workcenters. The term "workcenters" refers to divisions of the squadron, otherwise known as shops, sections, or flights. Quality training, recognition, and suggestion programs are not part of the system.

JUMPSTART:
A PLAN FOR IMPLEMENTING QUALITY AIR FORCE



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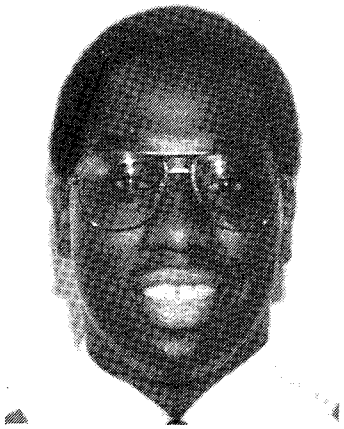


Capt Hilton Smith

Rick Vassella

JUMPSTART

A PLAN FOR IMPLEMENTING QUALITY AIR FORCE

By

Major George Michael Christensen (USAF)
Capt Hilton Smith, Jr. (USAF)
Mr. Rick Vassella (GS-11)

INTRODUCTION

What came first: the chicken or the egg? A similar question often plagues those of us charged with Implementing Total Quality (TQ). Most quality advisors and consultants insist on extensive training prior to beginning implementation. The common argument is whether to begin from the top and proceed down or train the workers first and then have the managers learn the quality principles. If training could be completed instantly, somewhat like loading a disk on a computer hard drive, the question would be mute. First you'd train everyone, and then implement. In practice, training takes months and sometimes years depending on the size of your organization. In some companies and especially in the military, turnover is a critical problem. While awareness training can be accomplished in a large auditorium with hired, enthusiastic and motivated speakers, the tools, training and advanced principles take years to understand and integrate. If you are involved in a company or unit that changes commanders every year or two and the entire organization is rotated systematically over three years, you have to train constantly. You can't do awareness training this year, tools training next year and advanced strategic planning the third year, because by the fourth year everyone's gone. You get stuck in the mode of always training and never implementing. That is what happened at Altus AFB, Ok. We were in our third year of our quality journey; training was rampant and implementation was sporadic. The quality council asked two questions. 1) Why? and 2) How do we change? We've already answered the first. Operation JUMPSTART answered the second question. Our first concern was to establish the objectives of this new program, then set some ground rules. That completed, we developed the course concept and finally we ended up with what we called the four continuous phases of JUMPSTART.

OBJECTIVES

- **Move from theory to activity**

We finally admitted we probably wouldn't get everyone trained at one time, due to the turnover inherent in the military. But we still needed to see some activity. Over half of the base could talk quality but not many could "walk the talk". We found that after awareness training, individuals would be fired up, but they didn't know how to begin the journey. The light would come on but still not show the way. They still needed a road map.

- **Provide a simplified format for organizations to implement Quality Principles**

The second objective, then, was to provide a simple road map to begin the journey. We weren't looking for a strategic plan of gargantuan proportions. It had to be simple and be completed in a few months. Again, the goal is to JUMPSTART the implementation. Once an organization knows how, they are more likely to continue the journey. A quality journey of 10 years starts with the first step.

- **Encourage teams and individuals to make job improvements**

Quality principles require both teams and individuals to become personally involved. This program, then, would involve all people from all levels of the organization. When teams and

individuals feel they are driving the quality train and not being unwillingly pulled, they get involved and feel more accountable for the success of the organization and the quality journey.

- **Increase accountability at all levels**

While doing our initial baselining of JUMPSTART, we found something very interesting. If you asked upper-management why there was no activity, they would point down to the organization. They (upper-management) supported the program, but couldn't do much because the organization wasn't that interested. It would be like pushing on a rope. The folks doing the work, the first line employees would point up to management saying, "We think quality is great and would do great things for the Air Force and our base, but [pointing upward], they won't let us." Middle-management just shakes their head with one hand pointing up and one hand pointing down. It is always someone else's responsibility. The greatest objective of JUMPSTART, then, was to ensure everyone accepted responsibility. Once the objectives were settled, we began working on the ground rules for the program.

GROUND RULES

- **Working groups would consist of Squadron Commander and approximately 15 identified squadron members.**

The 16 member working group consists of the key players in the organization. In the past, these members would decide how the squadron would be run. Instead they will work with a trained JUMPSTART facilitator to bring tools and exercises back to their sections. After JUMPSTART, this group can be the squadron steering committee.

- **Trained working groups will have 5-10 working days to complete each of the first three phases.**

Since this is only a JUMPSTART to implementation, it was important that each phase be completed in a timely fashion. If the squadrons were given longer, they might be tempted to procrastinate. Timely completion ensured continuous movement.

- **All 16 working group members will be trained in Awareness and Teams and Tools.**

Although we didn't make it a requirement that the entire squadron be trained, for reasons mentioned before, we felt it was extremely important that the working group members be trained in our two introductory courses, Total Quality Awareness and Teams and Tools. Since the group members can explain basic principles to their co-workers, it wouldn't be necessary that all were trained. We would put on special courses, if required, or give extra allocations to the squadron for our regularly scheduled classes.

- **Squadron commanders will be responsible for timely completion of each phase.**

If a phase bogged down, the responsibility to ensure movement rested squarely on the squadron commander's shoulder. If an individual was not taking the process seriously, he or she answered directly to the squadron commander...not the facilitator.

- **Squadron commanders report progress to group steering committee.**

Having the squadron commanders brief the steering committee on their unit's progress ensured the next level knew of their individual squadron's progress. It also ensured movement in the squadron because, the groups meet once or twice a month and expecte regular updates. They also knew at what phase the squadrons should be at.

- **All information will be kept at the squadron/section level.**

Although the squadron commanders brief the group council on their progress, we did not intend for them to bring up every piece of information gathered. The actual data gathered and processes improved should stay down at the lowest level where it is meaningful. The purpose of JUMPSTART is to recharge the quality journey in the squadron, not to tell all to the group.

OVERALL COURSE CONCEPT

With the objectives stated and ground rules agreed upon, the overall course concept was developed. All previous courses were facilitator driven. Information would be presented and group consensus would be reached. Knowledge would be gained in the "discovery" fashion verses "teaching." Our first guidance was to develop another course in the discovery fashion. But we were sure another course wasn't the answer. If three full time courses and several special classes couldn't spur activity, a fourth class wouldn't. We developed a totally interactive program that followed this format. 1) Working group meeting with facilitator, 2) Squadron works on assignments, and 3) Report back results to working group.

- **Working group meeting with facilitator.**

While other classes relied on "discovery," this program was review and rediscovery. All working group members have been trained, but it had been years since some had their training. The first step of all facilitator led meetings with the working group is a review of all quality tools to be used by the working group. They would then go over the working group's assignment for the next week and make sure everyone understood what tools they would use and what product they would bring back to the next meeting. It is the squadron commander's responsibility to ensure all members are clear as to their taskings. This meeting would last anywhere from 1 to 3 hours, depending on the needs of the group. It is up to the squadron commander to schedule additional meetings as "progress reports." These additional meetings could be with or without the facilitator, commander's choice.

- **Squadron works on assignments.**

The working group adjourns with their assignments and go to the work centers. Here they gather their co-workers, explain the tasks (i.e. flow chart critical processes), and determine if any on-the-spot training is required. The co-workers, then, go about gathering data and returning it to the working group member. The working group member does not gather the individual data, rather he/she collates data the co-workers prepare. In this way, everyone in the organization is directly involved. Any working group member can call the squadron commander or facilitator

- **Phase II: Identify processes (10 working days)**

Identify critical processes at ALL LEVELS

First step is to review what a critical process is. For our purposes, a critical process is the reason for existence. We say all levels because there are processes critical at every level. Not all processes may be critical to the overall organization, but to an individual or section the process might be critical. We could argue how important phone etiquette is to the organization, but to the receptionist or customer service representatives it is a critical task.

Flowchart critical processes

If it's critical, it should be flowcharted. Each individual, section and group will then, have flow charts of what they think are critical tasks. Fact based decision making requires objective, identifiable tasks. Streamline the processes after flowcharting.

Evaluate its purpose, validity and support to your customer

Armed with the customer/supplier alignment from phase I, see if your critical process add value to this alignment. If your critical task adds nothing of value, maybe it's not so critical. It might even be of negative value to your customers. These non and negative value-added tasks probably should be eliminated. What should be left is critical, value-added processes.

Determine what is to be measured and how to measure it

If it is an objective, critical, value-added process, then it can be measured. It is not the intent of JUMPSTART to develop metrics. That would require weeks or months; however, this useful information needs to be set aside for a metrics working group to develop after completion of JUMPSTART.

- **Phase III: opportunity identification (five working days)**

Identify opportunities for improvement

Analyze phase I and II outputs for opportunities for improvements. Notice we didn't say to list problems. Opportunities can be negative or positive. We want to fix problem areas permanently and seize opportunities to improve. List all of these on a flip chart for the group to see.

Determine level of charter

Next we determine the lowest level an opportunity can be chartered. If the section can correct or improve a process independently, they are empowered to do so. If it must be group or wing chartered, it's set aside for the squadron commander to bring to the group/wing quality council for charter.

Charter squadron PATs/NWGs

Next the opportunities are rank ordered by importance acccording to the customer and mission statements. The working group, now acting as squadron council, charters the PATs it can (based on time and individual availability) and empowers Natural Working Groups (NWG) at the section level to proceed with its opportunities for improvements.

anytime to clarify a tool, process or assignment. The individual four phases are structured to take one week of intense activity.

- **Report back results to working group.**

After 5 or 10 working days, depending on the phase, the working group reports back its information to the squadron commander. After discussion/evaluation, the working group prepares for the next phase. The facilitator again reviews all quality tools to be used and goes over the group's assignment for the next week making sure everyone understands what tools to use and what product to bring back to the next meeting. With this overall working concept established we designed the four phases.

THE FOUR PHASES OF JUMPSTART

The nuts and bolts of JUMPSTART are its four phases. Phase I lasts five working days and concentrates on customer focus. Phase II identifies processes and lasts for 10 working days. Phase III, opportunity identification, lasts five working days. Phase IV, progress, continues throughout the year, however it is reported to the group councils every two weeks. Let's examine these phases individually.

- **Phase I: Customer focus (five working days)**

Why we are here/working group's objectives

Since this is the first meeting of the working group, the first order of business is to explain JUMPSTART (as we already have here) and agree on the working groups objectives. It is critical that all group members reach consensus with the course concept. This is where we emphasize the depth into the organization we want the group to go. They don't make policy decision, they gather information from first line employees and bring it back to the group unbiased.

Have complete understanding of your mission statement.

If a unit does not have a mission statement, now is the time to develop a working mission statement. If the squadron has a mission statement, we review it and modify it, if necessary, until the group "owns" the mission statement. These first two steps ensures understanding and consensus of what's important to the unit.

Identify, understand, and verify customer and supplier needs.

This is basically homework. The facilitator covers what customers and suppliers are. The group is adjourned to rediscover who their customers and suppliers are. Once suppliers and customers are identified, the organizations differentiate between internal and external customers and suppliers. They then call them and ask four alignment questions. These questions are right from the Air Mobility Command's workbook, Leaders. 1) What are your requirements? 2)How will you use what I give you 3) How am I satisfying your requirements? and 4) How can I improve? They have five working days to complete phase I. With customers and suppliers aligned, we move on to phase II.

- **Phase IV: progress (10 working days initially, then every two weeks)**

Approve squadron PATs/NWGs membership

Working group members return with nominations for PATs/NWG chartered in phase III. They are required to justify their nominations to the groups. This will keep line of sight selection from occurring.

Identify roadblocks to improvement

This is where the group discusses problems they have encountered throughout the month long process. They look at management support and cross-functional involvement and suggest ways to knock down the roadblocks. The JUMPSTART process will knock down many roadblocks along the way, but those left need to be dealt with. If they belong to other squadrons, group or wing agencies, the squadron commander can discuss them at the appropriate councils.

Brief group steering committee

Within ten days the squadron commander will be on the group steering committee to discuss their JUMPSTART journey. He/she will brief all squadron PATs/NWGs progress and those opportunities that await squadron charter. He/she will recommend PATs for group or wing level charter. If it's approved for group charter, it will be chartered then. If it is a wing level charter, the group commander will take it forward to the wing and present it at the next wing quality council. The squadron commander can also brief success stories and discuss roadblocks to improvement discovered by his units. This briefing will be given to every group quality council from then on. Eventually every squadron commander will brief the progress of all PATs going on in their unit at every meeting. After every group council, the group commander should have information for the wing council.

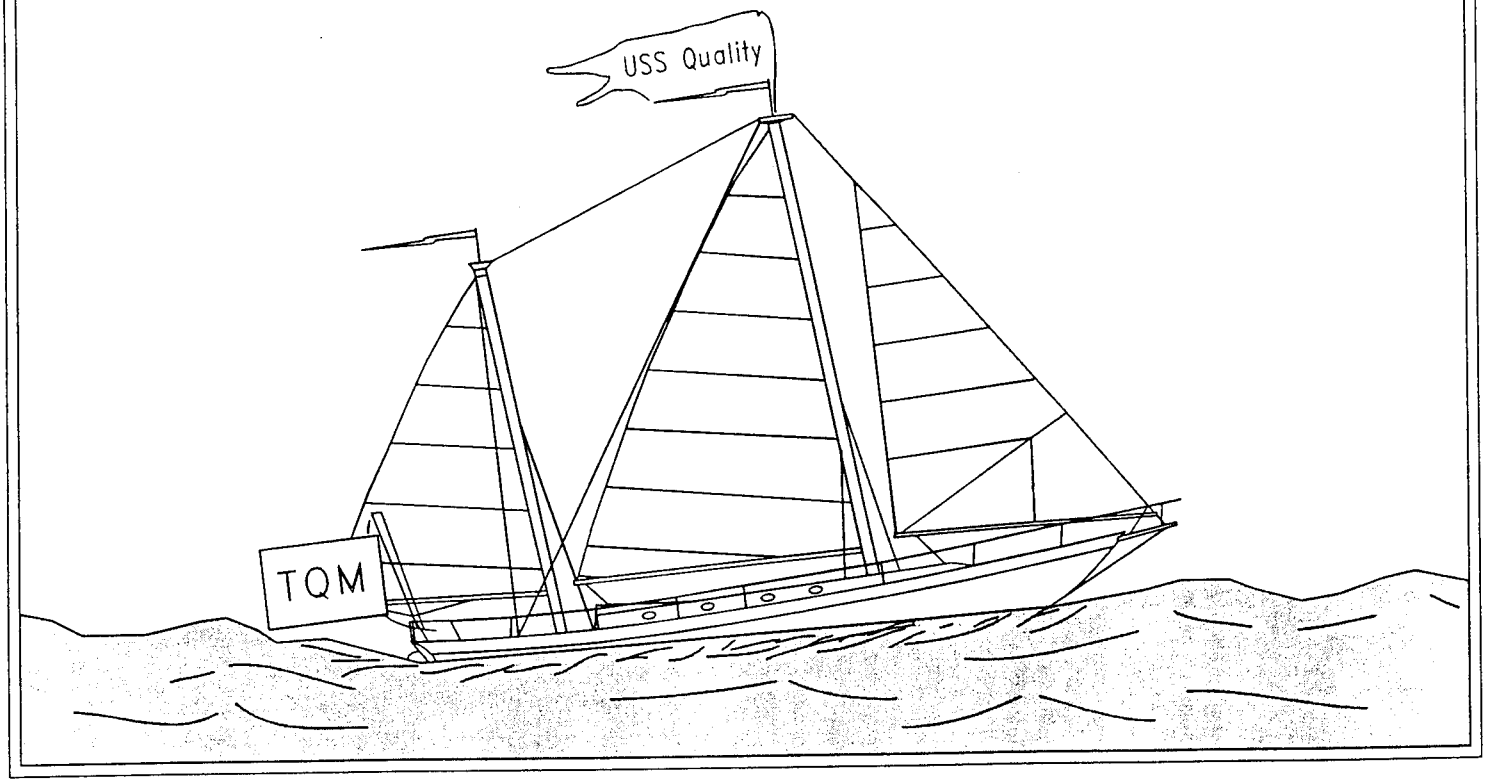
CONCLUSION

So far, two "pilot" squadrons have run the JUMPSTART program. One was an operational flying squadron and the other a maintenance squadron. Both reported great results and are glad they went through the program. Both provided important feed back which has been incorporated into JUMPSTART discussed here. JUMPSTART has proven to be an important plan for implementing QAF. The ground rules set the stage. The concept of 1) working group meeting with the facilitator 2) homework on assignments, and 3) reporting back to working group ensures movement and cooperation at all levels of the organization. The four phases of I) Customer focus; II) Process identification; III) Opportunity identification; and IV) Progress brings the squadron through a simple format to move from theory to activity while encouraging teams and individuals to make job improvements and accept accountability at all levels.

SPRINT AND DRIFT: NAVIGATING QUALITY IMPLEMENTATION THROUGH THE ROUGH SEAS OF CHANGE

MSgt Dale Peterson

Sprint and Drift: Navigating Quality Implementation Through the Rough Seas of Change



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Overview

The last two years have seen an inordinate amount of change throughout the Department of Defense. The 544th Intelligence Wing, the most decorated unit in Air Force history and a stalwart of Strategic Air Command tradition, evolved into the Strategic Joint Intelligence Center (STRATJIC) and became an integral part of United States Strategic Command (USSTRATCOM). With the seeds of Quality planted in the waning days of the 544th, quality implementation survived the deactivation of the founding organization, grew with the genesis of a new unit and a new Command, and developed with the integration of other services into a Joint Command.

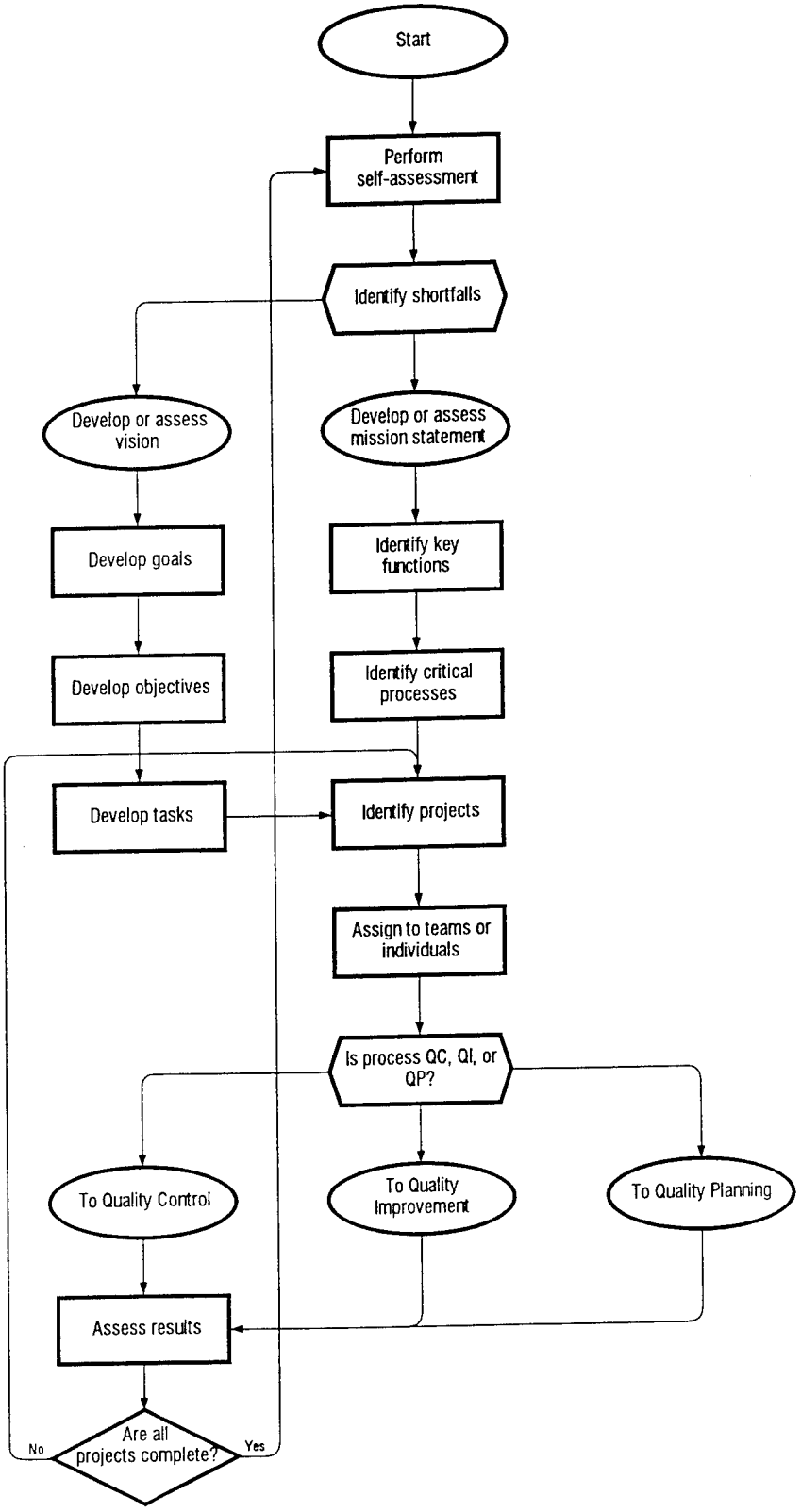
Many institutions become perplexed and bewildered when facing the seemingly insurmountable task of Total Quality implementation. Seeking a solution to the Total Quality puzzle, organizations often try to find solace in formulas, recipes, or cookbooks. Rigidly following a specific ritual for Total Quality implementation straightjackets an organization and does not allow for adapting to a changing environment. One agency's successful formula for Total Quality implementation may not be compatible with the culture and mission of another organization. Rather than a recipe, an organization should establish a Total Quality infrastructure and develop a Total Quality gameplan.

An infrastructure for Total Quality provides a framework for implementation; a gameplan supplies direction and strategy while allowing for flexibility to adapt to changing conditions. A pragmatic approach to introducing Total Quality leads to Total Quality implementation staying on course. Though progress is sometimes slow, especially when adapting to change, a solid infrastructure coupled with a sound gameplan; bolstered by strong leadership, helps ensure success. The Total Quality infrastructure and Total Quality gameplan are intricately entwined. One is not developed without the other. The following is a synopsis of our implementation.

Total Quality Infrastructure

Quality Council. Based on the work of Dr J. M. Juran, the Quality Council lends itself to the traditional hierarchical structure of military organizations. Within the Directorate of Intelligence (J2) of USSTRATCOM, the Quality Council function is filled by the Executive Steering Group (ESG). The ESG is the process owner of the **Quality Guidance Process (Fig 1)** within J2. The Quality Guidance process provides a course chart for senior leadership to follow when piloting the Total Quality ship.

Fig 1, QUALITY GUIDANCE PROCESS.



The ESG is the authority for implementing Total Quality and the Quality Improvement Proposal (QIP) process as specified in the Quality Implementation Guidelines. Consisting of the senior leadership, the ESG makes the command structure responsible for Quality.

The ESG is the J2 arm of the USSTRATCOM Executive Quality Council. By having Councils located at lower levels of the Command, the lesser Councils are able to address Directorate and Division level specific issues without tying up the USSTRATCOM Executive Quality Council.

Total Quality Office. The Total Quality Office is the internal consultant for Total Quality matters. Surprisingly, our clientele consists of not only internal customers, but external customers as well. We advise leaders on Quality and are often the point-of-contact for taskings from the Directorate and the Command. We are responsible for developing curriculum and conducting training.

The Total Quality Office is the Executive agent to the J2 ESG for QIPs. By providing accounting and follow-up to Quality initiatives, the Quality Office helps ensure projects don't fall through the cracks.

The Total Quality Office assists the USSTRATCOM Quality Office in coordinating Command-wide Quality initiatives. No one lives in a vacuum. Likewise, Quality within a Directorate cannot ignore the rest of the Command. Since we had a considerable head start in pursuing Quality, we have been able to assist the Command in providing training and drafting Command strategies for implementing Quality. By joining hands with Quality Advisors from other Directorates, we are hammering out a unified strategy. This step is critical to link the pockets of Quality that exist within the organization to effect a Command-wide transformation.

Quality Implementation Guidelines. The Quality Implementation Guidelines are the mechanism to encourage Quality Improvement at all levels. While anyone may approve a QIP, disapproval is the purview of 0-6's and above. The intent is not to disempower middle managers, but rather to ensure all ideas are given due consideration.

The Guidelines are the vehicle to define Quality roles and responsibilities. Not only are individual rights and responsibilities under a Total Quality environment outlined, but the roles and responsibilities of areas such as the Total Quality Office and the Executive Steering Group are outlined as well.

The Guidelines are the compendium to provide a systematic approach to handle Quality initiatives. The process is intended to provide timely handling and objective evaluation of submissions.

Total Quality Gameplan

Research and Development. Research and development is one of the most critical phases in developing a Total Quality gameplan. Without proper investigation, Total Quality implementation can go awry. Fact finding and data gathering from private and public sources provides a wealth of information that can be distilled to generate the model(s) adopted by the organization.

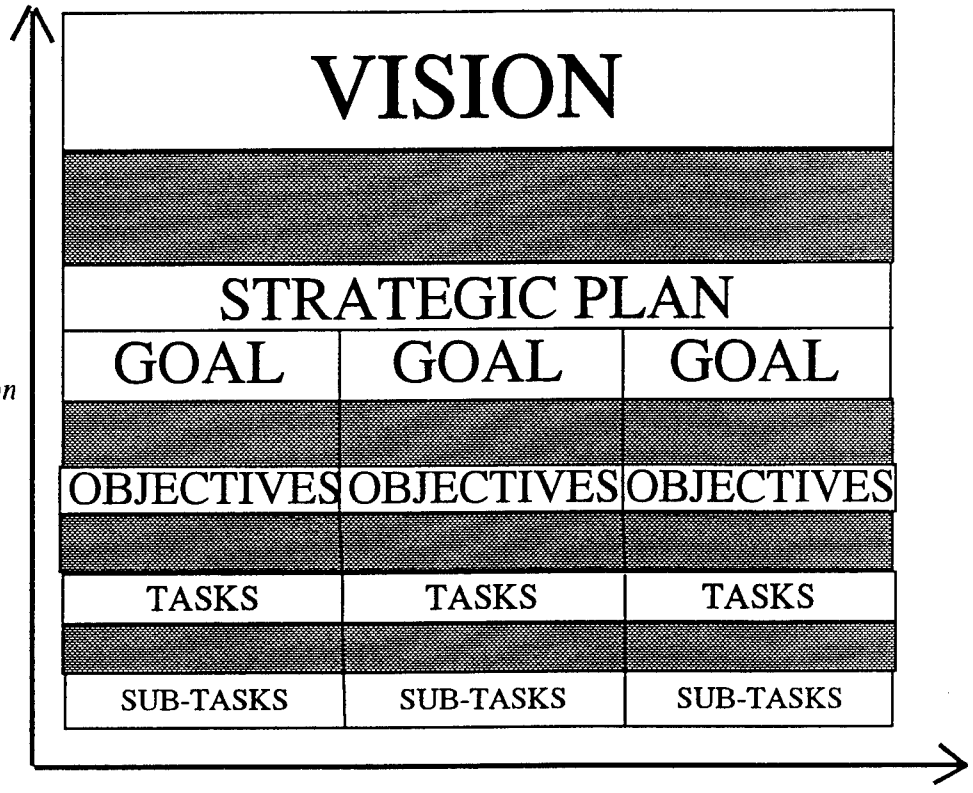
Modeling. Though the Quality field is well over fifty years old, it is a dynamic and highly adaptable discipline. Every successful Quality organization has developed, adapted, and refined their Total Quality gameplan based on research and development, benchmarking, trial and error, or some combination thereof. Just as in other disciplines, organizations look to role models to pattern successful behavior. Since organizations are like individuals, in that no two are alike, modeling can be a double-edged sword. Many Quality implementations have failed because organizations have been unable or unwilling to tailor Total Quality to their unique environment. Modeling is a flexible *guide* for success, not a rigid *mold* for mastery.

Tailoring Total Quality to the Organization. Since modeling provides the basic pattern the organization wishes to emulate, *tailoring* the Total Quality gameplan to the organization provides the custom fit. How do you assess the current state of your organization? Under the 544 IW and now with USSTRATCOM, we have conducted annual surveys. Based upon a survey developed by DoD, this survey provides vital feedback on how we are faring on our Quality journey. With survey data to bolster beliefs about the state of the organization, our tailoring of our Total Quality gameplan is made that much more effective and allows us to target specific behavior patterns to change and refocus work processes on customers, products, and services.

Unlike many other organizations, our Quality system is tailored to each level of the organization. Each Division has its own vision, goals, objectives, and tasks. As shown in **Fig 2, Building Quality**, each level fits like a brick in a wall supporting the layer above it. A vision is an ideal future state that the organization aspires to achieve. To paraphrase Joel Barker in his *The Power of Vision* video, each person needs to see their part in the organization's vision. Otherwise, a vision far removed from the work environment may deteriorate into sloganeering.

Nurturing Cultural Change. As espoused by those within the Quality arena, we can no longer afford to conduct business as usual. "If it ain't broke, don't fix it," gives way to continuous improvement. This change in attitude is

Fig 2, BUILDING QUALITY.



Time & Direction

(Provided by the Total Quality Gameplan)

Breadth of the Organization

(Encompassed by the Total Quality Infrastructure)

dependent upon a change in the culture of the organization. There are those who feel that cultural change will magically take care of itself as a consequence of forming teams and pursuing continuous improvement.

As an Association of Quality and Participation (AQP) study conducted by Dr Susan Resnick-West shows, however, Total Quality implementation which is devoid of nurturing cultural change or reinforcing new behavioral patterns is short lived. Successful implementation is dependent upon nurturing cultural change to effect Total Quality as an integral part of daily work.

Today's military environment challenges us to change our culture in the face of seemingly perpetual reorganizations. The demands of today will often delay Quality until tomorrow. An effective gameplan weathers these slow-downs without withering. How do we nurture cultural change? Fundamental to the process is training.

Training. Training is a critical ingredient for any competent Total Quality gameplan. Training must be both general and specific; both opportune and timely; and both appropriate and relevant. Quality training must target both specific audiences and specific skills.

Executive Training. Senior executives are very busy people. Seldom can they afford to take extended periods of time for training. Yet at the same time, they are singly the most critical audience for training. One of our most successful strategies is condensing Quality training for our senior leadership into forty-five minute executive seminars. By breaking larger chunks of information into smaller pieces, we are able to educate without devaluing the content.

Basic Training for Total Quality. A basic foundation in Total Quality is essential before presenting more specific and specialized training. Rather than a simple "Quality Awareness" course as prevalent in many organizations, our "Fundamentals of Total Quality Management", TQMFUN for short, is analogous to a college survey course. During this training, students are acquainted with basic Quality philosophy, are introduced to twenty-one Total Quality tools and techniques, and are presented with the J2(JIC) Quality Implementation Guidelines.

In one forum, students are provided the answers to why Total Quality, how you do it, and what the system is. Since Quality is becoming more common place within DoD, students may answer a simple questionnaire to bypass areas they are already familiar with. Two years of enthusiastic feedback from our students has validated our approach.

Specialized Training. Specialized training is a catch-all to summarize training for tools, facilitators, and instructors. These courses target relatively small, specialized audiences.

Follow-on Training. Courses that come subsequent to TQMFUN but designed for a wider audience than specialized training come under the follow-on training label. Topics include coaching, communication, delegation, and empowerment.

Just-In-Time (JIT) Training. Since we have a fairly large organizational population, everyone cannot be expected to have received training in all the skill areas necessary prior to being called on to perform in a team environment. Therefore, JIT training is most often used for new teams. Training lasts from two to three days depending on whether everyone on the team has had TQMFUN. Training topics include group dynamics, tools, and productive meetings.

Teams. The last provision of our Total Quality gameplan is for teams. Teams are different from working groups, committees, or other throngs of people working together.

Process Action Teams (PATs). As with many other organizations, we faced the challenge of "team" proliferation. Breeding like rabbits, "teams" crop up everywhere. Feeling eager to do something, people are formed into work groups and called a PAT. The benign danger is that faux PATs muddy the waters; the malignant danger is that these false PATs become Trojan horses which can poison Total Quality for the uninitiated. As a litmus test for authenticity, we suggest asking three simple questions about the team in question: 1) Does the team have a charter?; 2) Was the team trained in the skills and techniques necessary to have an effective team?; and 3) Was the team allowed a realistic timeline to accomplish their tasking? If the answer is "yes" to these three questions, then the team is a pedigree PAT. If the answer is "no", then the team is a mongrel. Don't interpret this to mean that other types of working groups are not effective. However, if PATs are what the organization is aspiring to form, then other working groups must not be construed as PATs. By providing guidelines on how to develop charters, by advocating team training, and by negotiating timelines as part of our Total Quality gameplan, we have been able to minimize the proliferation of imitation PATs.

The last item to note about PATs is that we use the label loosely to categorize our Quality teams. Though traditionally used to describe Quality

Improvement teams, we use the PAT term for Quality Planning and Quality Control teams as well.

Charters. Charters are so important to the effectiveness of teams that they merit special emphasis. Though a team may be able to function without a charter, they invariably are much more productive if they have one. The charter is a short document which is created when the team members are selected to work on a team and specifies the expectation of the chartering body. The charter serves to outline the task, to provide the team with guidance on the requirements it must fulfill, and to empower the team to do the things necessary to complete its task. The charter is effectively a contract between the chartering authority and the team. The charter provides boundaries for the team so that they do not take-off on tangents or attempt to tackle issues beyond the scope of their project.

Lessons Learned

Start-up. Quality is an incredibly dynamic, broad, and diverse field. Only by continuously soliciting information, have we been able to keep abreast of changes and additions. Senior management is reliant on their Quality Professionals to assist in formulating strategy, building a Total Quality infrastructure, and drafting a Total Quality gameplan. As Linda Merritt, a Quality Planning Manager with AT & T, remarked, "The Quality Professional is in many ways the equivalent of the canary used by miners exploring new tunnels." Quality Planning performed at the outset of the Quality journey helps ensure the vitality and longevity of Total Quality within your organization. After all, a Total Quality implementation effort which consists solely of Quality Improvement and neglects Quality Planning is nothing more than TQM firefighting.

At the same time, the Total Quality infrastructure and the gameplan must maintain focus on the organization as a customer, must be integrated with the vision of the organization, and must enhance the achievement of the mission. Senior leadership has every right to be leery of a Total Quality bureaucracy and should remain vigilant against it. As a former senior executive liked to remark, "We don't want Quality to become a self-licking ice-cream cone!" If Quality is to grow, however, structure must be supplied to provide support and direction. Effective infrastructure supports are the training wheels which allow a fledgling Total Quality implementation effort to gain confidence, speed, and momentum. Our Quality infrastructure and Quality gameplan have withstood the test of time by remaining intact with adjustments for a changing environment and a changing organizational structure.

Reorganization. Our organization has experienced no less than four major reorganizations since the inception of our Quality systems in April of 1991. A dynamic policy makes Quality implementation fluid enough to adapt to the changing organization. Since our Quality infrastructure and Quality gameplan flow with organizational structure, transitioning our Quality systems across reorganizations has been less painful than one would assume.

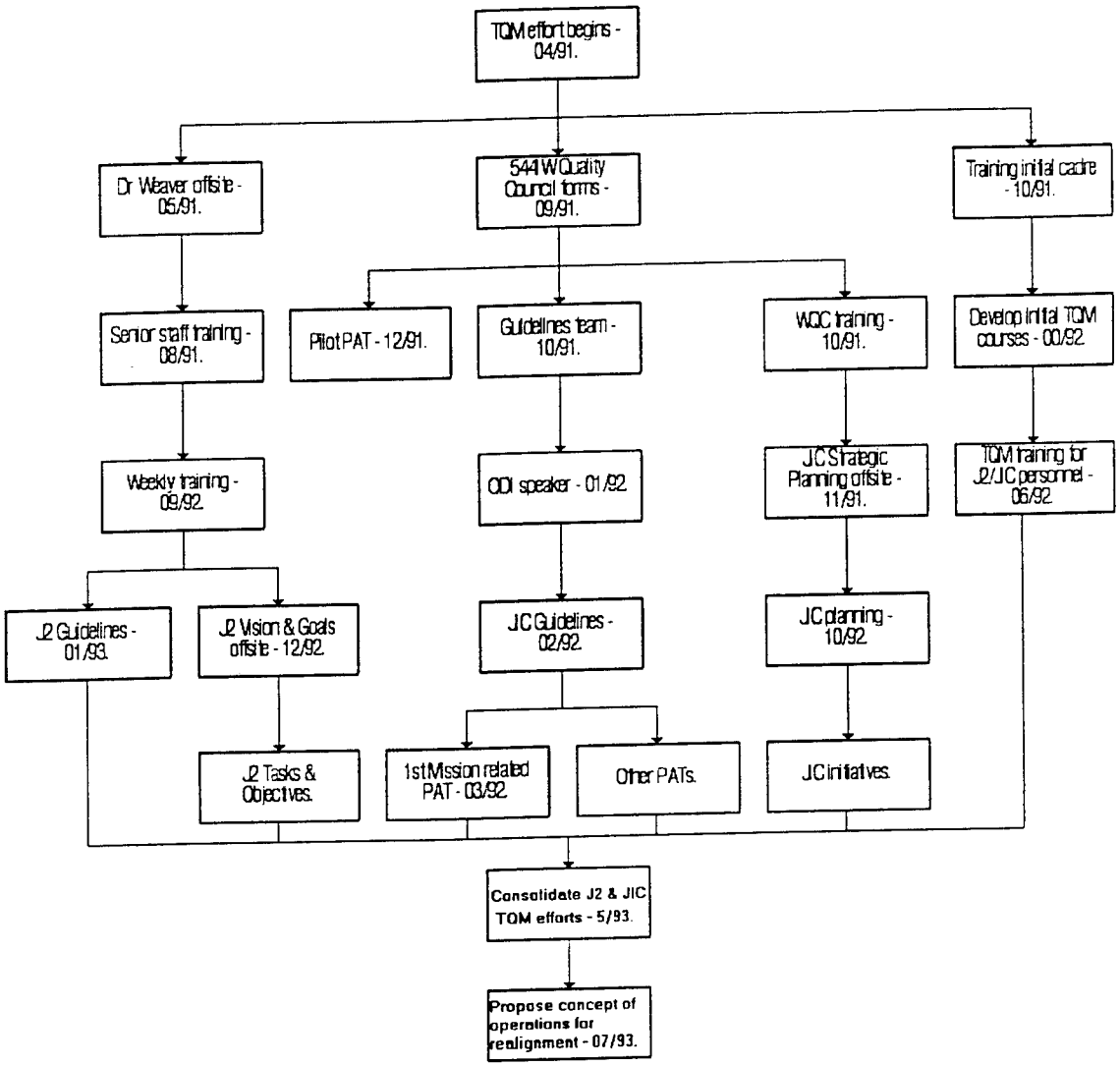
Transition to a Joint Environment. As a joint organization, we use the DoD adopted term of TQM as the label for our Quality processes. Whether called TQM, TQL, or Quality Air Force, the basic tenets are the same. By coming under the DoD umbrella, we avoid the partisan semantics of arguing over labels. The Navy is a full partner in our Quality endeavor. The joint environment gives us the added benefit of being able to draw upon wider resources than would otherwise be possible. Since the Navy's strategy for Quality follows the teachings of Dr Deming and the Air Force's strategy reflects the influence of Dr Juran, we had to meld the two strategies to form our own. Bringing the Navy on board was hastened by having a strong Quality effort in place when we stood up as a joint organization.

Conclusion

All the systems and structures for Total Quality implementation form a lattice work to provide an environment where Quality can take root and grow. The goal for these support structures is for them to eventually fade. As the culture of the organization changes, as Quality makes the transition from formal cross-functional teams to teams doing daily work, and as the tenets of Quality become part of the normal way of doing business, the organization evolves into a Total Quality organization. Navigating Quality implementation through the rough seas of change is seldom clear sailing. Rather it is synonymous with the Naval practice of sprint and drift: you beeline towards your target, then you drift while you reassess your target's position. Once you reacquire your target, the cycle begins again. **Fig 3, Total Quality Implementation Milestones**, gives a brief synopsis of our Quality journey thus far.

Having structure and a gameplan has allowed our Total Quality implementation efforts to survive and thrive. Since Total Quality is a journey and not a destination, sound planning can keep you on the road to Total Quality without running out of gas.

Fig 3, TOTAL QUALITY IMPLEMENTATION MILESTONES.



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The Memory Jogger Plus, Goal/QPC.

The ESD Process Improvement Guide: Total Quality Tools for Teams and Individuals, ESD, MITRE, and Rome Lab.

Kaizen: The Key to Japan's Competitive Success, Masaaki Imai.

In Search of Excellence: Lessons from America's Best-Run Companies, Thomas J. Peters & Robert H. Waterman, Jr.

A Passion for Excellence: The Leadership, Thomas J. Peters & Nancy Austin.

In addition, we used material from the following sources:

Air Force Institute of Technology

Boeing Aerospace Company

Tatham Process Engineering

Military Airlift Command (Air Mobility Command)

Foreign Technology Division (Foreign Aerospace Science and Technology Center)

Eastman Kodak Company

Xerox Corporation

Harris Corporation

Air Force Accounting & Finance Center

Air Force Logistics Command (Air Force Material Command)

1926th Communication-Computer Group, Warner Robins Air Force Base, Georgia

Dr. Pamela Dennis, Destra

Mr. Jim Frye & Mr. Jimmy Poole, ODI

We find certain software useful for supporting our efforts:

allClear, Flowcharting.

The Memory Jogger PC+, PC based tool generation.

SPSS/PC+, Heavy duty SPC and number crunching beyond the capabilities of normal spreadsheets.

BIOGRAPHY

MSgt Peterson, a Total Quality Advisor in the Intelligence Directorate of USSTRATCOM, Offutt Air Force Base, Nebraska, has a BS in Government from Angelo State University. He is an instructor, a facilitator, and is a national member of the AQP.

A TRANSITION TO TEAMS

Maj Jim Joyce

Capt Kathy DiNuovo

A Transition to Teams

Major Jim Joyce
Deputy Director for Quality
Air Force Operational Test and Evaluation Center

Captain Kathy DiNuovo
Commander's Quality Assistant
Air Force Operational Test and Evaluation Center

OVERVIEW

The Air Force Operational Test and Evaluation Center (AFOTEC) recently moved from a traditional, hierarchical management structure to a flatter, team-based organization. This paper highlights AFOTEC's first year of transition:

- From division and section chiefs to defining the role of team leaders,
- From matrix-managed projects to building and empowering 92 functional teams,
- From supporting only individual achievement to also awarding team-based high performance.

This case study:

- identifies the issues and processes involved in converting to a team-based operation,
- describes the team building experiences of AFOTEC.

If you are involved with building teams and making your organization more productive, this case study will help make your transition more successful. If you are a manager about to get involved with teams, AFOTEC's experience will help you understand your role in a team-based organization.

A TEAM-BASED ORGANIZATION

In June 1992, AFOTEC was given responsibility for operationally testing all new system acquisitions and modifications to existing systems as part of an Air Force-wide reorganization of operational test and evaluation (OT&E). Before this date, AFOTEC shared OT&E responsibility with the major commands.

This change in testing responsibility increased AFOTEC's test programs from 41 to 186. Additional manpower was received, but the increased workload dictated that AFOTEC relook at the methods and organization used to plan, conduct and report OT&E. It was timely that AFOTEC was involved in major quality management initiatives to:

- Define, measure, and improve OT&E processes;
- Further involve the staff in those processes;
- Focus on defining and meeting our customer expectations.

As a result, AFOTEC's restructuring emphasizes both streamlining processes and realigning the organization to build and empower high performing teams. This has been accomplished by redefining the role of management and teams, redirecting job accountability and changing the channels of communication.

Teams are not new to AFOTEC. For over ten years, AFOTEC has benefitted from using teams in two capacities to complete the OT&E mission:

- Test Support Group (TSG) - A team consisting of 6-15 part-time, matrix-managed, functional experts chartered with developing a test concept and plan, and
- Test Team (TT) - A team consisting of full time, system/functional experts dedicated to conducting and reporting a specific test.

The goal of AFOTEC's new structure has been to extend the potential of teams to the entire command. Specific features of AFOTEC's new team-based structure are:

- All of the AFOTEC staff are members of at least one of the 92 teams. The major types of teams formed are:

Leadership Teams:	Including the senior leadership team, AFOTEC has 13 leadership teams which consist of team leaders within a directorate or detachment,
General Support Teams:	17 teams that perform support such as training, personnel and quality programs to each function within the command,
OT&E Support Teams:	10 teams that provide specific OT&E mission support such as the OT&E policies and procedures team.
Mission Teams:	52 teams that plan, conduct and report OT&E located at the headquarters and 4 remote detachments.

The size of AFOTEC teams varies between 3 and 27 members with an average membership of 12. There are 60 team leaders and 40 team facilitators.

- AFOTEC reduced the number of layers in the organization from 5 to 3 and cut the coordination chain from 12 to 4. This was done by eliminating the middle management layer (branch and section chiefs) between teams and top management and by empowering the teams to make and be accountable for decisions. The new, flatter organization strips away many bureaucratic processes and reinforces the status of TSGs and Test Teams. For example, TSGs now report to their director and then to the commander; Test Teams report to their detachment commander and then to the AFOTEC commander.

- AFOTEC rebuilt the TSGs so that the main team players are assigned together on a team. TSGs now consist of full-time analysts and logistics experts dedicated to a specific number of test programs. This was done by reforming teams under three functionally based test directorates and four remote detachments, and by consolidating 4 support directorates, and eliminating 33 divisions.

• AFOTEC's commander, Maj General Anderson personally clarified the support responsibility between each type of teams and AFOTEC's customers:

Leadership Teams >
General Support Teams >
OT&E Support Teams >
Test Support Groups >
Test Teams >
AFOTEC Customers

The senior leadership developed the 1993 AFOTEC Annual Quality Plan which articulates the organization's goals and objectives. Teams have developed their mission, vision, objectives, and actions for meeting organizational goals and the needs of AFOTEC's internal and external customers.

• AFOTEC has redefined the role of a division chief to be a team leader that champions, leads, motivates, facilitates, guides, advises and does not dictate, order, inspect, force, or threaten. The role change was emphasized by changing job titles. For example, "Division Chief" titles were changed to "Team Leader".

• AFOTEC has developed a command-wide functional analysis so that each team is specifically aware of their processes, suppliers, customers, and products and services. The commander then challenged each team to manage their performance by measuring and improving their processes. As a result, responsibility and authority are clearer.

TEAMS AND QUALITY

One major aspect of a Quality Air Force organization is emphasizing an operating style based on trust, teamwork, and continuous improvement. Teams are the primary employee involvement technique used at AFOTEC. AFOTEC's plan for implementing quality principles called for first providing a culture change to a participative management style and employee involvement. Then, using teams as the means, taking steps to continuously improve processes. Teams provide increased power and productivity - the high grade fuel to accomplish the increased "quality dimension" of our OT&E mission. The strategy is to develop high performing teams to fuel additional OT&E mission as well as needed process improvement efforts.

By moving to a team-based organization, Maj General Anderson has provided an opportunity to implement a cultural revolution. Culture is defined as "the pattern of basic assumptions and beliefs that are shared by members of the organization" [1]. The following table defines the cultural changes that are foreseen for AFOTEC as a result of teams.

Element	Old Organization	New Organization
Structure	Layered - some teams	Flat - all teams
Job Design	Single-task / individual	Whole process / team
Leader's role	Direct and control Schedule/monitor work Rule enforcer	Coach and facilitator
Management Process	Manager controlled	Shared with team
Span of Control	1:6	1:12
Performance Orientation	Manager focussed	Goal and customer based
Innovation	Management controlled	Team controlled
Decision Making	Manager based	Partnerships between teams and Leadership

The primary reasons that AFOTEC moved to a team-based organization were to:

- Improve productivity - Because we have found that teams communicate better, tackle more opportunities, find better solutions and implement actions more quickly;
- Increase job satisfaction - Because our highly experienced and educated staff welcome the autonomy, responsibility, and job ownership that teams provide;
- Affect quality of products - Because teams are seen as a key method to improve our OT&E processes.

HOW WE STARTED

Organizations have taken different approaches to building a totally team-based organization. Since its inception, AFOTEC has used teams to accomplish major mission functions. These are the recent steps taken to complete the evolution to teams:

- The senior leadership team (AFOTEC Executive Council) defined and articulated AFOTEC's Quality Plan. This plan aligns AFOTEC's Quality Plan with the Air Force mission and vision. The plan defines AFOTEC's goals, objectives, values, and measures of short and long term success and tasks each organization with aligning their efforts to meet the command's objectives.

- The transition support team specified the organizational mission workload and manning available.

- Each organization defined the mission, support processes, and inter-relationships necessary to complete the workload of each team.

- Senior Leadership with support from the staff determined the organizational structure necessary to man the workload and processes.

- The commander committed the resources to make the new organization viable. He established a Training Team and charged them with training everyone on the processes, and job specific skills. He chartered the Quality Programs Team to undertake the following initiatives:

  - Establish an organizational baseline by completing a self-assessment survey based on the Malcolm Baldridge criteria,
  - Provide team skills training for 60 team leaders. Training covers the following subjects:
    - Role of the Team Leader
    - Coaching and Linking Skills
    - Statistical Process Control
    - Team Dynamics

  - Provide team building workshops for 92 teams. Workshops cover the following subjects [2,3,4,5]:
    - People /Teamwork skills:
      - Listening and Feedback Skills
      - One-on-one and Team Communication
      - Handling Conflict
      - Understanding Diversity
      - Effective Team Meetings
    - Team Task skills:
      - Defining team's mission, goals, progress measures, mechanisms for improvement.
      - Customer Needs Analysis
      - Process Analysis and Improvement Tools

  - Providing training and support for 40 team facilitators. Workshops cover the following subjects:
    - Process Analysis and Improvement Tools and Techniques
    - Statistical Process Control Tools
    - Team Dynamics and Development
    - Facilitator Skills and Style
    - Consulting and Coaching Skills

- Finally, the senior leadership charged the team leaders and teams with making the new organization succeed. Teams are working to meet that challenge.

MEASURES OF CHANGE

Moving to a team-based organization is not a panacea nor does it insure overnight successes [6,7,8]. There are varied expectations from everyone as to how quickly change should occur and how soon improved productivity should be measurable. Based on the efforts of the last year, these changes to our operational culture are evident:

- AFOTEC has increased support of teams as well as individuals. For example, AFOTEC has begun to train teams together, hire individuals to complement teams, recognize and reward team accomplishments, define duty titles in terms of team roles, and all team members are being asked to participate during major product deliveries.

- Unanimously, team members have reported improved teamwork within each team. They have seen improved communication, coordination, and problem solving which improves innovation and productivity and affects the team's performance. Team members have reported an increase in the number of team socials, a more relaxed, free flowing work environment, and a more focused effort on team goals and activities. AFOTEC leadership has noticed an increase in team-based successes. As a result, quarterly team awards are now presented for outstanding team accomplishments related to the mission, process improvement, and teamwork.

- To many members of the senior leadership, teams were initially seen as a means to handle the increased workload. Once the change to teams was made, leadership at all levels began to learn more about the potential and pitfalls of a team-based organization. In an attempt to make it work, several blunders were made implementing teams, such as:
    - Ordering team behaviors, roles, and participation, and
    - Delegating responsibility of teamwork without coaching or facilitating.

- As teams mature, they naturally change their membership and mission. At AFOTEC, as teams look at their processes and team membership, there seems to be a natural evolution towards work redesign. Process improvement drives team job redefinition which drives individual job redefinition which drives team composition changes which drives process improvement.

- Teams may not be needed everywhere. At AFOTEC, some teams were artificially formed around a broad charter. After defining their common mission and processes, the team found that they worked relatively independent of each other. Now the team only meets when they need to work common issues.

- Team membership changes can keep teams from becoming high performing teams. In a typical year AFOTEC turns over about 25 percent of the staff. In addition, a significant percentage of the team leaders will be retiring due to the Air Force downsizing. Some teams have not been affected by personnel turnover, while others have felt a major impact. Teams that have had a significant membership change, have reported that they return to square one in the team development process.

SUMMARY

The use of teams has proven successful in industry and throughout the Air Force. AFOTEC's success with teams has been extended to build a team-based organization focused on our goal of being recognized, by our customer, as the premier operational test agency in the Department of Defense.

AUTHORS

Major Jim Joyce is the Deputy Director for Quality Programs at the Air Force Operational Test and Evaluation Center (AFOTEC). In this role, he assists the leadership of AFOTEC with supporting Quality Air Force processes. His principle undertakings have been to:

- lead an organization self-assessment based on the Malcolm Baldridge award criteria,
- lead the quality education of more than 800 members of the command,
- develop and present workshops to support 92 teams and 60 team leaders.

Major Joyce is certified to administer the Myers-Briggs Type Indicator and the Team Management System. He has received team training from ASQC, AQP, ASI, and PDS.

Captain Kathy DiNuovo is the Commander's Quality Assistant at the Air Force Operational Test and Evaluation Center (AFOTEC). Her principle undertakings have been to:

- present the quality education to more than 800 members of the command,
- present workshops to support 92 teams,
- develop and present workshops to support 40 team facilitators.

Captain DiNuovo is certified to administer the Myers-Briggs Type Indicator. She has received facilitator training from AFQC, SM-ALC, and PDS. This paper details the team support efforts which Major Joyce and Captain DiNuovo have dealt with on a daily basis since 1991.

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TEAMWORK: CAN IT WORK UNDER CONTRACT?

Joe Costa

TEAMWORK: CAN IT WORK UNDER CONTRACT?*

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INTRODUCTION

Teams have been addressed as the wave of the future and the future is upon us. Everyone has signed up to the fact that if the United States is to remain a competitive and viable force in either manufacturing or service industries, it will have to improve the quality of both its products and its processes. Teams have been utilized as a fundamental vehicle to this continuous improvement process. There are numerous success stories about the use of teams:

- Federal Express found and fixed a $2.1 million billing problem.
- Aetna reduced the ratio of middle managers from 1:7 to 1:30.
- General Mills increased productivity at one plant 40 percent by using self-managing teams.**

However, the question remains: Can companies that are bound by contracts to the U. S. Government cross traditional bureaucratic lines and utilize teams to improve age-old processes for the mutual benefit of both parties? I believe the answer is yes, and this paper is an attempt to summarize, from a contractor's perspective, three successful years of continuous improvement effort at Arnold Engineering Development Center (AEDC), largely through the use of teams.

BACKGROUND

AEDC is an organization under the Air Force Materiel Command (AFMC). AEDC's main mission is conducting development, certification, and qualification testing of aircraft, missile, and space systems to ensure their performance as required.

The work force size is approximately 3,500 people consisting of engineers, scientists, managers, technicians, and craftsmen, with various support personnel employed by the Air Force (both military and civilian), and three primary contractors. The contractors (which employ over 3,000 of the work force) are organized as follows: Effort "A" (Sverdrup Technology, Inc.) — is chiefly responsible for turbine engine and rocket motor testing; Effort "B" (Calspan Corporation) — performs flight aerodynamic and space systems testing; Effort "C" (SSI Services, Inc.) — provides overall base support including security, fire, buildings and grounds, machine and fabrication shops, utilities, etc.

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* The research reported herein was performed by the Arnold Engineering Development Center (AEDC), Air Force Materiel Command. Analysis of this research was done by personnel of SSI Services, Inc., mission support services contractor for AEDC. Further reproduction is authorized to satisfy needs of the U. S. Government.

** Brocka, Bruce and Brocka, M. Suzanne, Quality Management. Homewood, Illinois, Richard D. Irwin, 1992.

AEDC's main thrust into Total Quality Management (TQM) occurred in the latter part of 1989 when it was presented to personnel as a tool that could open doors to increased productivity, reduced cost, and a better work environment. TQM would ensure AEDC's continued operation in the face of other government facility closings and reduced operating budgets. Needless to say, this initial thrust was met with much skepticism, particularly considering the work force's composition of many employees with 20 to 35 years of service that have seen several "productivity" type improvement programs (i.e., zero defects, Quality Circles, etc.) come and go without significant impact.

Culture, steeped in 41 years of history, was one of AEDC's main obstacles to implementing continuous improvement. In addition, the organizational structure of each contractor, as well as the Air Force, is typically bureaucratic (tall, with long lines of communication). However, the formation and use of teams (mainly cross-functional) broke down barriers of communication and enabled change, allowing improvement to take place.

IMPLEMENTATION

AEDC formed a TQM Executive Council with representation from the Air Force and each contractor, as well as individual (Air Force and contractor) steering committees. Specific team leader and facilitator training was conducted, as well as several overall awareness/information sessions. Initially, a project-by-project approach to continuous improvement was utilized, and six pilot projects were selected:

1. Timeliness and Cost of Machine Shop Products (AEDC Executive Council sponsored)
2. On-Base Transportation (AEDC Executive Council sponsored)
3. Base Civil Engineering Work Request, Form 332 (Air Force sponsored)
4. Timeliness of Designs (Effort "A" sponsored)
5. Project Cost Estimating (Effort "B" sponsored)
6. Work Crew Transportation (Effort "C" sponsored)

Although the projects' names are not significant, the fact that their execution required each team to be cross-departmental and cross-company, requiring representation from each effort in order to accomplish their mission, is.

Today, cross-functional teams have turned out to be the norm; however, in 1989 teams of personnel working together on common goals and objectives were a new experience for many people at AEDC. The project-by-project approach to improvement grew drastically over the first two years, with several teams implementing substantial improvements, as will be shared in the "Accomplishments" section of this paper.

Despite these successes, it was noted that the Improvement Teams affected only a small percentage of the work force, with a majority still wondering what this "TQ thing" was all about. Although SSI's employee involvement has grown tremendously over the last few years, (Figure 1), everyone could not be involved from the start. The teams themselves, while opening up communications across boundaries never really crossed before, also experienced conflict. Typical team meetings brought true realization of complex (and occasionally arcane) practices, punctuated with state

ments such as, "Oh, that's why you do that," or "I wondered why you always wanted that information," as well as heated arguments over why existing processes should not be changed, or "It's fine the way it is, we've done it that way for the last 30 years." Teams discovered that their cross-company members, in addition to having the overall team mission, had their own company goals and objectives that did not necessarily line up with consensus on team recommendations.

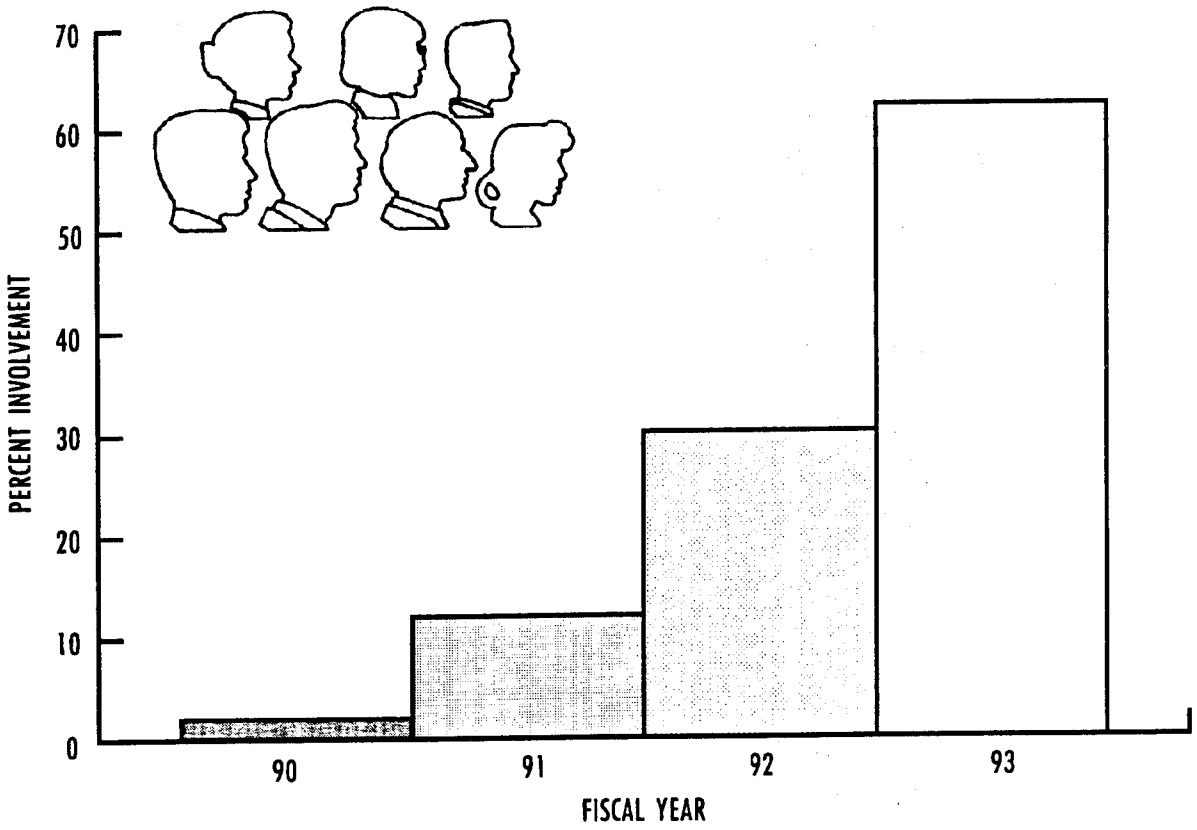

Figure 1. SSI's total quality commitment by employee involvement.

The teams realized that continuous improvement meant change and change was something that would be resisted until it could be proven to be in everyone's best interest.

CULTURAL TRANSFORMATION

Soon the project-by-project approach to improvement, although effective, proved too slow and too isolated to affect the entire AEDC organization. Planning teams which focused on creating or redesigning an entire process that centered on meeting customer needs were formed. Understandably, the "process," whether it was welding or installation of small computers, crossed many organizational boundaries but also required each organization to look at its role in delivering a product or service to the end customer. Planning teams began to show organizations how they were a customer (internal) to each other, and if they couldn't satisfy each other's needs, the output of the process was certainly not going to satisfy the end customer's (external) needs.

In addition, Business Process Teams were formed which not only focused on the customer (both internal and external), but also identified the key existing processes within each company as their major thrust, and encompassed much larger pieces

such as "Control of Work" and "Utility Operations" for SSI. The process of defining some of these key business processes was a much more laborious task than anyone imagined. Flow charts of the processes were created, initially in more detail than anyone could even understand and then brought to a functional level that could be analyzed and focused on for improvement. Customers were contacted for their requirements (or needs) from the process so measurements could be established to see if their needs were, in fact, being met.

Concurrent with this shift from project-oriented improvement teams to process-oriented teams, AEDC received a new commander (1991). AEDC's new commander had an extensive background in implementing TQ principles in other parts of the Air Force, as well as a wealth of knowledge gleaned from many books on the subject. The commander saw the need for a more radical cultural change within AEDC, one that would change everyone's paradigm on what teamwork is or should be.

DesignShops™ were initiated so people from all parts of the AEDC organization could come together to focus on common problems as a team. Within DesignShops™, strategies would be laid out by subteams and brought back to the main group. Concerns would be raised, many fruitful discussions held, but most of all, communication that crossed all organizational barriers was enhanced. Funds were allocated to house the DesignShops™ within a dedicated facility; hence, a great commitment was made to this new team approach to continuous improvement.

Furthermore, a Teamworks Course (commonly referred to as the Ropes Course) was added so various functional or cross-functional teams could work together to overcome physical obstacles away from the work environment. The Teamworks Course turned out to be an overwhelming success as groups found that by spending a day in the woods together, they could begin to understand each other and see qualities that may have gone unnoticed in the office (i.e., leadership, problem-solving, and team spirit). Again, a significant commitment was made by AEDC's leadership.

ACCOMPLISHMENTS

Talk is cheap, but results are hard to deny. Although I believe most of the value in what has been achieved to date resides in the intangible (i.e., morale, enthusiasm, and trust), the following are some examples of our teams' accomplishments.

- Handling of Gaseous Supply Trailers — New gaseous supply trailers being procured by the government were larger than the old trailers and could not be easily maneuvered into the spaces previously allotted. Either the trailers would have to be relocated to a more easily accessible location at the expense of a great amount of additional piping, or an alternate solution would have to be found. A team formed to solve the problem found that replacement of the existing trailer tow vehicle, leased at a cost of $6,000 per year, with an excessed vehicle modified to have a much shorter turning radius solved the problem at a significant cost savings. In addition, the team identified and proposed a project to eliminate the use of existing gaseous supply trailers by providing inert gases (nitrogen, helium, etc.) to the test cells with permanent vessels available from surplus, at an estimated cost savings of over $2 million.

- Construction of the J-6 Large Rocket Test Facility — While this effort actually preceded AEDC's involvement with TQM, I feel it played a great role as a catalyst to the cultural transformation taking place. The Air Force saw a need to construct this new test facility in a manner breaking with tradition. Typically, the Corps of Engineers would be utilized to manage the design and construction of the facility,

only to find upon delivery, it did not meet all the Air Force's needs. A dedicated team consisting of the Corps of Engineers, the Air Force, and the Effort "A" technical services contractor and Effort "C" mission support contractor was formed and co-located in late 1986 to follow design, construction, and testing of J-6. Later, the architectural engineering firm and construction contractor were brought in to form a team for which the Corps coined the title, "a partnership." In addition, a "partnering agreement" was set up so the entire team could focus on one set of goals and objectives. This partnership has succeeded in bringing the facility to the end of construction under cost and ahead of schedule, with a bright outlook on its checkout to accomplish the same. The Corps of Engineers has since successfully implemented "partnering" on many new contracts.

- Unclassified Visitors Process — AEDC's security force recognized that an inordinate amount of time was being spent on issuing and controlling passes to unclassified visitors. Consequently, a team formed to streamline the process determined that a significant part of the process could actually be eliminated. A pilot test period proved the team's theory, and the unclassified visitors' passes were eliminated. This streamlined process saves approximately $1,200/year and 700 manhours of effort.

- Reduce Receiving's Non-Compliance Rate — A perceived high incidence of noncompliance to material purchase agreements produced work delays and increased cost to the government for handling. A team was formed to improve the process. After more than a year's worth of work, a formal vendor rating and feedback system was born. Vendors were apprised of how their shipments would be "rated," and they were given feedback on this performance. A supplier's failure to improve its performance when it was found deficient could result in its removal from the approved suppliers list. Figure 2 shows the dramatic result of an extremely sound and effective process that I cannot do justice to in this paper. Noncompliance incidence from vendors decreased from some 80 percent to less than 20 percent over a two-year period. In addition, disposition costs were cut by almost 80 percent (see Figure 3).

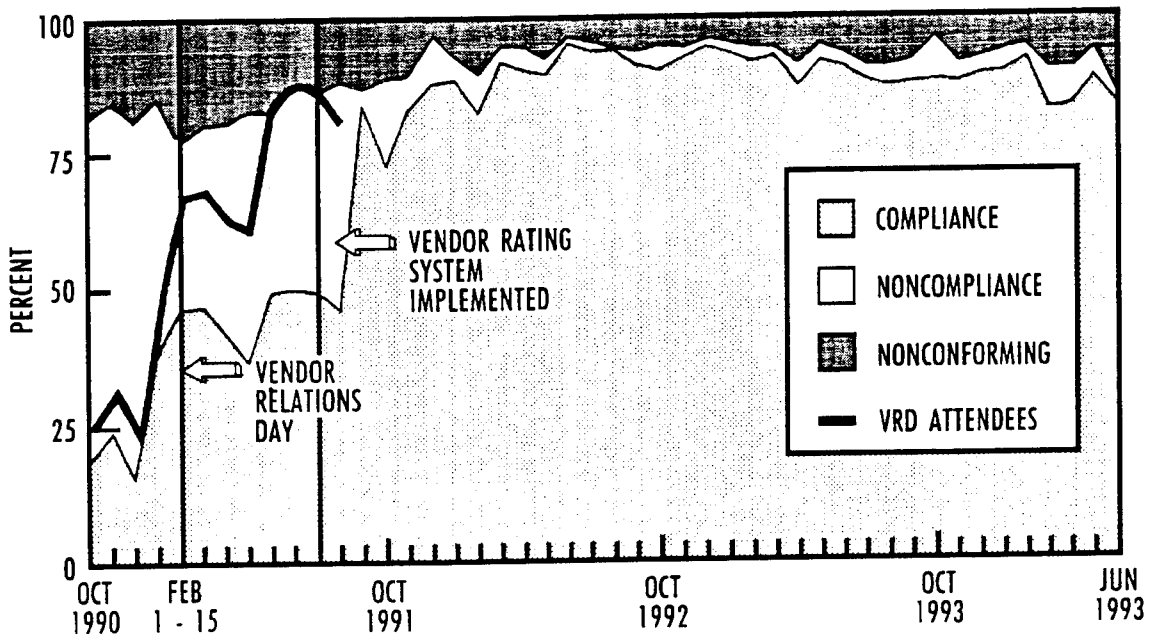

Figure 2. Receiving inpection incidence rate.

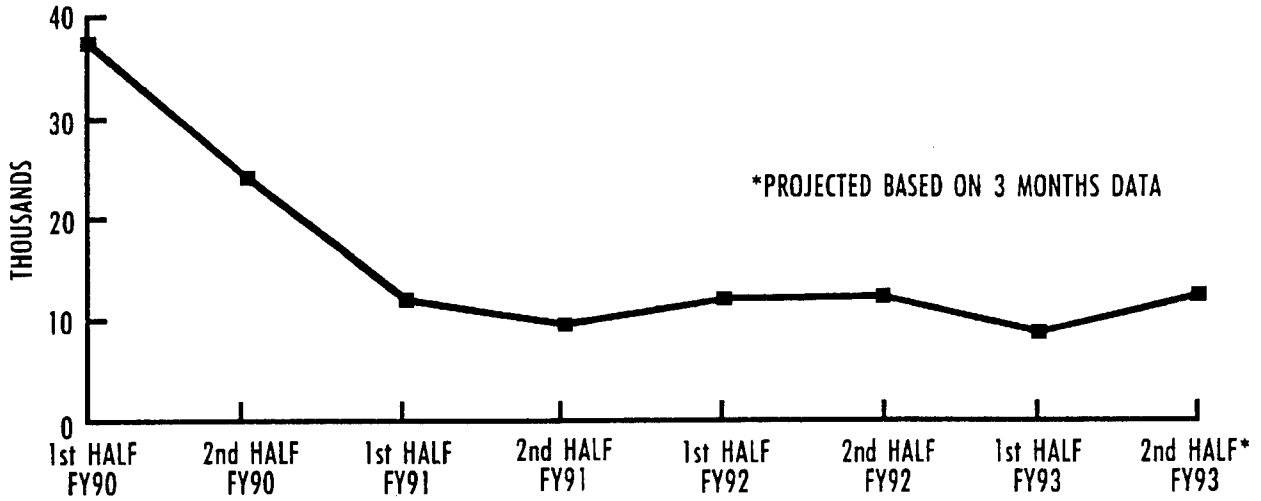

Figure 3. Receiving inpection technical nonconformance disposition costs.

- Establishment of Business Process Teams — Although these teams are still in the Process Design stage and have not produced measurable results, the intangible benefits received to date are worthy of note. Customers have a better understanding of key business processes as a result of the teams' contact with them to establish their needs. Consequently, customer satisfaction has increased without any changes to the processes taking place. In addition, several potential problems were avoided, particularly in the Utility Operations area, due to increased contact with the customers. The customers discovered that their demand on the raw water system, for instance, had a direct impact on the integrity of the system (due to dynamic response/water hammer). In addition, the customers' rate of demand on the systems determined if the pumping station could engage the pumps fast enough to meet their demands. Procedural changes were initiated to avoid a potential rupture to the system while still meeting customer needs.

- Improved Craft Relations — Here, a team of Labor and Management personnel was formed to enter into contract negotiations early, utilizing a DesignShop™ approach to joint data gathering and problem solving, with both sides seeking a true win-win outcome. After approximately six weeks of team meetings facilitated by a neutral employee, negotiations were concluded with a new contract three months before the old one expired. In addition, the new contract was approved for a five-year period, the longest ever negotiated at AEDC. A clause was also included in the contract that commits both parties to maintenance of an environment of trust and respect throughout the relationship. The significance of this accomplishment is even greater when it is noted that three years earlier, negotiations ended in a strike.

SUMMARY

Teamwork can work under contract, but it takes a strong, committed leadership willing to take risks and allocate the resources to make it happen. Parties on both sides of any contract must be committed to common goals and objectives, working together to achieve improvement. The overall culture of an organization does have to change, as well as admit that change is necessary to improve (or even stay in business), because a "we've always done it that way" attitude no longer works. I do not think we have arrived, nor has anyone else; continuous improvement is just that — continuous. However, teams such as the ones utilized at AEDC, enable an

organization to draw upon all the talents and abilities of its work force. Then, and only then, can change be initiated in the most efficient and effective manner for continuous improvement (and survival).

BIOGRAPHY

Joe Costa holds a B.S. degree in Civil Engineering from New Jersey Institute of Technology and an M.S. in Industrial Engineering from the University of Tennessee. He has worked in the nuclear power, oil, and government service fields over the last 20 years. Joe is currently the Manager of Quality Programs for SSI Services, Inc., at Arnold Engineering Development Center, Arnold AFB, TN.

TQM IN THE PACER SHARE PROJECT - A BRIDGE TO THE FUTURE

Debra Schwartz

TQM IN THE PACER SHARE PROJECT A BRIDGE TO THE FUTURE

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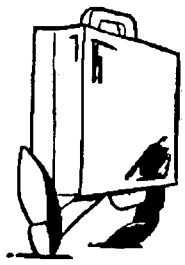
Quality improvement planning at SM-ALC has incorporated Total Quality Management (TQM) concepts since the early 1980s when a vision was developed of an organization that meets the customer's needs the first time, every time. The Pacer Share Demonstration Project was the key element in improving the way business was transacted. The project officially ended in February 1993, but its positive influence will be felt for many years.

SUCCESS

"Let no man imagine that he has no influence." ---- Henry George



Tyler woke to the sound of birds singing and sunlight dancing through his window. He was the luckiest man alive. He whistled while he dressed for work, laughing at his children sleepily preparing for school, little John had his shoes on the wrong feet again. Tyler arrived at the Air Base knowing he owned the world, and happily checked his brain at the gate, remembering this time to take his receipt. No decisions to make for the next eight hours; he wondered what his wife had packed for lunch.

Wilson overslept, waking up to the smell of fresh brewed coffee. He had been up half the night working on an idea for the design of a new tool. His team was depending on him. They could finally fix the problem that had hounded them for years. Wilson took the detour around the brain check at the gate and arrived a little late at the shop. He set right to work showing his new idea to the boss.

Each of these men feels that he is successful. Which one would you rather have working for you? More importantly, which one would you rather be? At McClellan Air Force Base in California, a lot of people were happy to be little Tylers -- report for work, mindlessly do the job, go home. There are still some Tylers, but most have chosen to become Wilsons -- empowered, participating, team players.

This change was brought about through the use of TQM principles and techniques. TQM incorporates many methods and tools, but the basic approach is to manage every process with quality, defined by the customer, as the prime consideration.

THE MISSION

The Distribution Directorate (now a division) is a major organization at Sacramento ALC, as it is at the four other air logistics centers in Air Force Material Command (AFMC). The critical mission Distribution accomplishes is to provide transportation and supply support for Air Force managed and repaired assets, including all versions of the F-111, A-10, KC-135, and F-15E aircraft, the F-117A Stealth Fighter, and the F-22 Advanced Tactical Fighter.

Distribution is responsible for maintaining the lifeline that supports logistics operations worldwide, by managing an inventory of over 350,000 line items, valued at over $4 billion. During the Pacer Share project a $50 million annual payroll was required to maintain this operation with 104 military and 1311 civilian personnel assigned.

THE VISION

"The great thing in this world is not so much where we stand as in what direction we are moving."

---- *Oliver Wendel Holmes, Sr*

The journey taken to achieve a high performance team-based organization began in the 1980s. The first step was to create a vision of an organization which would respond to the needs of the customer. Every customer would receive excellent service, from the mechanic doing repair work and the pilot flying the plane, to the co-worker sitting at the next desk.

The vision was of an organization so customer oriented that it would look for flaws in its own systems and identify potential problems that could affect customer service. The organization would then be able to take corrective action when needed, without being inhibited by bureaucracy and chain-of-command restraints.

PLANNING AND PREPARATION

To make the vision become reality, a new, flexible human resource management system was needed. An office was established with a visionary manager and two analysts, tasked to plan ways to identify and change the processes and rules that were keeping people from giving their best efforts on the job. All plans and goals were accomplished under the direction of the highest levels of management.

As plans started to take shape, coordination with organized labor was necessary. At first, the unions were not receptive to all the new ideas. During the negotiation process managers and union representatives began to realize that their working relationship would have to be the first process to undergo improvement. Discussions about managing for total quality led both sides to realize that they had a mutual customer -- the workforce. It is management's responsibility to create an environment of excellence, trust, respect, and empowerment which enables the workforce to focus on quality first to meet the needs of the customer. The union must ensure that this environment is nurtured and maintained. Together, as

partners, the needs of the workforce are met.

As a result of this new understanding, a union representative was invited to join the design staff as a full-time representative. In addition, a labor and management board was formed which reviewed all project plans before submission for final approval. A true labor-management partnership developed and expanded into all labor-management dealings. A *PACER SHARE CREED OF UNITY* signed by both Distribution managers and union officials made the working partnership a reality.

THE SEEDS OF CHANGE

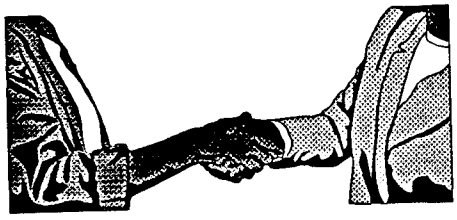
Ground work was also laid to prepare the workforce for the coming changes. The tool chosen to create a paradigm shift in interfaces between workers and supervisors was the introduction of Quality Circles. This started participative management practices and opened new channels of communication.

Further ways to increase trust, eliminate fear, establish team work and continuous process improvement were targeted by the final design of the Pacer Share Demonstration project. Formal briefings explaining the project were given to all employees, followed by additional informal question and answer sessions scheduled on request. The most often asked questions were published in booklet form and distributed. Every employee also received a copy of the *FEDERAL REGISTER* that outlined the complete project (*FEDERAL REGISTER, vol. 52, no. 224, Friday, November 20, 1987.)*

THE PACER SHARE PROJECT

"The very idea that people's opinions count--in the markets, in the workplace, in the voting booth--is America's great gift to the world."

-- John Paluszek



The project was implemented in February 1988, with the approval of the Office of Personnel Management (OPM) under legal authority of Title VI of the Civil Service Reform Act of 1978. Through a group of six process improvements, Pacer Share addressed basic environmental issues affecting workforce development, flexibility, trust, empowerment, and management effectiveness. These six interventions were:

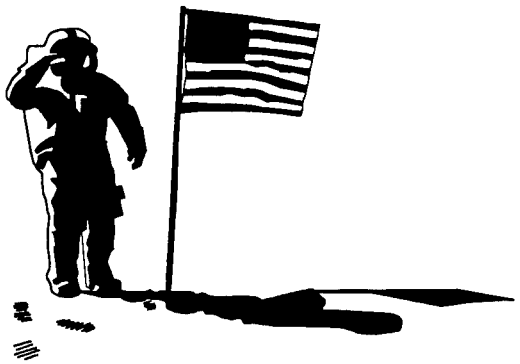
1) job series consolidation
2) pay banding
3) organization approval of supervisor grades
4) demonstration on-call (DOC) hiring
5) elimination of individual performance appraisals
6) productivity gainsharing

Assessment of the project was conducted by external evaluators, The Rand Corporation of Santa Monica, CA, and the Navy Personnel Research and Development Center (NPRDC) of San Diego, CA.

AN ADAPTABLE WORKFORCE

"If you treat people as intelligent, sophisticated, and cultivated as you can possibly imagine, chances are they just might be."

-- Patrick Stewart in *TV GUIDE*



The six interventions were designed to work together, not individually. The Pacer Share project created an excellent management system.

The sixty-six traditional Distribution job series were grouped into six work processes with only one job description for each process. For example, *Management Analyst, Management Clerk/Assistant,* and *Program Analyst* each had a different traditional job series. Under the new system these were consolidated into the *Management Operations Process.* An employee in this process could be assigned any of the duties from the traditional restricted jobs, provided the duties were within the assigned pay band.

The thirty existing white and blue collar pay grades were grouped into eight broad levels, removing the rigid grade restrictions. Pay bands were designated by the level of skill and responsibility required in each process. Supervisory grades were determined by the scope of responsibility, and the complexity of the process supervised, instead of being based on the number and grade of the employees supervised.

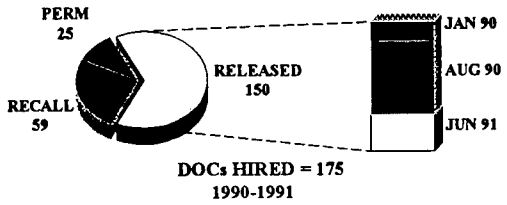
Individual skill requirements were designated in sixty-seven Job Proficiency Guides (JPG) that detailed exactly what was required for each job. Once a primary skill was learned, the job could be restructured for training in additional skills within the process, creating the ability for employees to move to new work areas during critical workload fluctuations. Combined, these interventions improved responsiveness to mission requirements by enabling individuals to work any job within the process.

Work teams and managers could choose to restructure a job instead of hiring to fill vacancies. Seven work teams accepted the challenge of working as self-directed teams, operating without a first line supervisor. Civilian positions were reduced 23%, supervisory positions 40%, and overall payroll cost decreased 7%. The evaluators found that this new flexibility kept operational costs stable, even though individual salaries grew under paybanding.

A PROTECTED WORKFORCE

This skilled workforce was protected by development of an on-call hiring program which allowed increased flexibility in responding to workload fluctuations. All new employees were hired under this program and were the first released when workloads decreased. DOC employees were indistinguishable from permanent employees, entitled to the same benefits, training, and mobility. They could be

released with ten days notice and recalled with three days notice.



This enabled management to make rapid adjustments to workload changes, avoid reduction-in-force situations and protect critical skills and investment in the permanent work force.

THE APPRAISAL CONTROVERSY

"The fear of death keeps us from living, not from dying."

-- Paul C Roud, *MAKING MIRACLES* (Warner Books)

Eliminating annual performance appraisals was the least painful and, according to the unions, the best liked intervention. It showed that management was serious about empowerment and team work.

The old assessment method was often unfair simply because the work processes were out of control. An individual's performance cannot improve if his or her work process has excessive rework and road blocks.

During the project organizational performance was assessed and compared to similar Air Force Distribution organizations. The project evaluators observed no decline in overall quality performance, which showed managers that workers were serious too, because job performance didn't decline as feared. The use of JPGs to plan job growth and improve individual potential was the only individual assessment accomplished during the project.

Surveys conducted by the outside evaluators showed that 63% of the supervisors felt that "*the absence of an individual rating system contributed towards honest communication. They felt it was easier to give employees directions because their subordinates were less defensive about being corrected" (FOURTH-YEAR EVALUATION REPORT, NPRDC, chapter 7, page 101.)*

Performance problems were identified by work teams or managers and referred to the labor-management board for correction. The board reviewed each case individually, first checking to verify that the employee was properly trained and capable of accomplishing the assigned job. In some cases it was found that employees were in jobs not suited to their abilities, so to remedy this, new tasks were assigned.

PRODUCTIVITY GAINSHARING

Gainsharing provided the incentive for teamwork and improving quality that was lacking in the old system. Payment of a gainshare was directly linked to organizational performance, based on unit cost savings in payroll dollars. The outside evaluators found that cost per transaction remained stable over time and compared favorably with other air logistics centers. Half of the savings were returned to the Air Force and half equally divided among the project's civilian workforce. $5.5 million were saved during the five year project. Each employee

received $1725 in gainshares and $319 in a special act award.

Although gainshares were distributed in nine of the 17 quarters, most employees did not feel there was a direct correlation between working smarter and saving money. They could not see how they directly affected cost savings. Therefore, a new model was designed, using applicable "standard" Air Force metrics. Processes at the lowest levels would be measured, the data rolled up into branch measure and compared to a baseline; the project ended before the new design could be tested.

HIGH PERFORMANCE TEAMS

The quality of a man's life is in direct proportion to his commitment to excellence, regardless of his chosen field of endeavor. -- Vince Lombardi

When the project was implemented in February 1988, changing the rules to invite innovation and quality was only the first step. A mechanism was still needed to break down long-standing communication barriers. Few people understood what was meant by participative management and team work. The work culture and environment were changing, but employees and managers still lacked the skills needed to take control of their work processes and work as a team.

Formal team building was established to create a support system, forge partnerships and improve communication methods. The voluntary Quality Circle groups were slowly phased out as natural work groups were formed and sent to team building workshops. An independent contractor was selected to conduct 97 two day workshops with 126 natural work groups. Supervisors and managers attended with their employees as part of the natural work team, and also went to workshops designed for management work groups.

After the team building workshops, every work team spent three days in Essential Process Management classes, developed by in-house quality experts. The course covered basic TQM techniques and tools. The teams were taught to identify their customers and use continuous process improvement methods to reach the goal of meeting or exceeding the customers' logistic requirements. Supervisors and managers entered into a six year education program where they learned leadership practices in a TQM environment.

Work teams began taking control of their work processes after completing the training sessions. Full-time coordinators were assigned to work with the teams and guide them into team work and process improvement. Distribution's major processes were flow diagrammed, analyzed, and streamlined

The workforce had accepted the responsibility for their processes and began monitoring their own production and quality. This made the organization which had been doing end-of-line inspections obsolete.

Quality experts were moved into positions within the process, allowing the quality inspection organization to be disbanded. Team work and quality were now part of everyone's job. The quality evolution was finally taking place. This was validated when SM-ALC competed for, and won, the prestigious Vice-President's Quality Improvement Prototype (QIP) Award in 1990.

ORGANIZATION IN TRANSITION

"If you don't challenge the rules that govern your life, your thinking will become stagnant and rigid."
-- Roger von Oech in *Journal for Quality and Participation*

Two major organizational changes took place during the project. In 1990, all air logistics centers were reorganized to form product directorates and thereby enhance mission capabilities. Distribution moved under a new layer of management within the Technology & Industrial Support Directorate. Since a high level of trust had developed between management and employees, this reorganization had little impact.

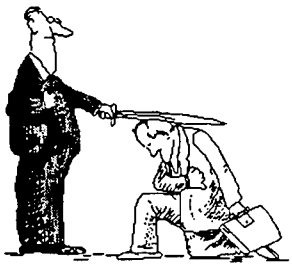
Sacramento was the first ALC to undergo the DOD depot consolidation effort in 1991. The major receiving, storing, and shipping processes were transferred to the Defense Logistics Agency. This placed the Pacer Share project under two different agencies with different levels of TQM experience.

Shortly after this transfer major downsizing occurred within the Air Force. An *early-retirement* was offered to senior employees, and many of the managers who had participated in the implementation of the project accepted retirement. New managers were selected based on their knowledge of Distribution processes and the Pacer Share Project. The organization needed to regroup, reaffirm it's vision, and set new objectives.

The Air Force Logistics Command (forerunner to AFMC) won the President's Quality and Productivity Improvement (QPI) Award in 1991. The criteria used in this award process then became the new criteria to measure TQM progress. In applying these criteria, customer focus and quality assurance were the two areas rated highest. Conversely, leadership, and measurement & analysis were rated lowest. Therefore, the Distribution executive staff targeted leadership as the area for immediate improvement.

LEADERSHIP BY EXAMPLE

"One of the most dangerous forms of human error is forgetting what one is trying to achieve." -- Paul Nitze



Distribution managers formed an executive team to show leadership and direct process improvement by example.

The philosophy of managing in a quality oriented organization had expanded as experience was gained in the new environment. Quality had become a management responsibility instead of a tasking handed off to a staff office. Management itself is a process which must be owned, controlled, and improved. This meant managers had to be involved in process improvement and follow the mandate given to the workforce to improve their process.

The executive team consisted of the military and civilian division chiefs, their immediate subordinates (branch chiefs), the Pacer Share design staff, and two quality advisors. After all the changes the Division had been through, they needed to reaffirm the original vision and augmented it with specific objectives. The team completed five projects, each targeted to improve the management process, clarify roles, definitions, and commitment:

1) Mission environment
- TQM and team work provide the environment for accomplishing the mission
- Empowerment does not mean there is a choice *not to*, but rather *how to* accomplish a tasking
- Team building is completed when a team has accepted responsibility for their customer and process. Then management must guide the team into process improvement and measuring the quality of support given to the customer.
- A successful team knows where it is going, how well it is doing, where improvements are needed, and how to make those improvements.
- The manager, as a member of the team, is responsible to assist in achieving process improvement and completing long range planning.

2) Vision

We will constantly exceed our customer's expectations by continuously improving our processes so the customer is delighted the first time, every time.

3) Objectives
- Provide excellent customer service
- Enhance peacetime and wartime readiness, performance, and productivity
- Provide an environment for success
- Instill leadership and constancy of purpose

4) Productivity Gainshare model
- Each Distribution process was identified and a productivity and quality metric established. Gainshares would be determined based on quality and productivity improvement as well as unit cost
- The executive team has incorporated a modified version of the model for a permanent performance management review.

5)Downsizing and restructuring
- Pacer Share ends
- Redesign position descriptions
- Reorganize around downsizing
- Learn appraisal system

LESSONS LEARNED

"Whenever things sound easy, it turns out there's one part you didn't hear."
--Donald E. Westlake, Drowned Hopes, (Mysterious Press)

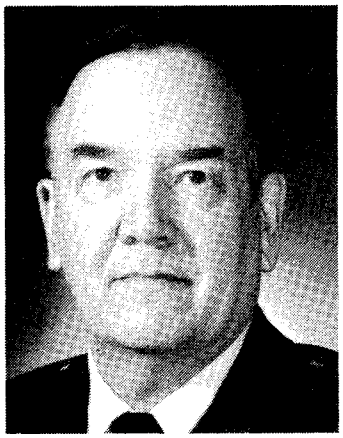
One of the responsibilities accepted by the organization is the duty to share what we have learned working with other agencies. The TQM model has been given to visiting groups from four foreign countries and fifty-four federal and state agencies and departments. Many lessons were learned during the demonstration as the organization adapted to change and plans were redesigned to adjust to real world situations. These are just some of the things learned on the journey:

- *Commitment to total quality evolution must start at the highest levels and be cascaded through the organization, including the middle manager.*
- *Every TQM journey should begin with a vision and a road map.*
- *Middle managers have an active role as process owners*
  - monitor customer support
  - set acceptable level of service
  - be proactive in solving problems
  - complete long range planning
- *Labor unions play a vital role in implementing and sustaining a TQM environment.*
- *The human resource should receive the same priority for upgrading, or updating through education, as that put into systems, machinery, and office equipment.*
- *A network of facilitators, trainers, and quality experts needs to be cultivated during the early part of the journey.*
- *None of us is as smart as all of us.*

SUMMARY

The men and women in the Pacer Share Project succeeded in changing their work culture. The organization has made significant progress in achieving processes that provide total customer satisfaction. The workforce is better trained and qualified, more flexible, and aware of the need to challenge business as usual. Distribution has created a unique system which can respond to the needs of the customer the first time, every time. The system works, and works well.

DEVELOPING, FEEDING, AND CARING FOR THE QUALITY COUNCIL



Col Gerald Erickson

Developing, Feeding, and Caring for the Quality Council

by

Col. Gerald I. Erickson, USAF, MC, CFS, FACS, FACPE

The successful development of the quality council, first and foremost, requires absolute committment and credibility on the part of the chief executive officer. The organization as a whole, and especially the leadership, both formal and informal, must be convinced that the boss really believes in TQM and is willing to make a 100% committment to this form of management. As Abe Lincoln said, "you can fool some of the people all of the time," but today, just as then, a healthy organization contains too many talented people to believe they won't quickly see through a scam. If I didn't have bright people in my organization I'd really be worried! I must emphasize, the CEO must exude an atmosphere of consistency, credibility, knowledge, and commitment to act on it.

To support the development of the quality council, executive management must supply the resources needed to do the job. To begin with, this means providing a full time, **really** full time, Total Quality Management office, consisting of at least one officer and a support person to provide administrative support and guidance and to oversee a formalized training program to reach all levels of the organization.

Selection of membership on the quality council is also critical. The CEO is usually the leader or chairperson of the quality council, but this does not necessarily have to be the case. In a very large organization, it may prove advantageous to use someone other than the CEO to chair this body. In our council at Upper Heyford, because of the personnel I had available, it seemed natural to begin our first quality council with the same membership as our executive committee. However, to ensure that a truly representative cross section of the organization was represented, and to provide the means of pulling the rest of the troops forward en masse, some variation was used. We needed a quality council that was broad-based, and yet wanted to avoid the sort of amoeba-like committee that seemed to suck in everything around it and was totally incapable of any sort of meaningful movement or decisions. We approached each prospective member positively and tried to very objectively assess each individual's attitude toward TQM as a discipline and their willingness and ability to function as a member of a team about to embark on a totally new experience. If an individual was clearly negatively set against this proposal, it was better to simply say that perhaps now was not the right time to impose on them to become involved in such a time-demanding undertaking. Of course, this did not permanently exclude them from participating on an invitational basis or from our utilizing their particular skills and abilities as they might benefit the whole. I must emphasize that in dealing with the recalcitrant authoritarian, one must do so in an absolutely nonattributional manner, **always** addressing process rather than personalities. Never

forget that the quality council functions as a visionary and leadership body and **not** as an extension of the will of the CEO. Remember to check things out with the council. Your own perceptions may well be colored by past experiences and perceptions. This will undoubtedly require the consumption of a little "humble pie" from time to time, but go ahead, it's amazing how much we can all learn from each other. As was once wisely said, "wisdom and patience are brothers".

The focus and format of meetings themselves need to be considered. I am convinced that it is extemely beneficial (if not essential) to have the initial meetings of the fledgling quality council in an off-site, pleasant, non-threatening environment. Care must be taken to doff the acoutrements of power and to meet in a casual, yet structured, setting. Refreshments, food and drink, are beneficial if not carried to the extreme. Relaxed but not too relaxed should be the rule. One must avoid the party atmosphere and remember this is a business meeting --- no alcohol or extraneous guests or spouses. The intent is to create a non-threatening working environment where council members can be encouraged to participate freely and yet stay focused on the business at hand --- creating the new quality council as the first step in changing the organization from one of compliance into a vital, innovative, focused, and responsive team. It is helpful in this initial meeting or two to focus on team-building exercises, brain-storming, nominal group technique, and, in general, things that will help to focus on where the organization has been, where it is now, and what its vision for the future is.

As the quality council begins to have regular meetings, topics such as how long? how often? where? and format need to be addressed. When scheduling meetings, the council members must agree on what seems appropriate for them. The schedule might be weekly, every two weeks, or whatever seems right to address the work to be done, without overkill. The length of the meetings is also important. Too many of us can call to mind seemingly endless meetings that we were required to attend which droned on and on and in which the most challenging issue appeared to be staying awake. These runaway meetings got that way because they were lacking both in specific agenda and in leadership. It is absolutely critical that a meeting agenda be decided upon ahead of time and that the agenda be circulated to all of the membership with well planned timing. Too far ahead of the meeting and it will most certainly be lost in the welter of minutiae that always seem to have a way of piling into our inbaskets, and too close to the meeting and it can't be guaranteed that everyone will either get it or have time to consider it before the meeting.

This brings us to the assignment of roles within the meeting of the quality council. The four major roles to be assigned are those of leader, facilitator, recorder and time keeper. In synopsis, the leader opens the meeting by reviewing the agenda, clarifying the objectives, and leading the discussion with an aim to encourage maximum participation and to attempt to steer the meeting as gently as possible to keep it on track. The leader is wise to talk as little as possible and to listen much. The facilitator, for us, was from our TQM office and as a non-voting

member, observed the process from an objective vantage point and brought us back to TQM procedure when we began to drift too far off the mark. The facillitator also serves a very vital training function during this process. The recorder maintains the meeting record which is then reviewed at the end of each meeting. If it is merely published in minutes, it may be delayed for an undetermined period of time, reaching the participants after they have mentally lost the freshness of the situation. Either before or after a review of the meeting record, lingering questions can also be addressed and can either be resolved quickly or referred for future consideration and discussion.

Next, evaluation of the meeting is considered ----- honestly, openly, and with nonattribution. Simply, how did it go? What did we think went especially right? What happened in the meeting that we didn't like? Finally, what did we learn and how will we improve the meeting next time? It's wonderful to see how people respond to this type of environment and become charged-up about the possibilities of a truly working meeting where things can happen, ideas exchanged, and positive changes put into practice.

During this process, it is inevitable to run the gamit of personalities, from domineering to reticent, from meek and reserved to forceful and take-charge. "Stovepipes" and turfdoms must be recognised for what they are (or have been) and be surplanted by cross-functional action groups that rise above the protectivism of the past to the vision of the future. As we flatten the pyramids, encouraging horizontal and interdepartmental flow of information

and cooperation, we find untold horizons for mutual advancement that satisfy both ourselves and our "customers".

The first order of business to be addressed by the quality council is to clearly decide the roles and functions that the council itself will play. There are two obvius tasks: to lead the implementation of TQM across the organization and to fulfill the requirement to train not only themselves (the executive level), but the entire organization from the CEO to the most junior clerk in the shipping department. It has been my experience, and born out by the experiences of others, that senior management and front-line workers are the first to come on board. A very critical force, the midlevel managers, seem to be the most resistant to abandoning the status quo and adapting to their new roles as facilitators and implementors of the organizational vision and mission statements. Corporate leadership must assist them in understanding the shifts going on within the organization and reassuring them that they are not assuming a less important role. To the contrary, they are being challenged with a new and infinitely more meaningful and satisfying role in the company. They must come to understand that they are the new facilitators, movers and shakers, and that they will be given far more responsibility to implement change within the organization than they could have imagined.

Three crucial agenda items need to be addressed in the first meetings of the quality council. First the **vision statement.** This critical statement sets the tone for the entire unit, charts the course, gives everyone within the organization a goal: a

destination, something to aspire to. Second, a **mission statement** is drafted, specifically addressing the way in which the organization supports and relates to its customers and its community. Finally, the quality council defines a list of **key values** which the organization holds as critical and compatable with both its vision and mission statements. These statements of who are we, what do we stand for, and where are we going provide the unifying principles of the organization. They must recieve complete dissemination throughout the organization so that each individual member knows intimately what they are and how they as a person fit into the big picture. Each person should not only receive briefings on these statements, but should be given their own personal copy to keep and to which they can refer. Also, since both the organization and its environment are constantly changing, so must the vision and mission statements. The council should discuss how frequently they want to review and update these statements.

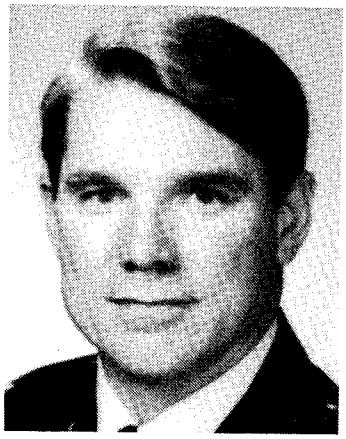
In order to really get things moving, after the majority of the organization's staff have recieved basic TQM training, management must assist and encourage staff members to find opportunities for improvement and to form process action teams. The quality council itself reviews and reaches consensus on its definition of an opportunity for improvement and also on what constitutes a process action team, as opposed to a working group or quality circle. This is not to say that working groups or quality circles are to be discouraged; quite the contrary. However, definition helps to keep the water from getting muddied and to keep

consistency in the process of TQM. It is important that during the fragile first steps of the organization down the path of TQM and continuous quality improvement, that the people throughout the organization, including the quality council itself, meet with success. As has been said before, "nothing succeeds like success". Therefore, it is absolutely critical that the quality council facilitate, empower, assist and encourage
these early efforts. Credibility is something that is gained only through hard work and consistency but can be lost in a heartbeat if executive management falls back into old authoritarian ways and yields to the temptation to micromanage. Once you give employees the ball, executive management has to keep hands off and let them run with it. Then, when a process action team meets with success, rewards and recognition should be immediate and public. Often, the best and most sincere reward of all is the granting of even greater responsiblity and empowerment. Lastly, the quality council should not forget to give itself a pat on the back for work well done. All of us respond far more strongly to praise and encouragement rather than criticism and fear.

In closing, as I alluded to earlier, the members of the organization and especially the quality council, should always keep in mind that we are in an ever-changing environment where things outside and inside remain in constant flux. For this reason, we cannot allow ourselves to become complacent or to rest on past achievements or goals attained. The very function of executive management in a TQM driven organization is to be prospective, visionary and sensitive to change. Although mottos and slogans are

generally avoided in TQM philosophy, I love the words used by one of our U.S. companies that has a reputation for being on the cutting edge. They are, simply, "what if"?

A QUALITY-BASED APPROACH TO MEETING AIR FORCE COMBAT CAMERA IMAGING REQUIREMENTS



Lt Col Jeffrey White

A QUALITY-BASED APPROACH TO MEETING AIR FORCE COMBAT CAMERA IMAGING REQUIREMENTS

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ABSTRACT

An innovative quality program was initiated in 1989 to improve support to Air Force imaging requirements. This paper highlights key aspects of quality implementation efforts to make Combat Camera imagery more responsive and valuable to Air Force customers in an era marked by major force reductions. Of particular note are the elements of the strategic planning process which sparked the transformation of Combat Camera's ability to field electronic-based imaging systems to better service customer requirements. What emerged was the Electronic Imaging Center (EIC) Concept which is now being implemented Air Force-wide.

BACKGROUND

Aerospace Audiovisual Service

When we began our quality journey in 1989, Air Force Combat Camera resources were organized under the Aerospace Audiovisual Service (AAVS), consisting of 83 units located worldwide. This included 66 Base Visual Information Service Center (BVISC) operations which provided photo lab, graphics, and presentations services to local base customers.

Air Combat Camera Service

In April 1992, the organization divested all its base support missions and was downsized to 14 units located in the United States, Europe, and the Pacific. AAVS was renamed the Air Combat Camera Service (AIRCCS) and retained only its Air Force-level missions. This includes responsibilities for Air Force Combat Camera Documentation, Air Force Regional Television Production Centers, Air Force Central Motion Picture & Video Library, DoD Motion Picture & Video Archives, and Air Force Executive Agent for Electronic Imaging.

Combat Camera Heritage

The Air Combat Camera Service is rooted in a proud heritage that dates back to the combat photography shot by Matthew Brady who brought the experience of the US Civil War to political leaders and the public alike. World War I saw the first use of cameras to cover combat actions from the air. During World War II, extensive use of motion pictures taken by combat cameramen helped mobilize industry in the US, provide training for draftees, and show the world what was happening. In the 1960s, the 35mm camera became the camera of choice for combat photographers during the conflict in Southeast Asia. It allowed photographers to rapidly move with the ground troops and take images from the cramped cockpits of fighter aircraft.

Over the years, combat photographers have documented every war and conflict with increasing sophistication. Despite the advances in imaging technology, however, one thing remained constant: combat photography was used primarily to record history for the historians. All that changed when we began our quality journey.

The Emergence of Electronic Imaging

In 1989, during Operation JUST CAUSE in Panama, our combat photographers began using electronic still photo systems that enabled us to transmit images from the field directly to the Pentagon in a matter of minutes where they could be viewed by the National Command Authority. During DESERT STORM, we developed improved electronic imaging capabilities that enabled the integration of our imagery into the decision making process of a combat theater. Our imagery provided primary support for bomb damage assessment, weapons performance, tactics, targeting, command and control, and public information. We now had the capacity to aid battle commanders in fighting the war. Our imagery could affect the outcome of battles and, therefore, we had to have a new sense of urgency.

A Paradigm Shift in Capabilities

For years, our traditional film/chemical-based processes had conditioned our people and our customers to think "slow" was fast. We had now introduced a process that delivered in seconds what our culture had conditioned us to deliver in days. A paradigm shift had occurred in the world of Combat Camera image capture and delivery. We no longer were just recording history for the historians. We had now exploited technology to give us the capability to provide near

real-time images to commanders to help them make history. Our challenge now was to make this technology widely available throughout the entire Air Force.

HOW WE GOT STARTED

Strategic Planning

Our first strategic plan was written in 1989 as an adjunct to the Air Force level Visual Information strategic plan. Since then it has been updated every year. The plan attempts to create a culture in which every person in every unit has a clear mandate to get involved in every aspect of our continuous improvement journey.

To date, every strategic quality plan has homed in on three critical criteria:

- Our customer. We need to take the time, speed, distance, and distribution out of the product delivery equation. We need to get imagery to the customer so fast from anywhere that our turnaround time was no longer a significant factor in the customer's decision making process.

- Our people. We need to listen to our people, broaden unit involvement, and place special emphasis on using cross-functional teams to improve our processes. Then we need to organize, train, and equip them with tools that ensure top performance, survivability, and safety.

- Technology Exploitation. We need to find off-the-shelf imaging technologies that are light, reliable, and environmentally clean that can process and deliver imagery from anyplace in the world in virtual real time. And we need to make this technology serve the needs of our customers wherever they may be.

Our Strategic Quality Plan was the catalyst for developing new and improved Combat Camera imaging capabilities. Our focus on the customer coupled with an emphasis on continuous improvement sparked the creation of "electronic imaging"—a concept of operations which changed forever how we do business, what tools we use, and the kinds of products we deliver. Our plan allows us to continuously refine and identify opportunities for improvement, develop goals, and set objectives. The planning process has the full involvement of all our people.

Skunk Works

We created the Combat Camera "Skunk Works" electronic imaging function in 1989, a process action team composed of our most talented people and empowered them to seek out, find, design, develop, integrate, and field the country's first totally Electronic Imaging Center (EIC). They took new commercial off-the-shelf technologies and applied them to meet Air Force Combat Camera and base-level imaging requirements. What they put together thrust AIRCCS beyond the leading edge of emerging technology. Their system has become the de facto standard for the Air Force, DoD, and private industry. In 1992, the Skunk Works was formally organized as a dedicated function within AIRCCS and now operates as a natural working group.

Spreading the Word

The Skunk Works effort convinced the AAVS commander that electronic-based systems had enormous potential in streamlining Air Force BVISC operations. But he knew we would have to convince the corporate Air Force to accept the cultural changes of going all-electronic. We needed to find out if our customers could utilize such technology and whether we could align these new technologies with their needs. In addition, we needed to align more closely with our key suppliers.

External Customer Alignment

In November 1989, the Skunk Works team organized a multi-media presentation of the EIC Concept which the AAVS Commander presented to VOLANT RALLY—a semi-annual commanders conference at Headquarters Military Airlift Command at Scott AFB. The presentation was enthusiastically received by all attendees. Word spread fast, and we were next asked to travel to the Pentagon to show our concept demonstration to the Air Force's corporate director for command, control, communications, and computers (HQ USAF/SC) and his staff. Equipment and crew traveled to the Pentagon in December 1989 to deliver the presentation. Again, response was overwhelmingly positive. USAF/SC agreed to be the Air Staff sponsor of an initiative to implement the EIC Concept at every base in the Air Force. USAF/SC then chartered AAVS to conduct a field test and brief the concept to Air Force leaders and managers.

Over 50 "Road Show" presentations were given to a host of audiences from March 1990 to the present. And in every case the response to the EIC Concept has been greeted by enthusiastic audiences, providing convincing evidence our customers were ready for the cultural change

associated with electronic imaging. Following are the key audiences that received the presentation:

- HQ TAC
- HQ PACAF
- HQ AFCC
- HQ AFSOC
- HQ ESC
- HQ ACC
- HQ 8th AF
- HQ AFLC
- AFSPACECOM
- HQ AFRES
- AFNEWS
- AFMPC
- Air University
- USAFA
- SAF/PA

Articles on the concept also appeared in numerous publications, including various base newspapers, *Airman Magazine*, and the *Air Force Times*.

Internal Customer Alignment

The EIC Concept represented a radical departure from "business as usual" within the visual information community. Before the concept could be successfully implemented, we knew we would have to educate our own community on the merits of electronic imaging. This involved Road Show presentations, written articles, and videotapes that targeted our own people who, ultimately, would be responsible for making the concept work when implemented in the field.

The EIC Concept also was a special topic at each Air Force Visual Information Manager's Conference since 1990. This has given the MAJCOM visual information managers the opportunity to become familiar with the concept and provided them a forum to get their questions and concerns answered.

Similarly, the EIC Concept became the primary driver behind the activities of the Air Force Visual Information Technology Advisory Board (VITAB). Composed of technical experts from all the MAJCOMs, the VITAB's charter is to explore new imaging technology. The VITAB's efforts were in mesh with the EIC Concept and proved essential to gaining strong MAJCOM support for the initiative.

Supplier Alignment

Our electronic imaging implementation strategy was based on the use of an array of new technologies which were being upgraded and improved on a regular basis. It takes a full time effort just to keep abreast of emerging technologies. The EIC Skunk Works team made it a

practice to visit those companies whose technologies showed the greatest promise in supporting EIC applications in an effort to stay "one step ahead" of the technology. We visited manufacturing facilities, spoke to engineers and corporate managers, and shared the Air Force strategy for applying electronic imaging technology. We emerged from this process with a much better understanding of technology trends which greatly strengthened our EIC implementation strategy. It also led to more a responsive industry response to meeting our needs. Some of the companies visited included Canon USA, Sony-Japan, Eastman Kodak Company, NExT Computer, Apple Computer, Software Publishing Corporation, MacroMedia Inc., General Parametrics, Polaroid Corporation, and 3M.

Benchmarking

The Northrop B-2 Division in Pico Rivera, California, provided us a critical benchmark for the EIC Concept. Northrop began replacing its conventional graphic and photographic processes with electronic imaging in 1989, and claimed significant savings for their support to the B-2 program. In 1991, they completely eliminated wet processes from their photo and graphics operations and documented big savings in labor, materials, maintenance, water usage, hazardous waste, facility space, and other utilities. The Northrop operation is a single facility that mirrored what we wanted to do, only on a much larger scale, and provided us a "real world" success story from private industry. The EIC Concept took the Northrop experience, improved it, and applied it to the entire Air Force.

As we continued to explore electronic imaging technology, it quickly became evident a "digital revolution" was occurring in the United States. The Center for Creative Imaging, the American Film Institute, and the National Press Photographers Association sponsored numerous seminars and workshops devoted to bringing electronic imaging technologies into the mainstream of the commercial publishing, photography, graphic arts, and motion picture/video industries. Our people were active participants in these activities which fostered a "beat the best" mentality and stimulated a search for major improvements rather than only incremental refinements of existing processes.

In higher education, the Rochester Institute of Technology (R.I.T.) School of Photography has emerged as a national leader in integrating electronic imaging into its curriculum. R.I.T. provided us an excellent benchmark for applying the technology to Air Force applications. We tuned-in to the school's video teleconferences on electronic imaging and sent our photographers to their advanced, 1-year photojournalism program that specializes in electronic imaging.

AN IDEA TAKES SHAPE: THE "EIC CONCEPT"

Concept Defined

The traditional Base Visual Information Service Center (BVISC) consists of three primary support areas: Still Photographic Laboratory, Graphic Arts, and Presentations. These functions rely on chemical-based, photo-mechanical processes to deliver photographic products, briefing aids, and other audiovisual services to base customers. The Electronic Imaging Center (EIC) Concept was developed in response to the notion that these BVISC functions can better be accomplished with electronic-based digital imaging processes.

What It Offers

Converting BVISC functions to all-electronic processes will maintain quality support to meeting customer requirements during an era of declining resources. Electronic processes promise to bring services straight to the customer much faster, at much lower costs, and with more productive use of existing manpower as compared with traditional BVISC processes. Revolutionary breakthroughs in digital photography, image compression, graphic imaging, digital printing, and electronic transmission have dramatically altered the way BVISCs can do business. Equally significant is that these new systems are relatively low cost, very fast, user friendly, available off-the-shelf, and can interface with customer desktop computer systems. Taken together, they make the notion of a non-polluting, dry-process, electronic BVISC a reality at substantial savings to the Air Force for a relatively small investment.

A Snapshot of the System

The EIC system was designed with the capability to output visual information products in hard copy (digital and laser prints, color & black-and-white) and transparencies (35mm slides and digitally-produced vu graphs), while being capable of delivering color graphics and photo images for direct electronic projection via computer (DOS/Windows and Macintosh formats). The graphics and photo imaging components are connected together on a local area network (LAN). The system maintains software file compatibility with the Air Force standard communication-computer architecture, as well as the briefing and display system architecture utilized in DoD command centers. Additionally, the system has the capability to electronically transmit and

receive imagery from the Joint Combat Camera Center located in the Pentagon and the Still Media Records Center at the Naval Imaging Command in Anacostia, DC. The key components of the EIC system are depicted in Exhibit 1.

EIC Program Goals

The EIC Skunk Works team developed a cost/benefit analysis of the concept. We estimated an $18 Million investment in electronic imaging systems at every BVISC in the Air Force would increase unit productivity by 30 percent, in addition to other residual benefits of converting to electronic systems. Specifically, the goals of EIC implementation were the following:

- Deliver ever-improving value to customer visual information requirements
- Increase BVISC manpower productivity by 30 percent to offset eminent manpower cuts
- Reduce by 50 percent photo-chemical processes by 1995, with the complete elimination of hazardous waste by the end of 1999
- Provide seamless interoperability with customer desktop computers, as well as with existing Combat Camera electronic imaging systems
- Establish an Air Force-wide imagery network, which would tie each BVISC electronically into DoD's Joint Combat Camera Center and Still Media Records Center

Concept Validation

Engineering Study. In September 1990, we contracted with Scientech Incorporated, a professional technology integration firm, and asked that they review current electronic technology and determine whether or not the EIC Concept contained the most effective and efficient solution and if not, what systems could make it better. Their subsequent report recommended a different local area networking (LAN) solution from that in the original test plan; otherwise, it confirmed that the EIC Skunk Works solution was the right one. The Scientech LAN recommendation, with minor modification, is the networking solution that is being fielded during EIC implementation. Scientech's independent review was also necessary to satisfy the Air Force communication-computer community's concerns, because the proposed system included a "non-standard" computer—the Apple Macintosh. Scientech's study, coupled

with the results of the EIC Proof of Concept Test, demonstrated the Macintosh system could provide seamless connectivity to customers who use DOS/Windows platforms.

Proof of Concept Test. At the direction of HQ USAF/SC, we conducted a 1-year proof of concept field test at four Air Force installations in 1991: Barksdale AFB, Eielson AFB, Elmendorf AFB, and Hurlburt Field. An EIC Proof of Concept Test Plan was published in September 1990. The plan assumed EIC systems would improve BVISC productivity by 30 percent. The test was successful in demonstrating the potential benefits of integrating electronic imaging into BVISC operations to improve customer satisfaction. The Air Force Special Staff Management Engineering Team (AFSSMET) measured baseline conventional BVISC processes and compared the baseline to EIC processes. The AFSSMET report was published in December 1991 and stated "The EIC Concept will exceed the expectations addressed in the EIC Proof of Concept Test Plan."

EIC Implementation. The Proof of Concept Test results were published in a final report which was briefed to HQ USAF/SC in December 1991. At that time the concept was approved for Air Force-wide implementation. A detailed EIC Implementation Plan was published in April 1992 which served as a planning guide for MAJCOM visual information managers. The original estimate for EIC investment costs was $18 Million. That figure was adjusted to $20.6 Million as a result of lessons learned during the field test. In 1993, HQ USAF/SCMV determined the Air National Guard and Air Force Reserves should be provided this technology as well—at a cost of $4 Million. This will make the total cost of EIC implementation $24.6 Million over 4 years. The tentative EIC implementation schedule is as follows:

- 1993 — AMC, PACAF, USAFE
- 1994 — ACC, AFSOC, AETC, AFSPACECOM
- 1995 — AFMC, AFIC, AFDW
- 1996 — ANG, AFRES

Training. The Defense Visual Information (VI) School at Lowry AFB started instruction on EIC systems in late 1992 for "pipeline" students from basic training. Beginning in October 1993, the VI School will provide a 2-week EIC training course at Lowry for 5- and 7-level VI technicians

from EIC equipped bases. EIC integration training will be provided by EIC Skunk Works and Defense VI School personnel on a regional basis within each MAJCOM.

Still Media Records Center. DoD purchased over 50 Macintosh-based electronic imaging systems and placed them at key locations at each of the Services as well as at the Unified Commands. As the key component in the DoD electronic photo automation initiative, these systems are linked electronically to systems located in the DoD Still Media Records Center (SMRC). Similarly, Air Force BVISC EIC systems will have the capability to electronically tie into the SMRC still photo "Image Bank."

Combat Camera Applications. The EIC Concept has proven itself repeatedly while meeting an array of real-world Combat Camera imagery requirements. Concurrent with the development of EIC technologies for base-level applications, we engineered and procured the electronic imaging system for the Joint Combat Camera Center in August 1990, at the beginning of Operation DESERT SHIELD. We deployed a second system to the Joint Combat Camera Team in Saudi Arabia just prior to commencement of DESERT STORM. The systems were used extensively throughout the entire operation—they performed flawlessly and provided products that exceeded customer expectations. Today, virtually every Combat Camera unit in DoD relies on EIC-based systems to perform its mission. The same systems to be fielded for BVISC use have emerged as a de facto DoD standard in the Combat Camera community.

THE COMBAT CAMERA STORY

Combat Camera products are requested by a wide range of Air Force, Department of Defense, and other federal agencies. Requests include Combat Camera coverage of exercises, contingencies, humanitarian relief efforts, historical one-time events, weapon systems tests and personnel competitions, operational tests and evaluations, and agency activities. Products range from edited motion video documentary clips, digital layout prints, and unedited instrumentation video material to 35mm color slides, photo displays, high-end video productions, and multi-media presentations.

Materials are used by the theater CINCs, the JCS, HQ USAF, MAJCOMs, as well as public affairs offices for internal Air Force use and release to the news media. Often there are several customers requesting different coverage and products on a single project or event. For example, during contingencies and on many JCS exercises, electronic still images and edited video clips

are transmitted daily to the Pentagon for use in JCS briefings while daily still and video material is provided to theater commanders and other in-theater and CONUS participants.

At the end of an exercise, functional coordinators require edited clips of their activities (e.g., civil engineers, special operations units) for evaluation of their respective operations. All customers expect their products to be delivered on time and tailored to meet their specific requirements.

The Electronic Imaging Center (EIC) Connection

The EIC Concept, while focused on base-level BVISC operations, has had far-reaching implications for the Combat Camera mission. The concept involved a high-risk, high-payback technological, organizational, and cultural transformation that has touched every Combat Camera person, every specialty, every capability, every process, and every system. The EIC initiative is in reality a revolution that has changed forever how the Air Combat Camera Service does business, what tools we use, and the kinds of products we deliver. The EIC Concept served as the springboard for integrating electronic imaging into virtually every Combat Camera mission area. To date, we have made significant strides toward exploiting technology to improve Combat Camera mission support to customer requirements.

Combat Documentation

Electronic imaging technology served as a force multiplier that enabled our mobile Combat Camera teams to deliver comprehensive coverage, in both day and night, of two US conflicts: JUST CAUSE and DESERT STORM. The technology was also used to document US humanitarian relief operations to the former Soviet Union (PROVIDE HOPE), Northern Iraq (PROVIDE COMFORT), Somalia (PROVIDE RELIEF and RESTORE HOPE), and Bosnia (PROVIDE PROMISE and DENY FLIGHT). Our people performed brilliantly with systems so responsive that they were integral to the success of these military operations.

Still Photo Technology

Electronic Still Photography . Electronic still cameras are used by Combat Camera still photographers to document military operations worldwide. These cameras provide us the capability of taking photos, by-passing the processing, and printing the images in a matter of minutes. Today's digital cameras produce images that rival photo-chemical based systems. Combat Camera photographers are using these systems also to capture and send high quality

images of significant military operations over satellite circuits to the Pentagon and the Unified Commands.

Still Image Transmission. One of the primary advantages of electronic-based photography is the ability to transmit images from one location to another. Today, we are able to send images over telephone lines to the Pentagon, including via STU-III, from virtually anywhere in the world. Each image usually takes 3 to 5 minutes to transmit. Using the INMARSAT satellite system, we can go where there are no telephones and still send images to any location in the world that is equipped with an electronic darkroom.

Electronic Darkroom Systems. Combat Camera pioneered the use of electronic darkroom systems within DoD. These systems are computer-based and replace the chemical-based photo labs of the past. Traditional film, video, and, digital images can be input, processed, and output with these systems to create electronically-generated prints and transparencies that are indistinguishable from their chemical-based counterparts. All hardware and software we use is commercial off-the-shelf and is recognized as the industry standard.

Video Technology

Video Acquisition. We made high-band 8mm (Hi8) and 8mm night vision cameras our field imaging formats for video acquisition—slashed weight and operating costs by a factor of 15. The national TV networks are following our lead in that they are now transistioning many of their field news gathering operations to the Hi8 format. Combat Camera has been doing it for over 3 years.

Video Field Editing. We standardized on new deployable, non-linear video editing systems, incorporating the latest in digital technology. These systems are providing unprecedented flexibility in delivering, within hours, edited video clips to field commanders.

Video Transmission. We field tested the first DoD capability to transmit and receive video via a mobile, "flyaway" satellite earth station uplink system which gives our military leadership the only true means of moving full motion imagery worldwide, near real time. Currently, we use the same commercial satellite system that was used by CNN to transmit those unforgettable images of the Tiananmen Square standoff in 1989 in the midst of a Chinese media "blackout."

Regional Television Production Centers

AIRCCS manages five regional Air Force television production units as well as the DoD contract production facility which supports all the military services and DoD. These are high-end production facilities which give customers production capabilities otherwise uneconomical and unavailable. Our regional facilities support Air Force corporate communications and readiness training programs, while providing deployable resources to support AIRCCS wartime taskings.

Corporate Communication

The Air Force Chief of Staff has been using AIRCCS production capabilities to produce corporate videotapes as his principal means of communicating what's happening in the Air Force to Air Force people around the world. Similarly, the major commands use our facilities to produce periodic Notice to Airmen (NOTAM) videos and other products to keep their people informed on important issues and policy changes. We also converted the venerable *Air Force Now* to video, and slashed costs by 60 percent while reducing turnaround from months to 3 days. These corporate video products have provided clear, in-depth, tightly reasoned insight into the hows and whys of the changing Air Force mission and structure. In a way, they are serving as the Air Force's road map to the 21st century.

Readiness Training

Our regional production facilities pioneered the use of interactive videodisc (IVD) technology for training Air Force aircrews and maintainers. In July 1990, the Institute for Defense Analysis conducted an effectivenes and cost analysis of IVD instruction in Defense training. They concluded that IVD instruction can have a significant impact on the productivity of resources allocated to military training and on the availabililty of people needed to operate and maintain military systems. ACC considers our IVD products indispensable to their command's combat training effort. Witness that IVD learning centers were used extensively by fighter and maintenance units during their deployments to the DESERT SHIELD/DESERT STORM operation.

Deployable Theater Support Teams

Our regional production centers are piloting innovative applications of the latest in deployable, digital-based video editing systems to support theater-wide requirements. Our tasking is to support a theater beyond wing level with mass and rapid screening, duplication, and distribution

of video strike imagery. We are equipped with special editing systems that allow us to electronically mask classified data (e.g., F-15-C gun camera video) and enlarge the remaining image, duplicate it, and move the images via satellite to the Pentagon and other down links. During DESERT STORM, the Combat Camera effort provided 80 percent of the battle damage assessment (BDA) data used by Air Force warfighters in successfully waging the air campaign. And these same images wowed the world when broadcast over the television networks, solidifying public support of the US effort in the war.

Air Force Central Visual Information Library (AFCVIL)

Our AFCVIL is responsible for distributing Air Force-level productions. We eliminated routine distribution of 16mm films and 3/4-inch U-matic videotapes to customers. These distribution formats were expensive to produce and carried the additional expense of two-way postage. Instead, we introduced one-way distribution from our AFCVIL and changed formats to VHS and 8mm, improving service to our customers while significantly cutting our costs.

DoD Motion Media Records Center (MMRC)

The MMRC preserves original motion picture, video, and mixed media produced by the Department of Defense prior to accessioning by the National Archives in Washington DC. The MMRC holdings consist of 160 million feet of film and 400,000 minutes of video. We are introducing robotics into a fully automated media storage and retrieval complex which will provide 3 minute access to any motion image we have!

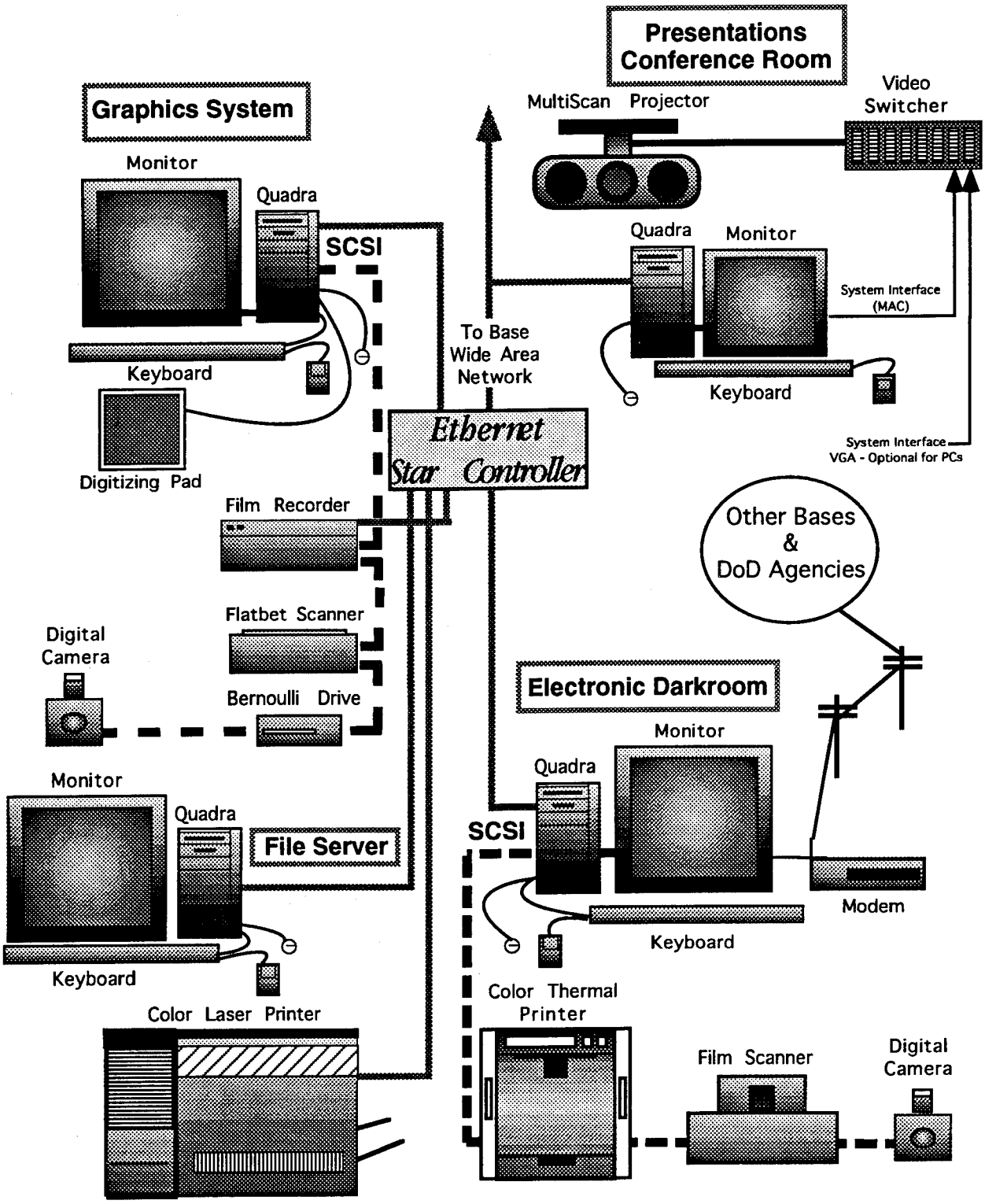
SUMMARY

As the Air Combat Camera Service prepares to meet the challenges of the future, it is necessary to look at the driving forces that will shape the world in which the Air Force will be operating in the years ahead. One of those major forces is the "Information Explosion" resulting from an accelerating pace of technology during a period when the Air Force will have a diminished force structure available to support contingency operations—both at home and overseas. Accurate and timely information will be more important that ever if military operations are to be successfully executed. Winning the information war, which means the effective integration and management of visual information technology, will be a deciding factor in any military operation or confrontation. The Electronic Imaging Center (EIC) Concept and its momentous effect on shaping Combat Camera technologies will offer long-lasting benefits to the Air Force mission.

EXHIBIT 1

Electronic Imaging Center

Basic Set-up



OCCUPATIONAL MEDICINE SERVICES (OMS)
PHYSICAL EXAMINATION PROCESS REVIEW

H. Gary Lebow

Joyce McDaniel

Richard Yates

OCCUPATIONAL MEDICINE SERVICES (OMS) PHYSICAL EXAMINATION PROCESS REVIEW

BY: H. GARY LEBOW
JOYCE MCDANIEL
RICHARD A. YATES

SUMMARY:

The Physical Exam Process conducted by Occupational Medicine Clinic requires healthy employees to be removed from their work centers on an annual basis for a routine exam that would last from 4 to 8 hours. With the military facing a significant reduction in both manpower and funding and the Air Logistic Centers now required to become bid competitive with civilian corporations, all efforts must be made to streamline our operations. Work force productivity being critical, the question then becomes what can a medical organization do to reduce constraints and improve throughput to enhance accomplishment of mission objectives. Using the philosophy of continuous quality improvement, numerous constraints have been identified and improvement modifications established.

INTRODUCTION:

Having received a significant amount of feedback data relative to total exam time from our customers, both management and patients, the need to review our process for physical exams became clear. There was a perceived need to operate more efficiently, maximize productivity, increase throughput, and eliminate rework and waste. The 653d Medical Group Quality Council approved an Opportunity Statement which identified the process boundaries, internal and external customers, and the desired outcome for the process review.

TEXT:

With approval in hand, Dr. Lebow, team leader, quickly identified his team and established an initial Milestone Chart. Flow charting of the process was accomplished, and it became apparent that individual knowledge of the process, and of specific portions of the process, varied markedly; and no one person had precise in-depth command of the entire process. Time studies were established in order to develop histograms and pareto charts, and by using the tools of TQM and Theory of Constraints, we were able to identify and rank the constraints. The initial problem was that all the employees were arriving nearly simultaneously, both in the morning and shortly after lunch, for the occupational physicals. Hence, the first change was to stagger the appointments at intervals of 3 to 4 patients per hour throughout the day. We also assigned one specific physician to do only occupational physical exams in the morning, and a colleague would do the same in the afternoon. Control charts were developed by Mr. Andy Gross of the Center Quality Office and Ms. Joyce McDaniel, administrator for our OMS. We were then able to establish an internal baseline in which certain trends were noted over time. One major identified problem was that the return-visit patients were totally unscheduled and were coming to OMS at their own convenience and seen as walk-in patients.

These were often commingled with the occupational physical exam patients. This was corrected by establishing a general appointment system for return visit patients. Having the ability to project which doctor was going to be seeing occupational physicals at specific times of the day, we were able to fit the return visit patients in with the physician they had initially seen. Now, almost all of the patients we were seeing at OMS (with the obvious exception of acute problems and either clinical or administrative emergencies) are done on an appointment basis.

There was an initial decrease of approximately 20 percent in the average disposition time for physical examinations patients in the Occupational Medicine Service here at Robins AFB. This correlated to a projected savings of over 1500 man-hours per year. We initially anticipated that this would increase significantly when the total effects of the appointment system became fully implemented throughout the companies on the flight line. We were required to make some changes to our process due to a requirement for implementation of a new spirometer for measuring a patient's pulmonary functions. We began to notice an increase in our times, and the initial reaction was to credit it to the new process. However, times continued to increase beyond what was felt to be appropriate for the new procedure. An extensive review of the process was initiated, and it became apparent as data was gathered and plotted that the reversal in our initial trend to approach spindle time was due to broken appointments. Patients were taking it upon themselves to report when it was convenient for them, not at their alloted time. Not only were we having patients arrive early or late (plus/minus 15 minutes) but a significant percentage were arriving on the wrong day. A direct correlation was shown between this deviation in schedule and the increase in our process time.

CONCLUSION:

A significant time savings can be accomplished if we can enforce a patient scheduling system. This will allow us to again approach our spindle time and return our center work force to their primary duties in less than 2 hours (including travel time) rather than the previous range of up to 8 hours. To accomplish, this we have implemented an education process starting with the directors and deputies to educate them on our process and how they, as primary customers, can benefit from a combined effort to ensure compliance. For the workers it translates into job security as a more efficient work force is a more competitive one in these days of competitive bidding. Lastly, for our internal customers, the benefits are reduced lines and non-hostile patients.

LESSONS LEARNED:

Assessment: A learning process developed in which the team became aware of the attributes of the assessment process and the requirement for continuous reevaluation of the situation.

Customer Service: Initial recognition of the primary customer is not often as easy as it would appear. The primary customer in this process is not the patient but the Product Directors. The patient is in reality the product who relates to the throughput within the process, and who becomes inventory when not moved in a timely manner from one point to the next. Quality was, therefore, determined by the rate at which we could return the product to the operational line while accomplishing an exam which was complete and free of rework.

Empowerment: History has shown that no one makes changes to a system without having to go through numerous levels of command for approval. Using the philosophy that workers have real worth and a knowledge of their process the 653d Quality Council allowed the team to implement changes as they determined a valid need existed. As trust is exhibited, the confidence of the team grows and challenges are met with enthusiasm and vigor.

Statistical Process Control: Tools that were considered nice games for the classroom were now put to use in a "real world" environment. They were utilized to define the boundaries of the process, identify the critical members of the team. They pointed out areas to be highlighted for review and downplayed areas with little significance for improvement. Limits were established and variation determined, and items driving the process out of control were
identified and resolved. Spindle times were identified and constraints singled out for improvement. Tools that had once been only a concept became alive and a vital part of day-to-day life.

Teams: Individuals who once looked upon each other as outsiders to their private work areas have now come together as a cohesive team working for common goals and transcending previous lines of demarcation.

OPERATIONAL PROCESS ACTION TEAM

Ronald Shepherd

Steve Walton

OPERATIONAL PROCESS ACTION TEAM

RON SHEPHERD AND STEVE WALTON

In March 1992 General Lee Butler, Commander, Strategic Air Command (SAC) now United States Strategic Command (USSTRATCOM) directed the reassessment of its working methods in light of quality and customer oriented principles. The 544th Strategic Intelligence Wing now the Joint Intelligence Center (JIC) at Offutt Air Force Base, Nebraska chartered the pioneer "Operational" Process Action Team (PAT). Other PAT's existed but they were of an administrative nature. Total Quality Management (TQM) training in development for the entire organization was still in its early stages.

Management chose the airfield data section, which is responsible for collecting, analyzing, recording, and maintaining more than 1,700 separate facilities, as the first specific operational area to be studied. With only eight analysts to perform the task, there was a real need to revamp the process of providing physical data such as runway length and width on foreign airfields and related installations. These factors led to the selection of a cross-functional team to study and improve the processes for updating and maintaining a portion of the intelligence database used by strategic planners and the entire national intelligence community.

The final results of the TQM effort were impressive. However, the actual implementation of TQM principles in a military environment and observing its triumphs and trials is as significant as the final success of the team effort. Since it was the first operational application of the TQM process at SAC/STRATCOM, others will find the experience useful and further reinforce the continued development of customer-oriented production.

As previously mentioned, eight individuals were responsible for more than 1,700 facilities. The required analysis and data entry for each facility took one analyst up to seven days to complete. The final quality control check took an additional couple of days per facility. Ideally, each installation requires biannual updates to ensure the data is current and reflects any new construction or facility changes. With over half of the data obsolete and the current production process being used, there was no hope of ever maintaining, let alone catchanything even approaching the desired norm.

TEAM FORMATION AND TRAINING

One of the most significant success factors was the initial decision to compose a cross-functional team, with representation from the computer support personnel, possible local end users, similar production shops, and others as needed or discovered. This broad approach had the effect of bringing into the team-building process those functions that would most likely need some changing or even scrapping. When the team felt it would be useful to change some aspect of the computer programming, it had a programmer present to determine the feasibility, and, if so, represent the team when negotiating with the computer division. This team composition proved valuable when dealing with a large compartmented bureaucracy. Bringing more of the organization "ON-BOARD" reinforces backing for decisions and breaks down organizational walls. Other examples abound why we were so successful bringing in others into the team. Without detailing each story, it is sufficient to say anyone planning to examine a production process should consider expanding the range of those involved to include all departments that contribute to the overall effort.

Training is another initial strong point needing further emphasis. When the PAT formed, TQM training was in the early stages of development. After identification of the team members, the newly created SAC/STRATJIC TQM Office provided an intensive, three day, off-site training seminar on TQM principles and tools. Each highly qualified trainer presented the concepts and demonstrated the various statistical tools available. The facilitator joined the team at the very onset of training and rapidly became an integral part of the team. He functioned throughout the entire process as a guiding force and allowed the team to remain focussed on the tasks at hand. The facilitator's active participation in the training reinforced the team building process.

Having the initial training on neutral territory in civilian clothes proved effective in breaking down organizational barriers and rank structure, promoting the free flow of ideas and consensus building. The team rank structure spanned from an E4 Sergeant to Captain and included two civilians. One well-known truth became even more evident: Those closest to the actual production, usually the lower ranking workers, tend to know more about the process and how to fix any problems.

APPLYING TOTAL QUALITY TO THE MILITARY ENVIRONMENT

Once the team completed its initial training it was time to get down to work. The 544th/STRATJIC Quality Council provided a formal charter to the team. In theory, the team answered directly to the Quality Council. The idea was to rid the group or the layers of command and coordination between developing an idea or game plan and actually gaining the authority to implement change.

Being the first operational TQM Process Action Team, we, and the organization, found it necessary to work out the authority issue as we went along. One prime example of trying to fit a non-military management style into the military organization was the task of going forth to identify our customers.

First we identified actual or potential customers, both within SAC/STRATCOM and the wider DOD community. The airfield production section operated for years under a one sentence directive from DIA stating "airfield descriptions will be maintained". DIA provided no other guidance as to what type of information be maintained or what report format be used. "This is the way it has always been done" is no longer acceptable in the work center.

The team decided to send a message out to the intelligence community inquiring as to whether anyone really used any of the information being produced. In theory, the Quality Council should have been the approving official. However, what began as a simple message stating "Do you use 'X' data and if so what parts are the most critical?" After four revisions from the chain of command, the message finally went out several weeks later. The important lessons here are, the chartering body should be the only approval necessary, and don't get bogged down with unnecessary coordination.

Team member selection took care to include all personnel within the organization affected by the changes the team may propose, eliminating the very need for having to get input from the endless bureaucracy chain. We quickly found the need to ensure the chain of command above us was well versed on the philosophy behind our efforts. The lack of training and awareness at the management level attributed to the multiple coordination stages causing unnecessary delays. To avoid many of the problems created by trying to 'fit' TQM into the military environment, educate the senior leadership in TQM philosophy. Widespread understanding and communication within the organization of quality principles and specific team goals can solve many problems with chain of command issues

TEAM ACCOMPLISHMENTS

The largest accomplishment was blazing the trail for other teams within STRATCOM. As the first operational team, we discovered some of the problems involved with bringing TQM to a military organization. Other local efforts will benefit from the lessons learned.

The second major accomplishment, although unintended, became the infectious nature of our success within the work center in dealing with the production problems we faced. As others in the organization learned of our success, they began to take notice of additional potential projects for quality enhancement and customer satisfaction. Widespread TQM training commenced about the time we were making big gains with our problems. Others could now relate the training to an actual success story on the production floor.

Actual production improvements were impressive. Before the PAT started, it took 40 to 50 man hours to accomplish all the tasks associated with one installation. With the customers actually identified and their requirements clearly defined, we eliminated unnecessary data, reducing man-hours by threefold.

Exploring new ways to gather and manage the data led to another key improvement. Relying on technical expertise within the team and the production staff, the process transformed from a labor intensive mechanical process to an automated environment. The man-hours and material savings, combined with the elimination of unneeded data, were sevenfold. New and better ways to accomplish old tasks should be a cornerstone in the search for quality improvement.

The manpower realignment had the greatest impact on the huge backlog of outdated information. The majority of personnel had a considerable amount of unproductive time remaining after completing their primary duties. To maximize efficiency, management agreed to spread the work among additional analysts with no impact on the primary mission. We went from an average of six analysts to around 40 working part-time on the project. The quality improvement aspects that need highlighting are twofold. First, keep an open mind about not only the processes involved, but also keep in mind who and how many are necessary to accomplish the tasks. Second, actual day to day tasks can be mind numbing in its repetition and detail. By spreading out the work among many, no one person

spends all day on such a tedious project. The outcome is a drastic drop in quality control problems and an increase in morale among those previously assigned to that task.

For the first time, the work center opened lines of communication with current and potential customers. The needs and requirements of users within STRATCOM and outside the Command adjust as the global situation changes. Customer feedback is a key element of maintaining a quality product produced with minimum effort and maximum effect.

CONCLUSIONS

We found that a successful quality improvement and customer oriented project using TQM principles can achieve surprising success in a military environment, but the very nature of the bureaucracy demands certain sensitivities to military organizational traditions. The command structure often cited for inhabiting change and innovation at the lower levels. TQM awareness at the top eases the application of quality principles at the bottom. The very concept of "breaking the walls between top and bottom" applies if each end of the command structure is working hand-in-hand with the other.

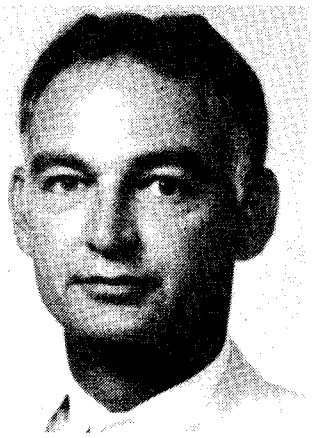
Forming the Process Action Team from all aspects of production and support is another key factor in allowing new ideas to be tested and accepted by the organization. The problems encountered by a slightly larger team is a small price to pay for having key personnel from each of these areas 'on board'.

Set team meeting norms and stick with them. Time wasted in ineffective meetings compounds when translated into time wasted in improving a process. A highly trained facilitator is the best way to ensure everyone remains focused on the task at hand.

TQM isn't the answer to all of an organization's ills, but our experience shows that there are very real savings and improvements revealed by training your personnel to look at the mission from a quality and customer perspective.

Bottom Line: Taking care of your people, giving them meaningful work to do, and furnishing them the tools to do their job, facilitates the mission. **TOTAL QUALITY MANAGEMENT** in its entirety can provide these things.

COMMON SENSE METRICS FOR STAFF



Titian Titzman

The new decade of the 90's started with the Air Force, our command, and our organization teaching Total Quality Management (TQM) to every employee. As our organization started its quality journey, we quickly connected with the Air Force vision, goals and objectives. As we developed our strategic and business plans we noted that the basis for such planning is good metrics. Metrics, the basis for measuring improvements which allow us to take action on our activities, proved to be very elusive.

Reviewing the Air Force quality principles, highlighted our need to include some key elements; Our customer's perspective is crucial to successful implementation of goals, objectives, and metrics. If your customer doesn't agree with these elements, your organization is missing the target. Empowerment of employees and teamwork are the elements which make the process work. Without employees ideas and support, any plan is destined to failure. Measurement is a important gauge of your progress and validates your continued process improvements. What gets measured gets empowered, and produced. Last, and probably the most important element, is to continually improve upon the process.

Defining metrics for our organization was harder than we first envisioned. Some of our confusion came from command metrics as defined in our AFMC regulations. Our organization was providing command metrics on some programs and supported center metrics for local process improvement efforts. We finally settled on our own branch metrics which support the center, command, and Air Force goals. Our branch goals had been previously identified and linked directly to the command and Air Force goals. Now our metric would help us determine how well we were supporting those goals .

The Metrics Handbook provided several attributes which make up a good metric. Here's a list of the key attributes:

1) Must drive the appropriate action.
2) Accepted as meaningful by the customer.
3) Tells how well you are meeting organizational goals and objectives through your processes and task.
4) Simple, understandable, logical, and repeatable.
5) Shows a trend.
6) Unambiguously defined.
7) Data economical to collect.
8) Must be timely.

This information was invaluable in helping use focus on those attributes which are necessary for good metrics.

Next, we discussed which measurements would best reflect what we, as a Branch, do. This dilemma caused us

to reflect on exactly what it is we do. With over twenty specialized system/program managers/OPRs in the same Branch this quickly became confusing. Each in their own right, supported the goals - some more directly than others. Some members had no direct contact with our customers, but supported those who did. Clerical staff is a case in point. Yet, we all supported the goals as a single organization, a Branch, yes as a TEAM!

We used the nominal group technique to outline, clarify, and list what we do. The technique provides four basic steps which enabled us to democratically agree the key results areas. These steps include:

1) Silent idea generation, given a task statement.
2) Round robin listing of individual ideas generated.
3) Clarification and combination by mutual agreement.
4) Voting and ranking of important items resulting in a consensus.

Using this technique we quickly agreed on what we do, and the order or precedence for each key area. We used generic terminology so everyone in our organization could relate to the tasks they were performing. Not every person performs every task, but our comprehensive list covers what everyone within our organization does. This was then validated with all personnel assigned to the branch.

The single focus for an organization with multifaceted programs and systems was identification of our "value adding" activities. The **Performance Measures Track System** booklet provided the focus we needed. Inputs from our customers were processed by us adding value and producing an output (see attachment 1). Every organization today has this simple process made more difficult with constraints. We identified our major constraints as : funds, time, personnel shortages, and knowledge. Despite these factors we interface daily with our internal and external customers. At the conclusion of this effort, we created our own list of definitions in order to standardize our meaning internally. This is another important step for insuring accurate and consistent measurements.

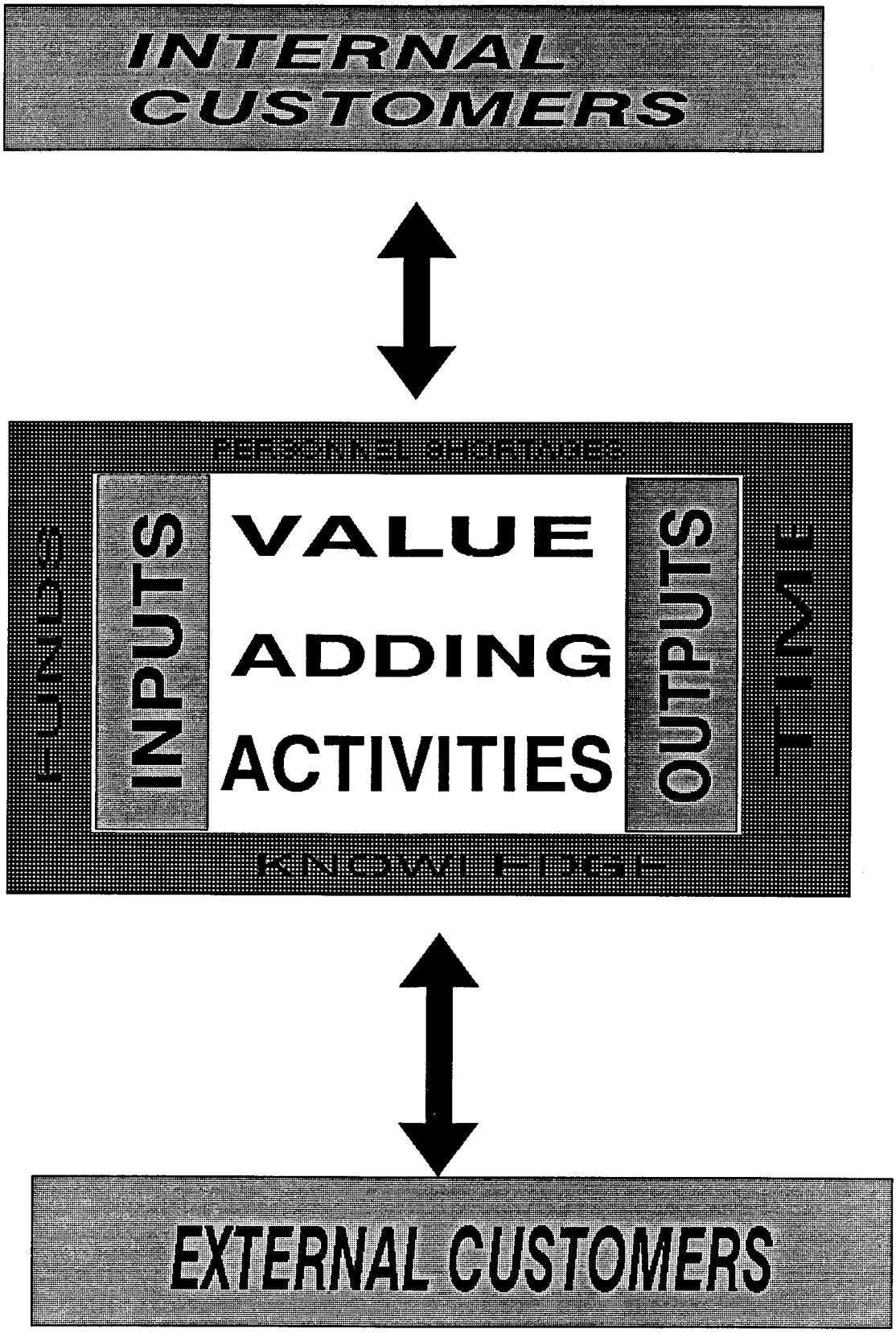
Having made all these decisions about who we are and what it is we do, we created a survey worksheet to track our key activities. (see attachment 2) This worksheet is completed monthly in order to gather data on our accomplishments as a branch. Each member completes their worksheet, and we then roll up the data to plot our results as a team. We made "enhancements" to this process/worksheet in Mar 93, and also lost several personnel to manpower re-alignments. Since its beginning in Jan 93, we now believe the process is stable enough to begin making improvements to our key results areas.

Reviewing the efficiency and effectiveness charts

(attachments 3 & 4) show how our activities "stack up" and trend lines. As you can see, our efficiency is beginning to smooth out as we overcome our learning curve and manpower reductions. Our efficiency is the ratio of outputs generated to labor hours consumed. In contrast, our effectiveness has been fairly stable and continues to improve. Effectiveness is the ratio of successful events or accomplishments determined by each individuals as a percentage of each value adding activity performed. The pareto charts (attachment 5 & 6) clearly indicate which activities take the most time to accomplish.

In trying to assess what key area to improve, we decided to survey both our internal and external customers. We intend to outline our program to them first, and then let our customers place our key result area in the order which they feel is most important. By so doing, we believe improvements made will reflect what our customers consider the most important. At the time of this writing, our customer survey has yet to be accomplished.

Our approach to staff metrics has been touted by some as being very creative and unique. Management has supported this initiative from the beginning, offering their continued support and guidance as we develop and improve our branch. We see this as just a basic common sense approach to metrics.



Attachment 1

FMIP

SURVEY WORKSHEET

Date:				Employee#	
Activity	Quantity	Hours	Effectiveness	%Internal	%External
GUIDANCE					
Regulations					
Supplements					
FMOI's					
Policy Letters					
Email					
Phone					
Sub-Totals					
IMPROVEMENT EFFORTS					
Analysis/Queries/Testing					
Meetings					
(Tiger, Team, Review, Branch, etc)					
System DR's/CSRD's					
PAT's					
TDY's					
Briefings					
Suggestions					
Sub-totals					
CUSTOMER SUPPORT					
Calls/Visits					
Problem Analysis					
Phone calls, letters requesting assistance on hard/software etc.					
Data Input/Output					
Data Query (products)					
Email					
Sub-totals					
COMMUNITY RELATIONS		*Not Ranked*			
Mentoring					
Ethnic Recognition					
Funds Drives (all)					
Sub-Totals					
CUSTOMER TRAINING					
Initial Training					
Refresher Training					
Training Media Includes:					
Deskside/OJT ,Correspondence (booklets), Briefings, Computer Assisted					
Classroom, Email, News (letters, articles, bulletins), Phone, Etc.					
Sub-Totals					

ATTACHMENT 2

FMIP

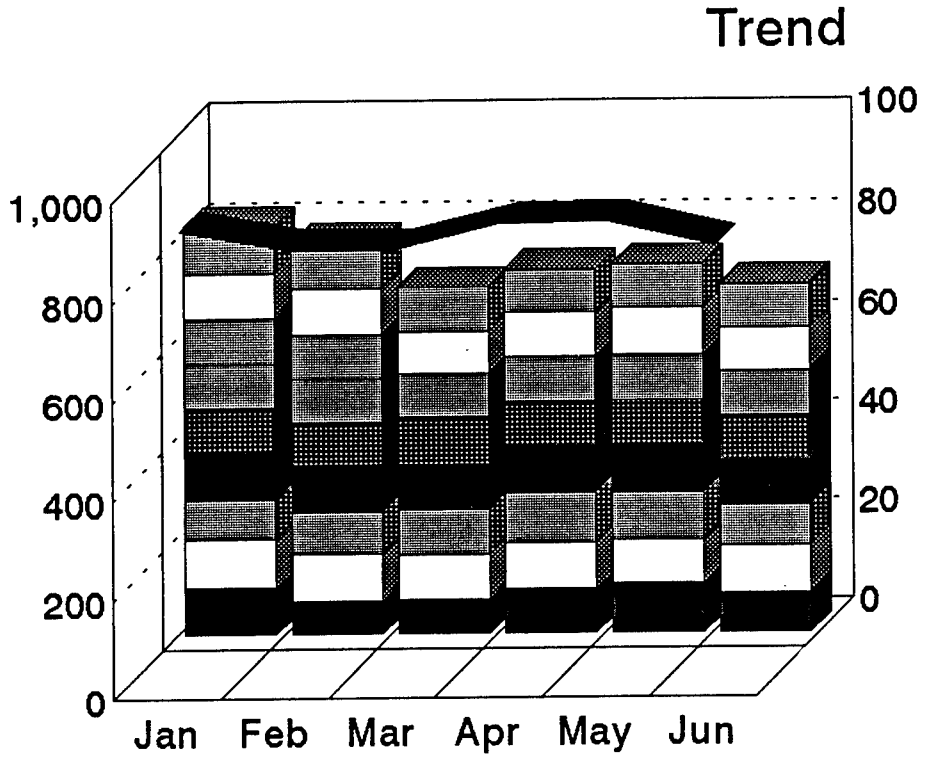
SURVEY WORKSHEET

Activity	Quantity	Hours	Effectiveness	%Internal	%External
ADMINISTRATIVE					
Suspenses					
Correspondence (all)					
Mail Distribution					
IG/GAO Visits					
Metric Measurements					
Time & Attendance					
E-Mail					
Briefing Preparations					
REET Team					
Monitoring Training					
Sub-Totals					
PERSONAL DEVELOPMENT					
Training					
Professional Memberships					
Participation - Includes: KMA, FMA, Toastmasters, Etc.					
Team Building					
Sub-Totals					
SYSTEMS DESIGN & DEVELOPMENT					
Workshop/TDY					
Product Review/SOW/Etc					
Testing					
VTCN/Local Meetings					
Briefings/Trip Reports					
Letters					
Suggestions					
CSRD's/DR's					
Sub-totals					
OTHER					
(Please List)					
Sub-Totals					
LEAVE					
Annual					
Sick					
Military					
LWOP					
Sub-Totals					
Activity	Quantity	Hours	Effectivenss	%Internal	%External
OVERALL TOTALS					

ATTACHMENT 2

Branch Effectiveness

CY 93



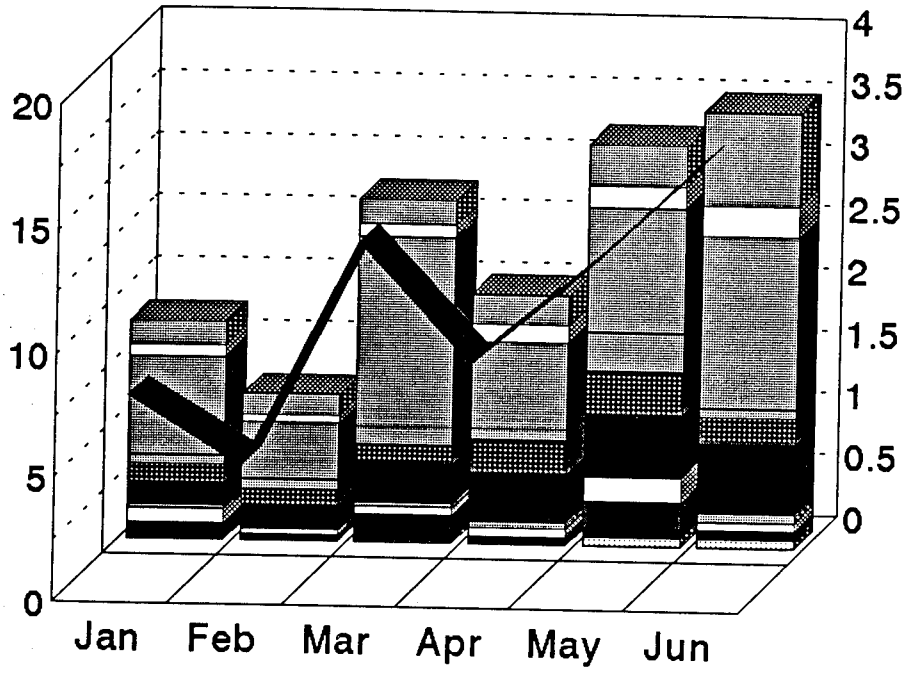
Guidance	92.86	90.86	88.13	86.38	86.92	89
Improvement Efforts	89.9	90.86	84.95	89.17	94.56	86.9
Customer Support	94.22	89.4	89.6	90.66	92.18	91.1
Community Relations	90	90	0	0	0	0
Customer Training	90	85	94.5	91.25	91.25	91.25
Administrative	93	94	92.43	94.17	95.5	87.62
Personal Development	80	86.7	90	100	95	83.3
System D&D	98	94	90.5	93.18	88.54	95.1
Other	95	67.5	70	90	100	80
Leave	0	0	0	0	0	0
AVG effectiveness	91.45	87.62	87.51	92.76	92.99	88.03

Attachment 3

Branch Efficiency

CY 93

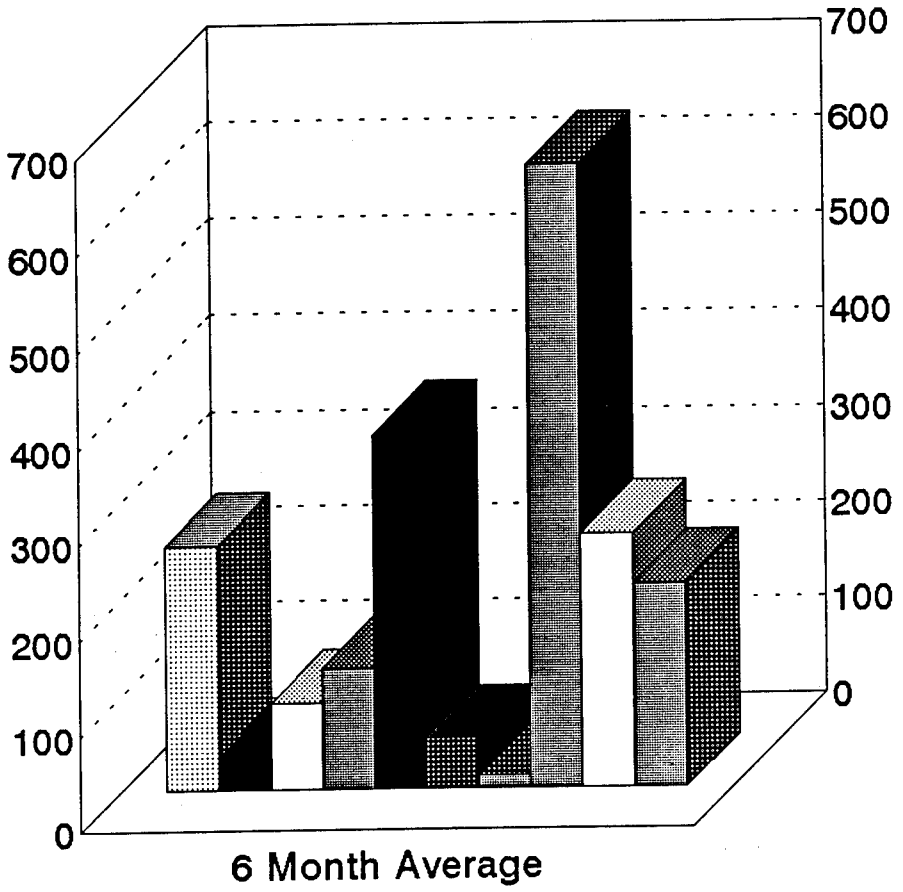
Trend



	Jan	Feb	Mar	Apr	May	Jun
Guidance	0.92	0.85	1	1.19	1.66	3.76
Improvement Efforts	0.48	0.32	0.51	0.73	0.837	1.22
Customer Support	4	2.28	7.63	3.5	5.06	6.94
Community Relations	0.36	0.44	0.71	0.46	1.5	0.33
Customer Training	0.736	0.59	0.78	1.29	1.79	1.1
Administrative	0.919	0.94	1.62	1.98	2.48	2.82
Personal Development	0.15	0.07	0.15	0.25	0.06	0.347
System D&D	0.55	0.17	0.27	0.34	0.967	0.33
Other	0.6	0.22	1.04	0.25	1.45	0.33
Leave	0.08	0.06	0.12	0.09	0.37	0.38
AVG Efficiency	1.56	1	2.81	1.85	2.62	3.48

Attachment 4

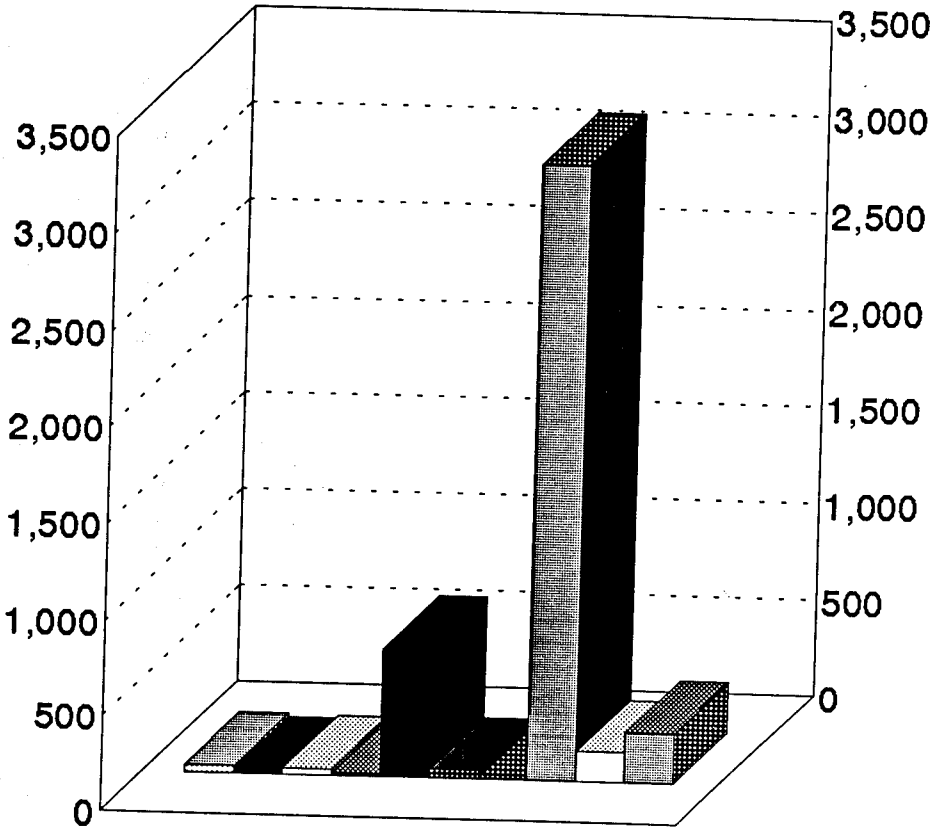
Pareto Analysis of Hours



Leave	256.7
Other	35.8
System D&D	91.1
Personal Development	127.3
Administrative	371.8
Customer Training	53.3
Community Relations	13.28
Customer Support	648.95
Improvement Efforts	265.6
Guidance	213

Attachment 5

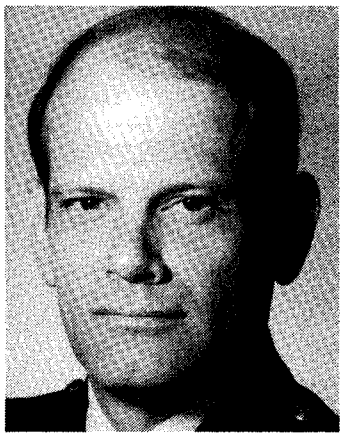
Pareto Analysis of Activities



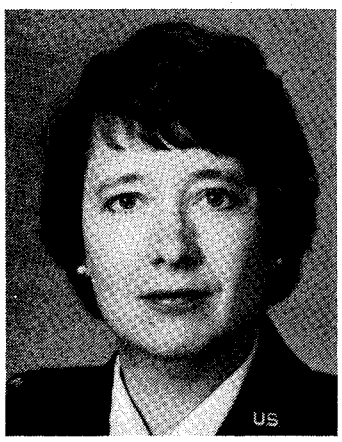
Leave	43
Other	23.5
System D&D	36.5
Personal Development	18.3
Administrative	679.3
Customer Training	47
Community Relations	6.6
Customer Support	3,202
Improvement Efforts	157.6
Guidance	268.6

Attachment 6

QUESTIONS FOR SENIOR LEADERS TO ASK ABOUT QUALITY AIR FORCE (QAF) METRICS AND TOOLS



Lt Col David Walker



Lt Col Donna Herge

Maj Paul Grunzke

Questions for Senior Leaders to Ask

About Quality Air Force (QAF) Metrics and Tools

Lt Col David C. Walker, Lt Col Donna C. Herge

and Major Paul M. Grunzke

Air University, Maxwell AFB, AL

Background

Metrics and the associated QAF tools help senior leaders employ the QAF principle of "management by fact" instead of guesswork. A metric is a "measurement, taken over time, that communicates vital information about a process or activity." (*Quality Air Force Glossary,* 1993) The QAF uses metrics to: measure process output against valid customer requirements, measure improvement from a baseline, gauge progress toward reaching goals and objectives, identify improvement opportunities, and provide data to make informed decisions. How then do senior leaders determine if a metric is really doing the job? How do they know if a metric is communicating vital information or if it is even necessary? This paper gives senior leaders some insights to these and other questions about metrics. These insights take the form of questions to ask about metrics that will help determine their reliability and validity. Virtually all of the attributes of a good metric are either reliability or validity issues so we start by briefly explaining these two terms.

Reliability addresses the accuracy or precision of the measurement. Is the measurement used to evaluate the system or process consistent and predictable? ***Reliability means measuring things right***. This does not mean that what is being measured will not vary. A good example we can all relate to is an intelligence test (such as the venerable IQ test). Assuming intelligence is a stable phenomenon, a highly reliable intelligence test would produce test scores with little or no variation across repeated administrations to the same individual. Scores for different individuals would, of course, vary. Although reliability is critical, the validity of a metric is even a more fundamental question.

Validity determines if the measure correctly evaluates what it is designed to measure. This may seem simple on the surface but can be really challenging. For example, do appraisal systems (these are certainly measures) consistently lead to promotion of the "right" people? ***Validity means measuring the right things.*** The relationship between reliability and validity is straightforward. A perfectly reliable measure can be invalid. In such a case you are doing a great job of measuring something that is unimportant or even worse, totally irrelevant to the process. This relationship is a key consideration and again, is not as easy as it might appear. The Federal Express experience helps illustrate this point. For years, this highly successful quality company (1990 Baldrige Award Winner) used percentage of on-time delivery of packages as the primary indicator of performance and customer satisfaction. Their measurement system was very accurate. However, "by the late 1980's, Federal Express officials began to recognize that percentage of on-time delivery was, in reality, an internal or introspective measure of customer

satisfaction using the company's own standards, not an external measure of customer satisfaction using the customers' standards" (*Blueprint for Service Quality: The Federal Express Approach*, 1991, p. 52). In this case Federal Express was using a reliable but invalid measure of customer satisfaction. They now use a system of 12 Service Quality Indicators (SQIs), each weighted according to impact on the customer. The indicators are determined by the customers and measure process failures. They have allowed the company to successfully focus on reducing the principle causes of customer dissatisfaction. Clearly, metrics must be both reliable and valid to be useful to senior leadership.

According to *The Metrics Handbook* (1991), a metrics package consists of three elements to include the operational definition, the actual measurement and recording of data, and the presentation (the descriptor and graphical presentation). The graphic presentation usually consists of a "picture" of one of the basic tools of quality. Senior leaders should understand what a metrics package is and how reliability and validity issues fit into development of a metrics package. Thus, we now address specific questions to consider when evaluating metrics. Reliability and validity issues are interrelated and both apply, in part, to all questions.

Questions Related to Metrics (Measures)

1. Do your metrics look at the organization through the "eyes of the customer?" Never forget that the customer is the organization's reason for existence. Your metrics should reflect this quality principle. For example, what do your personnel want from the morale, welfare, and recreation (MWR) facilities, the child care center, the hospital? Do you have the capability to meet their requests? What do your customers say are your deficiencies or failings? Metrics that highlight the specific reasons customers are not happy with a process or product can guide an organization to improvement efforts that directly target customer requirements. *The key is to actively involve your customers in the process of developing your metrics.*

2. Is the metric tied to organizational goals and does it drive appropriate actions? Metrics should help you gauge whether or not an organization is moving toward achieving its goals and lead to improvement efforts that contribute to attaining the goals. No magic formulas ensure that your metrics are good gauges. As you look at a metric, ask yourself and your people how it relates to the goals. If nobody can identify a direct or indirect connection, the metric is probably off-target.

3. Are appropriate sampling techniques used and enough data collected to produce meaningful metrics? For example, the base legal office may measure customer satisfaction based on voluntary responses on cards from a self-service box at the check-in counter. Is this sampling technique satisfactory, or will the lawyers tend to get a response only from those extremely happy or unhappy? What about customers in a hurry who do not take the time to respond? What about people who never come to the base legal office because of a bad experience during a previous visit?

4. Do you have a clear, understandable operational definition of the metric? (Deming, 1986) The operational definition is all the basic information on the metric. Make sure operational

definitions cover a description of what is being measured, how often it will be measured, the source of the data, the customer, the process owner, the desired outcome or trend you are looking for, and how the metric relates to organizational goals. If your metric addresses all of these points in plain language, it should pass the clarity test. Is this definition available for all who have access to the metric and is the operational definition visible on the metric display device?

5. If reviewing metrics aggregated from different sources, are you considering the pitfalls? If you are aggregating information from a number of subordinate units or bases into consolidated charts, are all the organizations using the same operational definition and measurement techniques? For example, ten bases may be measuring customer waiting times at the hospital pharmacy, but all may have a different way to quantify waiting time. How are you using consolidated metric data from subordinate units or bases? The temptation is to compare or rate the bases or units as we have always done in the Air Force. This kind of unit by unit comparison is still valid and can help to focus improvement efforts on those units that may have unique problems or need extra assistance in improving their processes. Comparison metrics can also identify benchmark units to serve as positive examples for others to follow. However, your metrics should go well beyond just comparing units. For example, if you have a metric that stratifies not-mission-capable rates for aircraft by base, you should identify the specific reasons (command-wide) why aircraft are not-mission-capable. This second stratification may identify reasons, that, if addressed, could improve the not-mission-capable rate at every unit! Further, you should look at the overall trends the metric is displaying. Is the metric increasing, relatively constant, or decreasing?

6. What metric displays and information are appropriate to each level of leadership? Do you need to review this metric at your level, or could it be pushed down to a lower level? It is easy to incrementally get bogged down in the details of organizational operations and review more metrics than you should. A metric should help you make decisions and drive appropriate actions (Weaver, 1992). Trust and empowerment of your people tie in directly with organizational metrics. Let your mid-level leaders review and act on as many metrics as they can. Keep what you see to an absolute minimum. Conversely, is this a metric that would be useful for those above you to review? Ask yourself if the metrics you see might be useful in part to your superiors. Few are likely to fall in this category unless your boss is a master micro manager.

7. Are you carefully examining metrics to make sure they will not drive unexpected, and often undesirable, behaviors? For example, if you focus only on how fast travel vouchers are processed, the number of mistakes on vouchers may go up. If your service club metrics focus on profit, customer satisfaction may become a secondary consideration. If base transportation establishes a goal to fully load trucks before making deliveries to save fuel, delivery times to customers may suffer. If your wing metrics focus on takeoff times, air crews may rush through pre-takeoff checklists jeopardizing safety. Establishing "check and balance" metrics can help prevent optimization of one aspect of a process at the expense of another.

8. Have you carefully considered the pitfalls associated with numerical goals and metrics? Are you asking where these goals came from or how they were derived? Are they based on a valid customer requirement? You might find that nobody knows where a goal came from or that it is purely arbitrary. Is the goal set at the ideal value the organization is trying to attain and not just

an easy to reach target? If the goal value is set lower than the desired value, people will be satisfied with just attaining the goal and not continuously improving. Starting with a relatively low goal and constantly moving it just out of reach is discouraging to people as well. Seriously consider setting goals at 100% unless there is a good reason not to do so. What action will you take if a goal is not met? It should be clear to those around you that you will not use this data to blame and punish; instead make it clear that the system, of which the people are a part, will be reviewed for ways to improve. "However, since goals do not provide a means to improve the system they can easily lead to the distortion of both the data and the system itself." (Wheeler, 1992, p. 295).

9. Are you evaluating externally imposed metrics? If they are unreasonable, in light of the above questions, are you challenging the requirement? There will always be some externally imposed metrics that you will have to accept, but a determined and well-supported argument may get an unreasonable requirement dropped or changed. You can initiate the effort to play catchball with the requestor of the metric to arrive at a really useful measure.

Summary Questions on Metric Development

1. Do you allow metric development to be an evolutionary process and are you being patient with those involved? This question is perhaps the most important if your organization is developing metrics for the first time. People will probably begin with too many metrics and are likely to measure the wrong things. They are likely to repackage many of the measurements they have always done without a hard look to see if they are really meaningful. They will cling to traditional measures because it easy and within their comfort zone. Let them try, and let them make mistakes. Keep asking the probing questions about their metrics to get them to think and rethink about what they are measuring. "A good measurement system should include the following types of measures: Customer satisfaction, quality of product/service measures, process measures, financial measures, employees satisfaction measures." (Brown, 1993, p. 82)

2. Are you asking someone from outside your organization to give your metrics a sanity check? Sometimes a review by someone unfamiliar with the processes can reveal useful insights and identify oversights.

3. Finally, are you doing too much measuring? It is easy to fall victim to the myth that "the one who dies with the most charts wins." (Townsend, 1993, p. 1) Measurement in and of itself is a non-value added activity. Make sure you do not measure any more than absolutely necessary to monitor and improve your system.

Questions to Ask About Specific Tools

You will have come a long way once your overall metrics' system is running smoothly and you are satisfied they effectively measure progress toward your goals and objectives. Even then, there are still some questions to keep handy when looking at specific tools presented during team briefings. The tools most commonly used for this purpose are Pareto charts, scatter diagrams, histograms, run charts and control charts (*Federal Quality Institute*, 1991) These questions are for both

senior leaders and teams to consider. Additional information on these tools can be found in the *Air Force Process Improvement Guide* (1993).

PARETO CHARTS:

1. Has the team constructed "nested" (secondary) Pareto charts to give more insight into specific areas where corrective action may be focused? For example a team might show you a Pareto chart that identifies late crew arrival as the primary reason for aircraft delays. You might ask the team to collect more data on why crews were arriving late and show this "secondary information" on another Pareto chart.

2. Has the team considered stratification analysis if a Pareto chart does not clearly identify one or two significant problem areas? Stratification analysis means looking at the same data from different perspectives. In the example above, the team examining aircraft delays may look at late crew arrivals by unit, by time of day, days of the week, characteristics (rank, time in service, training, etc.) of late crew members, or other variables to see if one factor may emerge from the data and lead directly to improvement in the process.

3. Has the team analyzed problem areas identified on a Pareto chart to be sure those that occur most frequently are really the most important to give high priority to improving? A problem that occurs much less frequently than others may account for most of the cost. Consider doing a "cost Pareto" if cost is a key problem associated with the process. Make sure the data shown on the Pareto chart drives the correct action. For example a team from base transportation might use a Pareto chart to show you the number of defects found in a fleet of trucks. They might identify 100 body dents, 30 upholstery rips, 10 bad wiper blades, and 7 defective engines. Although the 7 defective engines are the smallest problem numerically, from a mission standpoint, the engines should be repaired first. The point is to match the metric to the critical aspects of the process.

SCATTER DIAGRAMS:

1. When two of the variables are correlated, are you careful not to assume a cause and effect relationship without further investigation and verification?

2. Do you recognize that if a scatter diagram shows a pattern of some kind there may be a relationship between two variables? Some patterns, such as positive or negative linear relationships are fairly easy to interpret. However, there are many other complex patterns that could indicate a correlation that may not be so easy to understand. Remember, that if a pattern exists, the data requires further analysis.

HISTOGRAMS:

Are you familiar with the principal data patterns (distributions) that could appear on a histogram and what they are saying about the process? Patterns that approximate a bell-shaped curve are commonly observed, but there are many others, and not all deviations from the "normal" curve are abnormal or bad. Understanding histogram patterns can tell a senior leader many things. Certain

patterns point to measurement or data transcription errors, inappropriate data collection methods, data grouping errors, or data rounding bias. Patterns will also point to the variability in a process and quickly tell you whether or not the process is capable of meeting customer requirements. Take the time to study histograms and what they can tell you!

RUN CHARTS:

1. Are you careful not to overreact to "variation" on run charts? Since a run chart has no control limits, what appears to be abnormal variation may be normal and inherent in the process.

2. If a numerical goal is part of the chart, is it appropriate without knowing whether the process is capable of meeting customer requirements?

3. Has the team considered using a control chart if the answers to the first two questions are not clear?

CONTROL CHARTS:

1. Is the team using the right kind of control chart for the data presented? If in doubt, an XmR chart is the most acceptable control chart for any kind of data. (Greer & Halteman, 1993)

2. Do the patterns on the control charts indicate the presence of special causes of variation? If so, have actions been taken to understand how the variation occurred?

3. When was the last time control limits were recomputed? They should be recomputed whenever there is a significant change in the process.

4. When variable data (for example, length, weight, time) are charted, are both the charts for central tendency and variability presented? When looking at control charts for variable data you should always see two charts. Control charts for attribute data (for example, yes/no, go/no-go, on/off) always appear alone.

Summary

Senior leaders must be able to stand back and critically look at an organization's entire array of metrics from the systems perspective. Developing a good metrics system for an organization is anything but easy. It is an evolutionary process and the final responsibility for a valid metrics system falls directly on the shoulders of an organization's senior leadership.

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METRICS - MEASURING PROGRESS

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Metrics - Measuring Progress

by

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At a recent conference, with more than 800 quality professionals in attendance, the breakout sessions dealing with measurement consistently drew standing-room-only crowds. This is not unusual. Whichever workshop I attend, the greatest misunderstandings and the most requested information seem to center on the measurement issue.

How one *measures* a process is not the problem. Measuring progress toward achieving organizational goals and objectives is the concern of most of my peers in the federal sector. Unfortunately, everyone is looking for a simple formula and/or a defined list of measurements that can be quickly adapted to their individual situation.

While a simple formula and/or the list of common measures do not exist, I have used a step-by-step methodology for arriving at a comprehensive measurement system. The process described below is a compilation of the ideas I picked up in texts and lectures over the past year. It makes extensive use of Carl Thor's "Family of Measures" and follows the general guidelines of strategic planning described in Thomas H. Berry's *Managing the Total Quality Transformation*. The system was also partly inspired by the metric hierarchy developed by the US Air Force Mobility Command (formerly Military Airlift Command).

The Measurement Process Flowchart

Although the measurement system described herein was clear in my mind, articulating it to my corporate leadership, while in the throes of cultural change, was extremely frustrating (for them as well as myself). It wasn't until I presented the information in flow chart format (Figure 1), that it began to make sense.

The following describes the process, how it works, and how it can be used by any organization. Please be aware that some of the terminology and quality definitions used might differ from yours. However, the intended meaning should be apparent. Once clarified. the flow chart will be able to stand alone as a principal tool for the reader.

The Importance of Strategic Planning

The obvious starting point in the process is the definition of the organization's vision. For the Air Force, this was defined by the Secretary and Chief of Staff of the Air Force in conjunction with the Air Force's Quality Council. Even with an already defined vision, our command had to develop a mission (purpose) statement that had to be extensively worked by the upper echelon of management. To be useful, the mission statement required a synopsis of how we intended to satisfy customer requirements for the next five to eight years. It also needed to focus on why the organization exists, what it does, and who the people are that make it happen.

Using this information, the senior leadership, with customer input, prioritized the key work processes and identified the critical success factors they thought needed to be done extremely well for the command to carry out its mission. By analyzing how well we did these processes, particularly in relation to their importance in meeting customer requirements and achieving the vision of the organization, the senior leadership was well prepared to focus on near-term goals and objectives.

Once this capability analysis was completed, two quality management tools (affinity and tree diagrams) were used to facilitate senior leader agreement on five major goals for the organization. For each goal, they identified a limited number of objectives determined to be the most important drivers of goal accomplishment. The goals and objectives were then given to a cross-functional team for further refinement.

This team fine-tuned the wording, consolidated thoughts where possible, and deliberated on how to best communicate the goals so they would have the most meaning for the largest number of people in the organization. The final product of that effort (see Figure 2) was subsequently approved by the commander and senior managers before publication.

Senior Leadership Sets Direction

With the exception of the Air Force Vision and the fine-tuning of the goals and objectives, everything described to this point was the responsibility of the organization's senior leadership. In this command, the senior leaders meet quarterly for two or three days in a VISTA conference. VISTA is chaired by the commander, a two-star general. The voting members are the five departmental (functional) directors from the headquarters, four operational center commanders, and four (theater) commanders from around the world.

The members of VISTA consist of the major stakeholders in the command and are the decision makers at the top of key staff and line functions. I only mention VISTA to familiarize readers with our quality organization structure and how the strategic planning process works. In addition to setting the command's quality direction, it is the responsibility of the members of VISTA to chair their own quality councils, applying the same guidelines and planning process as they follow the VISTA lead. In this way, quality councils and objectives cascade all the way from VISTA to the smallest unit.

Since the purpose of this article is to detail a corporate measurement system, no further discussion on the initial goal development process is presented. However, the reader should understand that arriving at the corporate goals and objectives took many weeks of hard work.

Goals and Objectives Assigned to Teams

Because VISTA only meets quarterly due to geographical constraints, members nominated teams to work the next part of the process. The headquarters quality council (departmental staff directors chaired by the commander) took over the measurement system oversight role. This was appropriate because the team members were all from the major staff departments at the headquarters.

Not surprisingly, this is where the process slowed down. Initially, each team attempted to independently pursue its assigned goal, instead of trying to use the synergy of group effort. Despite numerous meetings and briefings to clarify tasks and desired outcomes, teams had difficulty developing and in some cases even visualizing

measurements for the stated objectives. There were comments such as: "These objectives cannot be measured," "We need to redo the objectives so they are processes," and "We need to redefine objectives around existing measures." Fortunately, I was able to use the measurement process flow chart to help people see the big picture and understand their role in putting together the menu for improvement.

The team's initial task was to find the right mix of members for the objectives being analyzed. In many cases, outside expertise was needed and representation from the appropriate staff agency had to be solicited. This was an important consideration. Having the proper cross-functional expertise from the outset of the project significantly decreased development time since all the processes being analyzed were understood by at least one member of the team.

Measures Are Found in the Processes That Drive the Objectives

The key step initially overlooked by every team was to identify and/or develop the process (or strategy) that supported the objectives we wanted to measure and the goals we wanted to achieve. Invariably, all the teams wanted to be able to say that the measures should simply come directly from the stated objective. Confusion reigned until everyone realized the objectives were sub-goals to make the goals come to reality and the processes to accomplish the objectives had to be determined and measured.

For some teams it turned out that a process (strategy) did not exist because the objective was futuristic; therefore, the process had to be created. Whether this was the case or existing processes could be found, the next step was to identify the process owner. If the process owner was on the team, work continued; but, if the process owner was not represented, the Quality Council tasked the owner to join the team.

Process Owners Nominate Appropriate Metrics

The rationale for involving process owners in determining proper measures was simple. While it is leadership's responsibility to guide the process selection and focus the corporate effort, leadership does not possess the expertise and intimate knowledge of processes that is held by those who work in them. Workers are in the best position to select the most meaningful measures of process capability and customer satisfaction. Additionally, when it is time to collect data, the information will flow bottom-up. As a result, the more involved process workers are in determining the data collection system, the more buy-in and likely success the organization will experience.

After teams flow charted the important steps of each process, it became possible to define the activities and the results desired from their accomplishment. To limit the measurement system, one or two meaningful metrics were developed for each of the objectives. Each metric had to convey enough vital information about the activity or result that leadership at every level of management would be compelled to take action to make improvements, if required. Another requirement was that the measurement process be simple so that the amount and complexity of effort required to gather data would be minimal.

Benchmark World-Class Organizations

At the outset, as part of the metric identification, each team was urged to benchmark to determine if similar processes and/or measures already existed. The reasons for this are self-explanatory: first, why reinvent the wheel if someone has already developed a good procedure?; and second, to use the efforts of others as a check for a

sense of direction as well as consistency of thought. The teams were asked to come up with results-oriented measures wherever possible. They were briefed that activity-based metrics are not as meaningful because they merely indicate something is happening. In some situations this might be very important. However, a better metric is one that tells management what and how well the something has impacted the results.

Because determining the measure(s) for each objective was the most difficult task of the teams, it was important to have those closest to the process flow chart the process and recommend the metric. After they identified the metric they were asked to flow chart the method for collecting the data and to subsequently develop a simple tool for use in the data gathering.

Returning to Figure 1, we see that the mission element team and/or the council has to accept, reject, and/or modify the suggested metric(s) and supporting tools. Since the process took place over a period of months, a number of changes could and did take place. Some council members wanted "instant pudding" and had a difficult time remaining patient. Over time, some processes were no longer considered important, and because continuous improvement is dynamic, more than one objective was removed from the senior leadership's original list.

The Family of Measures

With metrics identified for each mission element, the focus turned to articulating the final stage of the measurement process, developing the family of measures. In the beginning of this article, I mentioned the works of Carl Thor, formerly with the American Productivity & Quality Center and now with the Cumberland Group. The command's metric system was based on Thor's family of measures matrix. Because the organization identified five command goals, it required five families to measure the results. Figure 3 is a restatement of the first command goal--continuously improve AFIC capability to support Air Force operations and other customers. I will use this goal to illustrate how a family is linked together. For ease of understanding, only one of the objectives is used to illustrate the way in which the family of measures is created.

Define the Metric

As can be seen in Figure 3, there are four main objectives that should be accomplished for the goal to be realized. Taking this into consideration, the mission element team identified two or three key process measures that would best represent the degree of accomplishment of each objective. They then wrote a definition for each process measure so there would be a clear understanding of what the metric consisted of, exactly why it was selected, and how it should be interpreted. For example, Objective B of Goal 1 is to identify and understand customer requirements. The team recommended that the best process measures for this objective would be (1) the percentage of customers contacted; and, as a follow-on, (2) the percentage of contacted customers whose requirements were completely identified and acknowledged. The team's definition for the percentage of customers contacted is seen in Figure 4.

Tools for Gathering Data

Then, for each metric, the team put together a flow chart to illustrate how the data would be collected, and a collection tool to facilitate and standardize the collection process. Examples of these two instruments are provided at Figures 5 and 6.

How the Family is Structured

As identified in Figure 1, the final steps in this process call for the mission element team to send to the approving Quality Council (in this case VISTA) a suggested family of measures for each goal (see Figure 7). As shown, the family consists of the goal, its supporting objectives, process measures, and performance rating scales for each of the process measures. Within each goal, the objectives were weighted so that their sum total equals 1,000 points (100 percent times the scale of 10 as described below). In this example, the mission element team recommended that the four objectives of the first goal be weighted at 20, 30, 25 and 25 percent respectively; hence, the 200, 300, 250 and 250 points reflected in the example.

Establish Performance Scale For Each Metric

In Figure 7, we see under each objective the process measures that collectively tell senior management whether or not progress is being made toward achieving the overall goal. The numbers used on the scale of performance are the result of analysis by either the process owner or the mission element team. The scale ranges from a minimum acceptable level (1) to the maximum desired outcome (10) and, as logic would convey, all performance standards do not range from 0 to 100 percent. In fact, performance standards can be any range approved by the senior leaders and can be numbers of things instead of percentages. All processes, by definition, are not equally important (recall activity versus results data); therefore, the family of measures approach allows for the degree of accomplishment to be combined with the weight of importance.

Let's return to the process measure percentage of identified customers formally contacted. The following information can be deduced from the third column of Figure 7. The first number under the metric nomenclature is the actual performance ("Perf") for the reporting period, i.e. 30 percent of the units had formally contacted the customers. The 10 numbers directly below the performance factor constitute the scale approved by the leadership for evaluating the degree of process accomplishment. Unfortunately in this case, the senior leadership approved a minimum level of 44 percent and hence the 30 percent actual performance gained no points on the scale and yields a value of 0 for the measure. The picture is only slightly improved when we measure the percentage of customers whose total requirements are known. As can be seen in the fourth column, the 20 percent actual performance, when placed on the performance scale, extrapolates to a score of 1.3. The resulting score from the performance scale is then multiplied by the metricís weight to give the column its value, in this case, 26.

Index Number Gives Direction of Goal Achievement

In Figure 7 there are nine metrics supporting the four objectives of this goal. Just as each objective is weighted as a percentage of the entire goal, so are the metrics within and supporting a particular objective weighted. In this illustration, columns three and four (combined) measure the accomplishment of the second objective, and make up 30 percent of the total weight of the family. Since the metric in the fourth column (percent of customers whose total requirements are known) is results oriented, it was given twice the weight of the activity-oriented metric in column three. Nevertheless, the total of all weights under a particular objective will equal the importance of the objective to the goal; and the sum total of all weights of all the metrics within the family will always equal 100 percent. Therefore, if all nine processes being measured were achieving a maximum performance score of 10 points (perfect), the index at the bottom of Figure 7 would reflect the full 1,000 points (the summation of 10 times all the weights). The summation of all the recorded metric values results in the family's index.

The purpose of this article is not to explain a mathematical model, but rather to present a process that can be applied to any organization. Let me assure you that the family of measures, with very little training, can be understood and easily adapted to track progress towards any set of goals and objectives. The message I want to convey is that *your* organization can adopt this system. By combining the methodology of the strategic planning and measurement process outlined on these pages, with the synergy of teamwork, you can develop a meaningful and efficient metrics system.

The family of measures is a useful tool to vertically align an organization to focus on its most important processes. It will also help us identify and dedicate sufficient resources to generate continuous improvement and total customer satisfaction. As long as we keep internal and external customers as the prime motivation for what we do, the system detailed in this article will help us understand the "big picture" of why we promulgate goals, objectives, strategies, and measures. It will also assist us in maintaining constancy of purpose and ensure our existence as a viable organization.

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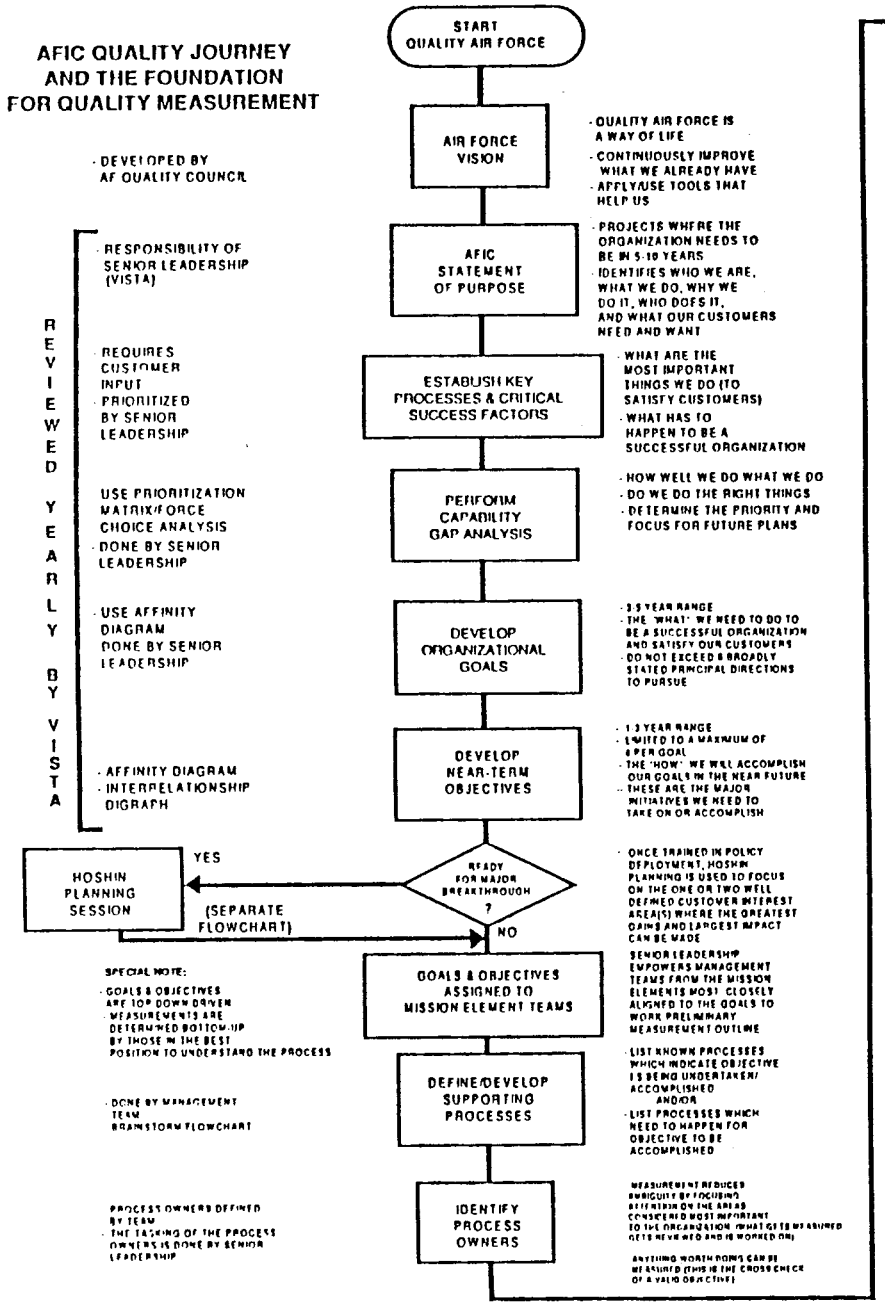
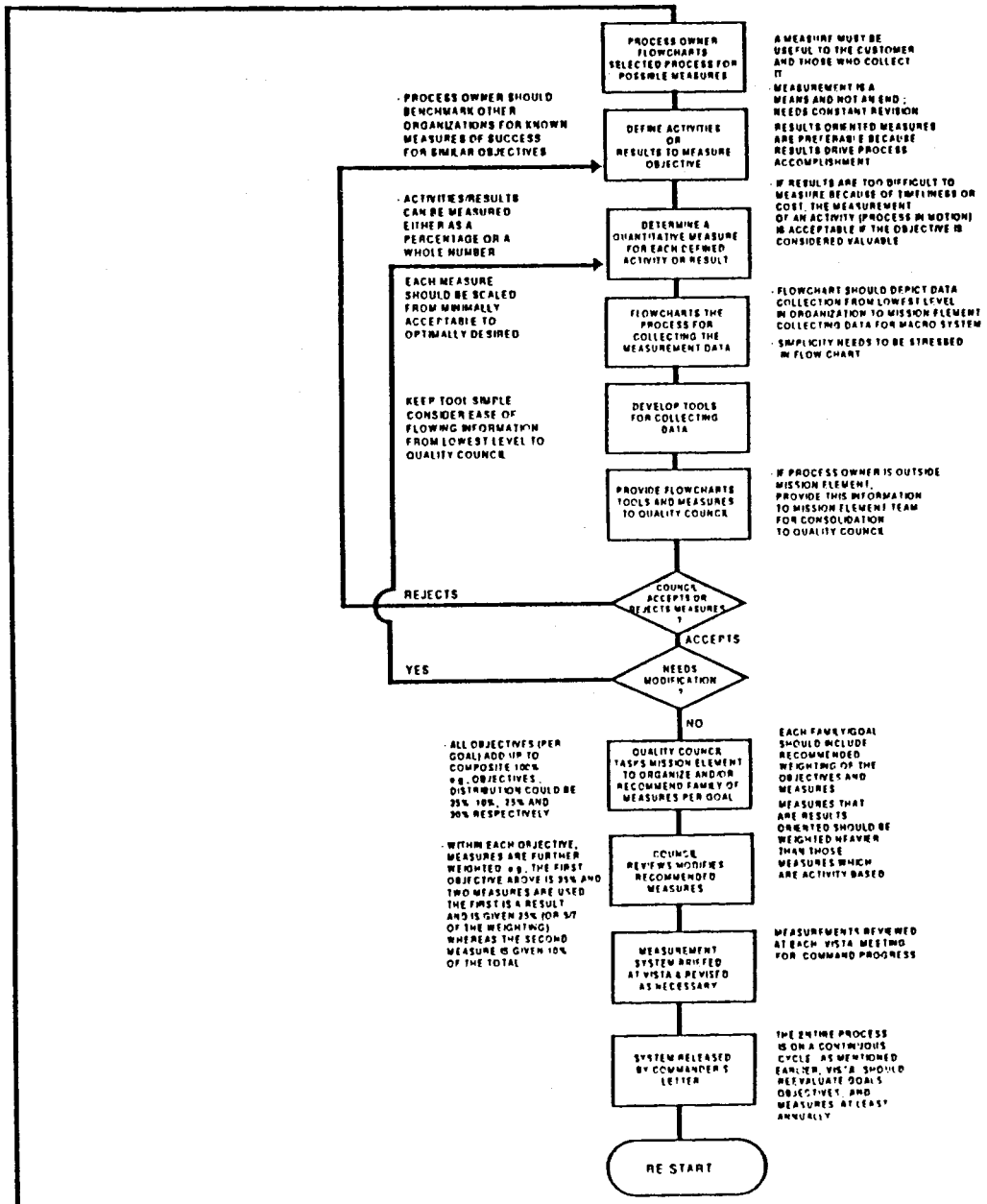
AFIC QUALITY JOURNEY AND THE FOUNDATION FOR QUALITY MEASUREMENT





AF Vision	Air Force people building the world's most respected air and space force -- Global power and reach for America				
AFIC Purpose	To provide the highest quality intelligence, security, and electronic combat products and services to global military and national customers through commitments to excellence and teamwork				
GOALS	CONTINUOUSLY IMPROVE AFIC CAPABILITY TO SUPPORT AF OPERATIONS AND OTHER CUSTOMERS	PROMOTE AWARENESS AND USE OF AFIC CAPABILITIES	CREATE AN EFFICIENT AND EFFECTIVE AFIC STRUCTURE ADAPTABLE TO CHANGING CUSTOMER NEEDS	PROVIDE AN ENVIRONMENT WHICH PROMOTES PROFESSIONAL EXCELLENCE AND AN IMPROVING QUALITY OF LIFE	ENSURE AFIC SYSTEMS KEEP PACE WITH EMERGING TECHNOLOGIES
OBJECTIVES	Identify internal and external customers	Ensure AFIC personnel thoroughly understand command missions	Provide one-stop shopping for AFIC services	Encourage individual professional development	Identify and integrate applicable new technologies
	Identify and understand customer requirements	Educate customers on command capabilities	Achieve efficiencies in AFIC processes	Ensure training and development programs meet our people's needs	Promote interoperability and standardization
	Ensure AFIC products and services are responsive to customer requirements		Simplify customer interface	Expand recognition programs to also focus on team contributions	
	Measure customer satisfaction and refine processes			Improve the quality of AFIC work and living facilities	

FIGURE 2

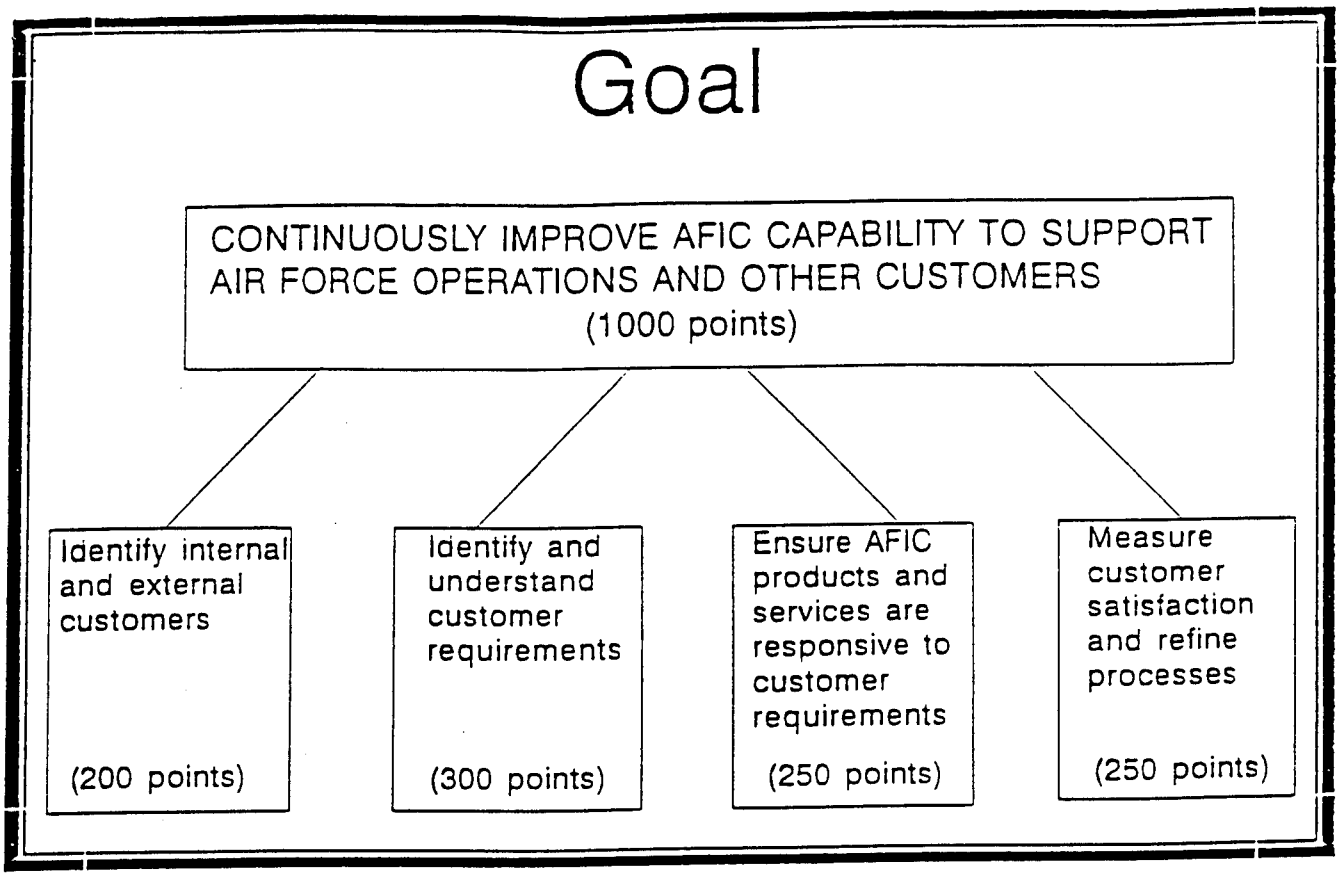


FIGURE 3

Definition of Goal 1, Objective B, Metric A

PERCENTAGE OF CUSTOMERS CONTACTED

METRIC TITLE: Percentage of Identified Customers Formally Contacted

DESCRIPTION: In conjunction with the identification of the internal and external customers from objective A of this goal, this metric will track and help ensure that all units within AFIC make initial contact with each of their customers and regularly perform quality followup visits to facilitate customer satisfaction by understanding customer requirements.

MEASUREMENT: The metric will be expressed as the percentage resulting from the total number of customers receiving quality visits divided by the total number of customers identified in objective A, referenced above.

DESIRED OUTCOME: By communicating with customers, units will be able to understand what the customer wants. With this information, they will be able to strategically plan and improve their processes/products. The ultimate goal of this measure is to drive increased customer satisfaction.

HQ AFIC PROCESS OWNER: AFIC/DOX

FIGURE 4

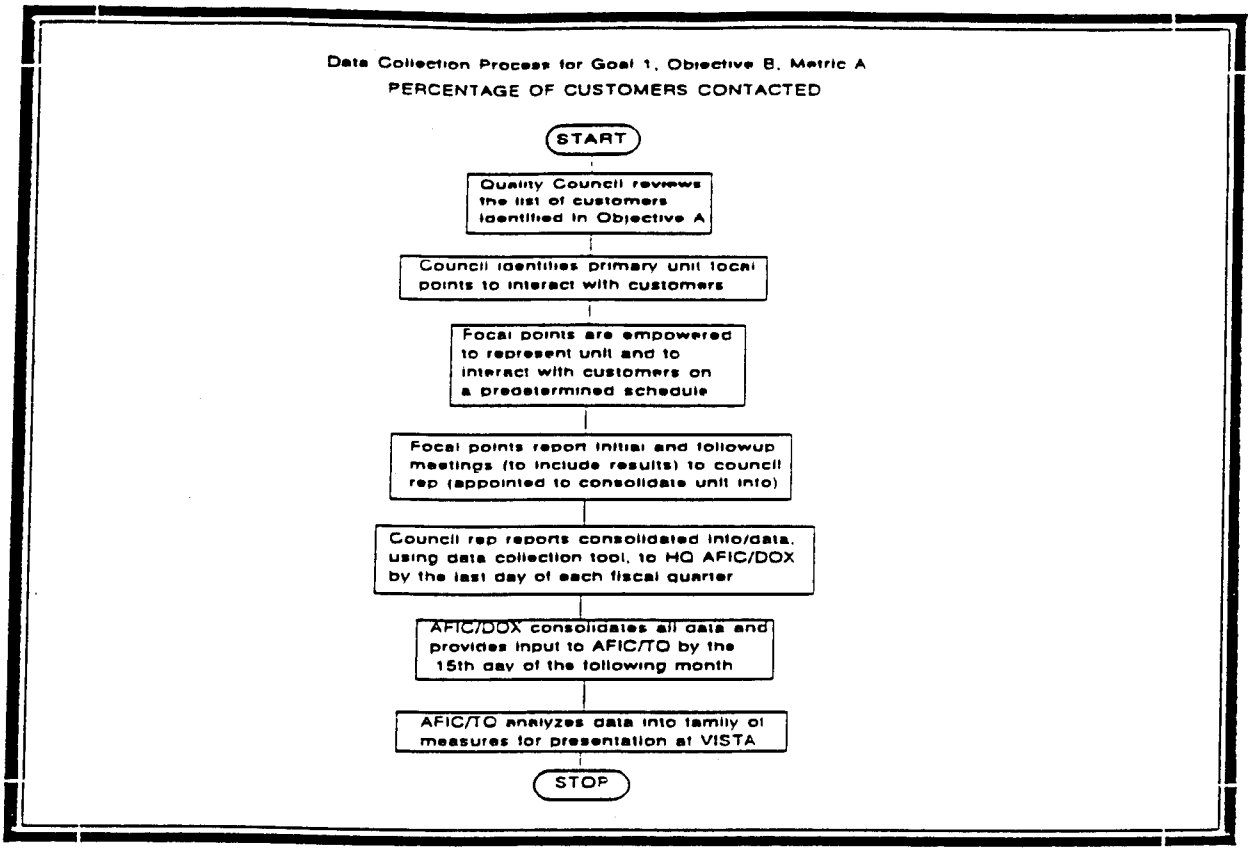


FIGURE 5

Data Collection Sheet
For
Goal 1, Objective B, Metric A

PERCENTAGE OF CUSTOMERS CONTACTED

This sheet is to be used at each level of the organization to record the data needed to determine the percentage of your unit's customers who received a quality visit by your unit representative(s) during this reporting period. Please consolidate data at each level and forward your report to the next echelon in your reporting chain.

(1) Organization: _____

(2) Reporting Period: _____

(3) Total number of customers identified in objective A: _____

(4) Number of customers identified above who received quality visits during this reporting period: _____

(5) Percentage derived by dividing the number of customers on line 4 by line 3: _____*

(*Information forwarded to HQ AFIC/DOX will include lines 1 thru 4 only.)

FIGURE 6

CONTINUOUSLY IMPROVE AFIC CAPABILITY TO SUPPORT AIR FORCE OPERATIONS AND OTHER CUSTOMERS (1000 POINTS)										Goal
Identify internal and external customers (200)		Identify and understand customer requirements (300)		Ensure AFIC products and services are responsive to customer requirements (250)			Measure customer satisfaction and refine processes (250)			OBJ
% of units with action plan to ID customers	% units with ID process completed	% of ID'd customers formally contacted	% of customers whose total requirements are known	% of units with a process to respond to customer requirementss	% of requirements being worked	% of requirements completed	% of units using formal feedback system	% of units using feedback to change processes		MEASURE
93	38	30	20	65	45	22	62	55		Perf
100	95	98	90	98	90	90	98	98		10
95	87	92	82	93	92	81	93	93		9
90	79	86	74	88	74	72	88	88		8
85	71	80	66	83	66	63	83	53		7
80	63	74	58	78	58	54	78	78		6
75	55	68	50	73	50	45	73	73		5
70	47	62	42	68	42	36	68	68		4
65	39	56	34	63	34	27	63	63		3
60	31	50	26	58	26	18	58	58		2
55	23	44	18	53	18	9	53	53		1
8.6	2.9	0	1.3	3.4	4.4	2.2	2.8	1.4	Max 10	Score X
8	12	10	20	5	10	10	15	10	100	Weight -
68.8	34.8	0	26	17	44	22	42	14	Max 1000	Value

FIGURE 7

Index 268.6

STRATEGIC PLANNING

Lt Col Hal Jensen

STRATEGIC PLANNING

Lieutenant Colonel Harold M. Jensen Jr.
Chief, Quality Integration
Air Force Special Operations Command

ABSTRACT

Air Force Special Operations Command developed a strategic plan with the purpose of aligning the entire organization toward the same ends. The development focus was improved support to our customers/teammates, especially our Army and Navy comrades in arms. The result was both a document and a process. The document affirms our institutional identity, tells us where we are now and states our mission. It also declares where we want to go and how we intend to get there by establishing goals and objectives. To ensure continued progress toward command goals we institutionalized the strategic planning process. Now, the senior leadership focuses on providing broad direction that empowers our people to solve problems.

OPERATION ALIGNMENT, PART ONE

You have been assigned to the planet Options One and now you're in a giant room. There are 10,000 people behind you and you're their commander. They're restless, action oriented, let's-get-it-done types. One group is coalescing over in the corner to attack head-on. Another is sending out recon patrols. A third seems to be learning how to repair your gunships. Somehow you've got to figure out what to do and then communicate that to your people. You need a plan, but, that's hard to do and this is probably a dream anyway, so you look skyward and scream, "Why am I here?" "Good question." says a booming voice. "Start your plan with that."

INITIAL DEVELOPMENT PROCESS

Our efforts to create a quality culture began in the Winter of 1991 with initial training for our senior leaders. By early 1992 we had created an infrastructure at the headquarters, established a cadre of instructors, and begun awareness training for all our people. We established some teams; had some successes and suffered some failures. Our efforts; however, were not focused. Our commander, Maj Gen Bruce L. Fister, recognized this shortcoming first and he directed development of a strategic plan; a document defining our goals and objectives that could be used to align the entire command toward the same ends. The focus, he said, must be improved support to our customers, especially our Army and Navy comrades in arms.

We started with a strawman drafted by a headquarters team. They developed the strawman based on several sources. This included efforts ongoing in Air Force Materiel Command and Air Mobility Command, civilian industry examples developed by Grumman Corporation and Federal Express, and discussions with Headquarters USAF planners. The strawman was then reviewed at a Quarterly Strategy meeting attended by

the commander, vice commander and all colonel directors in the headquarters. This draft Strategic Plan was then sent to several customer sets for comment. Over the course of almost a year this flow between the headquarters and customers occurred many times to reach consensus.

As the plan matured it grew into five distinct parts.

Our Heritage: Who we are and where we have been
The Situation: Where we are now
Vision and Mission: Where we want to be and what we do
Planning Process: How we plan
Goals and Objectives: Our plan

The heritage section was included because we found that many people did not know the history of Air Force special operations and that, once they did, it created a sense of pride and tradition.

It's hard to get to a destination if you don't know where you're starting from. Defining the current situation forced us to take stock of where we are today. We reviewed the national security environment, national military strategy, and how special operations fits as an instrument of United States national policy.

An entire section is titled, "From Air Force Vision ... to AFSOC Mission." This answers that question, "Why am I here" and it was our starting point. Logically, the AFSOC mission had to flow from both the Air Force and USSOCOM mission statements. Further, accomplishing the AFSOC mission had to move the Air Force toward its single vision of, "Air Force people building the world's most respected air and space force... global power and reach for America."

A section on the planning process showed how broad goals are translated into specific action at the individual level. We wanted people to see and understand how they could support this plan. We wanted 10,000 AFSOC people pulling in the same direction to achieve something of great importance.

Goals and objectives are the bulk of the Strategic Plan. Our goals are broad statements of desired future achievements. Objectives are specific actions whose accomplishment will indicate progress toward achieving the goals. General George S. Patton said, "Never tell people how to do things, tell them what to do and they will surprise you with their ingenuity." Our intent is to get everyone moving in the same direction, yet allow them the flexibility to tailor action to their specific needs. For example, a command objective in the Strategic Plan is to "Focus on the AFSOC family by improving quality of life programs." Each unit has to determine the best way to improve quality of life and that will vary by unit. Our group in the Pacific may support this objective by improving their work facilities. Our group in Europe may have great work facilities, but can support this command objective by improving family housing. Regardless of how they do it, they have listened to their customer, unit personnel and their families, determined how to best

satisfy their quality of life requirements, and taken action tailored to their situation. They have done very different things yet the entire command is moving forward toward achievement of the command objective. Our aim is to say "What" needs to be done in the Strategic Plan and then empower people to determine "How" to accomplish that based on their customer's needs.

Another important concept included in the Strategic Plan involved measurement. We called for development of "Measures of progress" or metrics. These would serve as guideposts to tell us if we were accomplishing an objective. We wanted to look at trend data for a measure of progress and determine if what we had done was moving us in the right direction. In a perfect world, metrics would be published with the objectives, but our commander recognized the importance of measuring the right things. What was measured would get done. For that reason, the first set of metrics are in a separate appendix published well after the Strategic Plan.

We recognized that this could not be a Headquarters document developed by a staff and forced on the field. To ensure field commander's would drive the strategic planning process, we created the AFSOC Commanders' Quality Board, a group consisting of all active duty unit commanders reporting directly to AFSOC/CC, all Air Reserve Component unit commanders who would report to AFSOC/CC during war, the AFSOC Vice-Commander, the Mobilization Augmentee to the AFSOC Commander, the Director of the Command Staff, and the Command Senior Enlisted Advisor. The Board is chaired by AFSOC/CC. The purpose of the Commanders' Quality Board is to provide the AFSOC Commander with senior level counsel concerning implementation of the Quality Air Force philosophy. One part of that philosophy is the establishment of goals and objectives.

Well, now we had a Strategic Plan, but we had to get it to our people. The Strategic Plan was distributed to command personnel in a 3 to 1 ratio. Headquarters AFSOC newcomer's get a copy in their orientation packages. Copies were sent to more than 50 individuals representing customer organizations. Speakers at the USAF Special Operations School get a copy. Visitors to Headquarters AFSOC get a copy. Daily planners are currently popular, so single page cards with the goals and objectives on one side and the flow from the Air Force vision to the AFSOC mission on the other were distributed throughout the headquarters and sent to field units. Posters are being developed. Commander's editorials addressing aspects of the Strategic Plan have been part of the command magazine. The Strategic Plan has been the subject of Commander's Calls. The AFSOC Commander's status briefing at the USSOCOM Commander's Conference used the Strategic Plan as a framework. A methodology showing how subordinate units can support the Strategic Plan was presented at the last Commander's Conference. Support of Strategic Plan goals is an integral part of our new Quality Air Force Assessments. We take every opportunity to show the Strategic Plan as a beacon that can guide daily activity.

OPERATION ALIGNMENT, PART TWO

Well, you're still on planet Options One, but now you've got a strategic plan. It tells your people "what" to do and lets them figure out "how" to do that. The problem you currently face is in that giant room. Its walls consist of thousands of "process" doors. Your people want to go crashing through all the doors and all at the same time. You know this is the wrong approach. First of all, you don't have enough people to do that. Second, there's little of value behind some of those doors and your resources will be wasted fighting aliens large and small. However, you know too, that behind some of those doors are paths leading to huge treasure vaults. Somehow you've got to figure out which doors to attack first and communicate that to your people.

BREAKTHROUGH AREAS

The AFSOC Strategic Plan has six broad objectives that cover just about everything we do, from operations to people programs to doctrine and technology. We think that's the correct approach. Everyone should see their activity supporting some part of the strategic plan. We believe we can move forward in all of these diverse areas, but it's not realistic to assume that we can make big, breakthrough improvements in all areas; we simply don't have enough resources to do that. For that reason we established priorities by identifying three Strategic Plan objectives as "key." That means we'll tackle these objectives first. We'll coordinate our efforts across the command, and we'll give the efforts supporting these objectives high priority in the allocation of resources. Why three key objectives? Air Force discussions with companies such as Florida Power and Light, Proctor & Gamble, and Hewlett Packard as well as theoretical studies on planning suggest that between one and five key objectives is the right number.

The final responsibility for selecting key objectives belongs to the AFSOC Commander, but he makes that decision based on personal input from key customers and other senior leaders in AFSOC.

OPERATION ALIGNMENT, PART THREE

Well, you've got a plan with a clear mission, goals, and objectives and now you've identified priorities. The bulk of your people are massing to attack key doors that you're confident will lead to huge treasure vaults. They go through the doors. Some meet stiff opposition, some very little. Calls are coming in. "What's the progress on the right?" "What weapons are most effective?" You institute a regular status report that tells everyone how the battle is progressing. Reports are also coming in that treasure has been found and behind that treasure... more doors. You look skyward again and ask, "Won't this ever end?" "No," says the voice, "And be glad it doesn't or you'd be out of a job. Now, readdress your strategic plan." "Wait a minute," you say, "I've got orders for planet Options Two." "Listen," the voice tells you, "I don't want the new guy reinventing the wheel, institutionalize your process." "Boy," you think, "This guy is good."

INSTITUTIONALIZATION

AFSOC has defined and institutionalized the process for developing a command Progress Report and modifying the command Strategic Plan. The command Progress Report is a document, published on an annual basis that tells our customers/teammates, including command personnel, about our accomplishments in relation to the goals and objectives stated in the command Strategic Plan. While the first command Progress Report will be published in 1994, the process for developing it is documented in an AFSOC regulation. At a meeting of the AFSOC Commanders' Quality Board, senior leaders participate in and guide command planning by following the strategic planning process shown in figure 1. The objectives of the process are to review command progress toward achievement of stated goals and objectives, consider modifications to the command strategic plan, establish priorities, and obtain consensus and commitment on command planning and execution. The products of this planning process are a Command Progress Report which documents Command accomplishments (How are we doing?) and an updated command Strategic Plan which documents command goals and objectives. (Where are we going?).

STRATEGIC PLANNING PROCESS

PROGRESS REPORT

1. OPRs brief goal/objective achievement
2. Commanders' Quality Board provides guidance/recommendations for command Progress Report
3. HQ staff develops Progress Report
4. Commander approves publication

STRATEGIC PLAN

1. Commanders' Quality Board reviews the following:
   A. AF vision/mission and USSOCOM mission
   B. AFSOC mission
   C. Current situation
   D. Commander's policies
   E. White papers/Command Position Papers
2. Board reassesses goals, objectives, key objectives, and measures of progress
3. HQ staff develops updated Strategic Plan
4. Commander approves publication

Figure 1

SPECIFIC STEPS. The following paragraphs discuss each step of the review and approval process shown in Figure 1.

PROGRESS REPORT

OPRs BRIEF GOAL/OBJECTIVE ACHIEVEMENT. Every objective in the Command Strategic Plan has an Office of Primary Responsibility (OPR), identified by the

Commander, who is responsible for integrating AFSOC efforts and resources toward accomplishment of this objective. At each meeting of the Commanders' Quality Board, OPRs brief the Board on achievement of Command goals. At a minimum, progress is determined against the Measure of Progress or metric approved by the AFSOC Quality Council. Measures of Progress are published in an appendix to the Command Strategic Plan. With a concerted effort almost any goal can be achieved for a short period of time, therefore, an important aim of OPRs is to improve processes so the desired results can be maintained forever. This process improvement effort is a key aspect of the OPR's presentation to the Commanders' Quality Board. Another key aspect is how the changes have been integrated with the Command business plan, i.e., the resource allocation process executed through the Planning, Programming, and Budgeting System.

COMMANDERS' QUALITY BOARD PROVIDES GUIDANCE/ RECOMMENDATIONS FOR COMMAND PROGRESS REPORT. The command Progress Report is an annual document that tells our stakeholders how we've done in accomplishing our goals and objectives over the past year. Our stakeholders are defined as those people and organizations who have an interest in the actions of this command. For example, stakeholders include our Army and Navy teammates in special operations, Headquarters USSOCOM, Headquarters USAF, and supported CINCs. Critical stakeholders that must not be forgotten are the men and women of the Air Force Special Operations Command. This document summarizes their efforts toward achieving command goals and objectives over the past year and closes the loop so they can see the results of their efforts.

HQ STAFF DEVELOPS PROGRESS REPORT. Input comes from OPRs for each goal in the Strategic Plan modified by guidance and recommendations of the Commanders' Quality Board. Overall OPR for development of the Progress Report is HQ AFSOC/XPP.

COMMANDER APPROVES PUBLICATION. The completed document, approved by AFSOC/CC tells our stakeholders what we've done in the past year.

STRATEGIC PLAN

COMMANDERS' QUALITY BOARD REVIEWS THE AF VISION/MISSION AND USSOCOM MISSION. This top level guidance drives our Command mission.

COMMANDERS' QUALITY BOARD REVIEWS THE AFSOC MISSION. The AFSOC mission must flow logically from the Air Force and USSOCOM mission statements. It is a brief statement of our reason for being and what we wish to accomplish an organization.

COMMANDERS' QUALITY BOARD REVIEWS THE CURRENT SITUATION. This is an assessment of existing conditions. It includes inputs concerning our current state, our resources, and the operating environment. An evaluation of our current state addresses products and services we currently produce, customer demand for those

products and services, and gaps in meeting customer requirements. A resource evaluation includes such factors as people, money, facilities, force structure, equipment and material. An evaluation of the operating environment includes enemy threats, the budget, and new or expanded taskings. Changes since the last update are highlighted.

COMMANDERS' QUALITY BOARD REVIEWS THE MAJCOM COMMANDER'S POLICIES. Existing policies provide guidance that are helpful in establishing goals and priorities.

COMMANDERS' QUALITY BOARD REVIEWS WHITE PAPERS/COMMAND POSITION PAPERS. A White Paper is a document providing a comprehensive study of an issue critical to the command. No command position has been decided. Once a command position is decided, the white paper becomes a command position paper. These documents provide a comprehensive study of issues critical to the command. Any direct reporting unit commander or headquarters director can request development of a white paper from AFSOC/CV. He will approve their development and distribution.

COMMANDERS' QUALITY BOARD REASSESSES GOALS, OBJECTIVES, KEY OBJECTIVES, AND MEASURES OF PROGRESS. With the background information noted above, senior leadership can then reevaluate the existing Strategic Plan to determine if the Command goals, objectives, key objectives, and metrics should be eliminated or modified or if new ones should be developed. Establishment of a few (1 to 3) key objectives is how the senior leadership identifies our command priorities. Key objectives receive priority consideration in the allocation of resources. Further, key objectives are generally worked in more detail. Each objective is worked by an OPR who integrates command efforts and resources toward accomplishment of this objective. OPRs are designated by the Commander.

HQ STAFF DEVELOPS UPDATED STRATEGIC PLAN. This action is taken based on Commanders' Quality Board inputs. Overall OPR is HQ AFSOC/XPP.

COMMANDER APPROVES PUBLICATION. The completed document, approved by AFSOC/CC, tells our stakeholders where we're going.

IMPACT

The AFSOC Strategic Plan has been on the streets since February 1993. Its impact has been significant. Senior leaders are involved and focused on the biggest command issues and they are providing broad direction that says "What" we want to achieve. More people feel empowered to determine "How" to achieve an objective. For example, Headquarters Directorates and field units are developing supporting objectives to those stated in the command plan. Newcomers are more quickly oriented to who we are and where we're going. People are thinking about how to integrate their actions with the resource allocation process executed through the Planning, Programming, and Budgeting System; our business plan. We are prioritizing new requirements and funding in relation

to their support for key objectives. Also, the Strategic Plan has become a key factor in our Quality Air Force Assessments.

OPERATION ALIGNMENT, PART FOUR

You stretch back in the seat of the ZX model Spectre gunship taking you to your next assignment. Not a bad job back there on Options One. You created the plan and institutionalized a process that will keep them at least one step ahead of any alien adversary. You feel so good that you bank left and blast a passing asteroid with the old 105 photon howitzer. "Cut that out." says the sky voice, but you can tell he doesn't really mean it.

ACKNOWLEDGEMENT

A special note of thanks must be given to Brigadier General Sam Mitchell who provided guidance, intellectual stimulation, and strong, continuous support.

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STRATEGIC PLANNING: THE PROCESS FROM MISSION TO INDICATORS

Maj Mary Ann Maier

STRATEGIC PLANNING:
THE PROCESS FROM MISSION TO INDICATORS

Abstract:
Quality Strategic Planning brings focus to an organization from the top leaders through to the lowest level of worker. The methodology expects the staff, at every level, to participates in the process of strategic planning. At the top, the executives validate their mission, determine what their key processes are and establish goals for their organization. At each level the senior leaders can define their mission in alignment with the organizational mission and after defining their key processes, establish objectives for these processes that meet the organizational goals. They are able to see the direct alignment of their individual duties with the organization's successful attainment of its goals. See attached diagram.

Proactive or reactive? Which defines your organization? Is it one that continually fights fires and responds only to the dictates thrust upon it? Is it one that establishes a realistic plan that is fluid, responsive and incorporates all work sections? Which organization would you like to be a part of, to lead?

Strategic planning brings management, at all levels, into control. Strategic planning is a methodology that can be described in a policy and disseminated throughout an organization. However, it requires new skills and the organization is bound to educate its managers in these skills. Strategic planning incorporates the quality improvement philosophy of measurement, process identification, and staff involvement.

Strategic planning begins with the executive staff. They must develop an organizational strategic plan. They must learn the skills necessary to develop a strategic plan. They must take time to develop a strategic plan. Once the organization's strategic plan is established, challenge each department to develop their strategic plan, to learn how to develop a strategic plan, to take the time to develop a strategic plan, and to involve their staff in the development of a strategic plan.

The strategic plan begins with a mission statement - a short paragraph describing a unit's reason for existence; a description of what the organization and, at each level of the organization, what that department is "paid to do". At the start of strategic planning, re-validate the mission statement. This statement reflects the key process of the organization. The executive staff should then identify and list those key processes. If the organization allocates resources (manpower, time, money) to a tangential process, it now becomes evident. Realigned the resources to support the strategic plan.

Once the key processes are identified, the executive staff begins to identify the goals of the organization - broad statements describing a desired end in three to five years. With the help of a facilitator, they can brainstorm or use an affinity diagram to reach a consensus on the goals of the organization. The should ask: What service do we provide? What must be accomplished? What is the desired future state? Does the goal support the mission?

When the goals have been identified, systematically work through each one and identify the objectives that must be accomplished to reach those goals. The objectives should be attainable in

twelve to eighteen months. An objective is always measurable and describes what will be accomplished, by how much, and by when. Focus on what is important to the customer. The number of objectives should be limited to that number which can be reasonably accomplished during the year. Make an executive decision to not pursue every great objective. Realize that there is a limit to what can be accomplished. As these objectives are accomplished, some of the remaining objectives can be brought back and pursued.

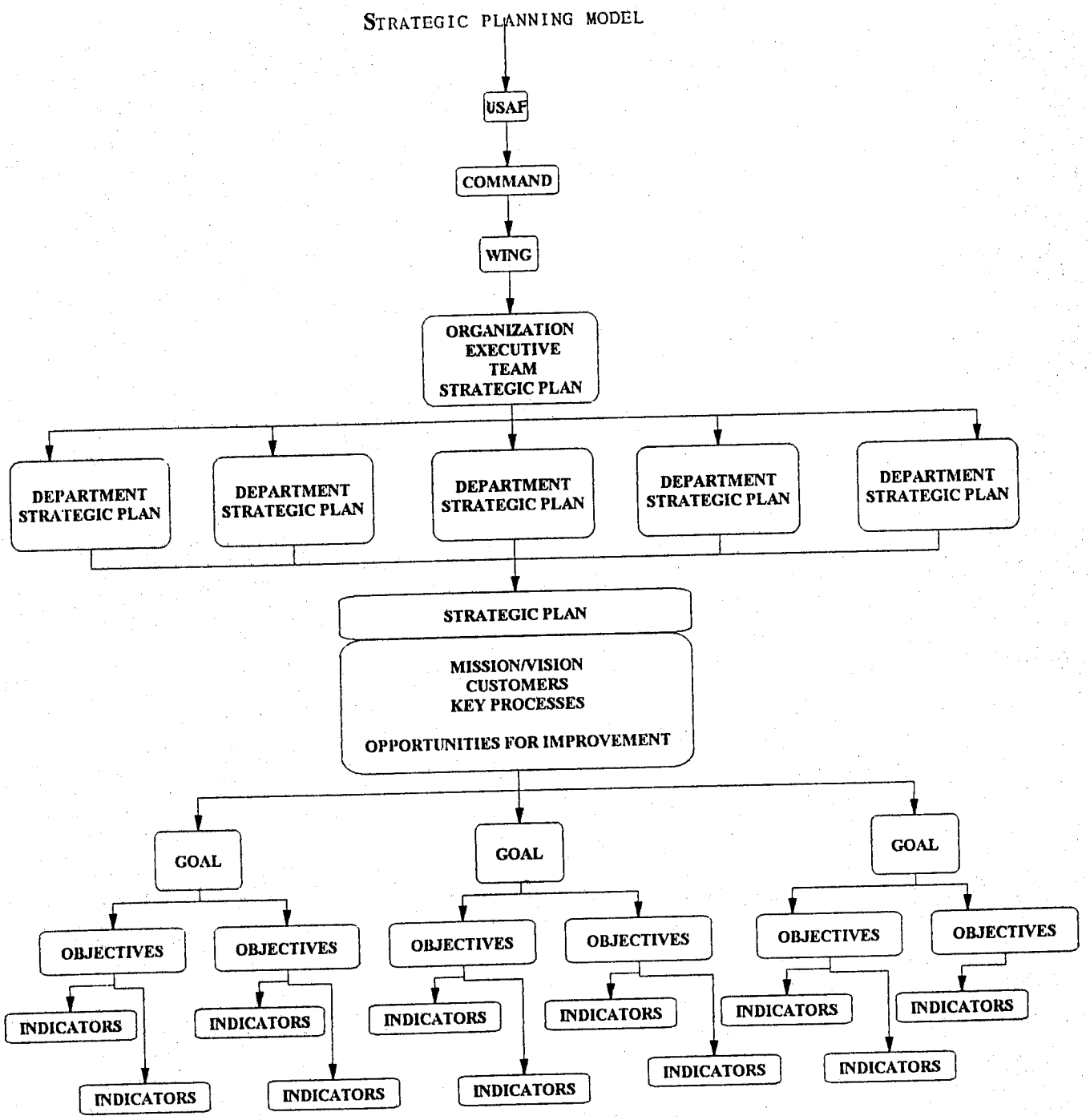
Why should an objective be measurable? They measure how we are doing, communicate the health of a process and distinguish health from sickness. We use these metrics to facilitate quality improvement, understand our processes and their capabilities. The component of the objective that is measured is the indicator or metric. A good indicator distinguished between good or poor performance by a changing value on a measured scale. It shows a trend, compares performance over time. Watching the progress of the indicator tells the executive staff if they are reaching their objectives. To develop an indicator, ask: "What quantitative indicator will tell me if this objective is being accomplished?" "Does the data currently exist to track or develop the indicator?" "Is the benefit of the data collected worth the cost of measuring?" "What action will be taken if this indicator's performance declines?"

The indicator should be followed using the tools of statistical process control (SPC). Display and act on the metrics. These charts show performance change over time. The staff accepts feed back from charts - it is objective.

Once the organization's strategic plan is completed, it is time to challenge each department to accomplish their own strategic plan. The component parts are the same. The organization's strategic plan is the road map. The organization's goals must be pursued by every department. The department strategic plan should be developed by the members of that department. The plan that is created by the staff will be owned by the staff rather than the plan that is created by the senior manager and presented to the staff.

The first time through, this is a time consuming process. Provide an educational opportunity for the senior managers, that supervisory level one step below the executive staff and one or two key staff members from that department. Present the component parts of the strategic plan and provide the time during the course for each manager to review one of their goals, assess one objective for that goal to determine if it is measurable, and identify an indicator for that objective. Once their indicator has been identified, review the tools of SPC to determine how the indicator will be displayed and tracked. When the process is accomplished once with guidance, the department manager has a better feel for continuing the process. Encourage the senior managers to build a strategic planning team with representatives of all levels and all processes. They will be able to interact cross functionally to develop the strategic plan. Utilize a facilitator to keep the team moving toward its goal.

The resultant document will be fluid, will belong to the department, and will be part of their daily operations. It will not be filed away until the required annual review. Graphs will be posted throughout the department as each section track the indicator they are responsible for. Management decisions are made based on the strategic plan and resources are allocated based on the strategic plan.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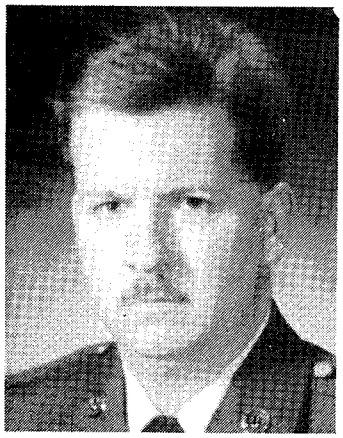
APPLICATION OF THE QUALITY PLANNING PROCESS IN RESTRUCTURING ORGANIZATIONS

Anita Springer



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Application of the Quality Planning Process in Restructuring Organizations

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ABSTRACT

Typically, reorganization decisions are made by management and are not based on a thorough analysis of external or internal customer needs and expectations. At the USSTRATCOM Intelligence Directorate, downsizing forces and changing missions are being met with sound quality planning to ensure continued success in meeting customer requirements. This paper describes how two teams used the quality planning process to restructure functional lines and responsibilities. These teams included representatives from management and the work force. The results are not only a better integration of manpower allocation, customer requirements, and smoother operations, but also quicker acceptance of change dictated by management.

INTRODUCTION

In today's Department of Defense (DoD), Total Quality (TQ) is the contemporary management approach being touted, despite downsizing forces and changing missions. One might think that quality efforts would be thwarted by the instability of an organization's size or mission. In actuality, these unstable environmental conditions can provide an impetus for carefully examining customer requirements for both end user customers and customers within the production or service process (employees). Juran's Quality Planning Road Map can serve as a helpful guide for such efforts (Juran, 1986); the management and planning tools can aid in the analysis of ideas and formulation of recommendations (Brassard, 1989).

THE CHALLENGE

Restructure two Branches--Penetration Analysis and Facilities--based on a thorough analysis of external and internal customer needs and expectations. That was the challenge. In the

wake of impending changes, the Penetration Analysis and Facilities Branches used quality planning teams to proactively devise blueprints for restructuring functional lines and responsibilities.

THE CASE STUDIES

Project Background

A. Penetration Analysis.

Penetration Analysis was the first USSTRATCOM functional area to use quality planning and the management and planning tools for a reorganization effort. In fact, this branch was formerly a part of Strategic Air Command's (SAC's) 544th Intelligence Wing and completed this project prior to the stand-up of USSTRATCOM in anticipation of a possible downward-directed realignment. The Penetration Analysis Branch was a 28-person cadre of engineers, mathematicians, computer programmers, aviators, and intelligence specialists. During the previous two years, the types of taskings assigned to this branch had shifted from unit mission support and acquisition support to more detailed engineering analysis and modeling in support of strategic planning. The formation of a quality planning team to find the best way to organize the branch to serve the customers was the brainchild of a newly-trained facilitator in Penetration Analysis. The team consisted of eight branch members ranging in rank from Lieutenant Colonel to Staff Sergeant and represented a cross-section of the branch's functional specialties.

B. Facilities.

The Facilities Branch, like the Penetration Analysis Branch, used the management and planning tools to counter the problems presented by the draw down, realignment, and reorganization within USSTRATCOM's Intelligence Directorate. The Facilities Branch, in the wake of a major reorganization and a 50 percent manpower cut, took a proactive approach to minimizing mission impact while continuing to meet customer needs. A quality planning team was formed consisting of one federal government employee and five military members. Representatives from both management and the work force, with expertise in facility management, were included. In recent years, the Facilities Branch had consisted of as many as eight full-time personnel and up to 10 part-time personnel drawn from a pool of personnel who were awaiting assignment. However, as the military began to draw down, the Facilities Branch was receiving less part-time support and personnel who were reassigned and retired from the branch were no longer being replaced, yet the workload had remained the same.

Application of the Quality Planning Process

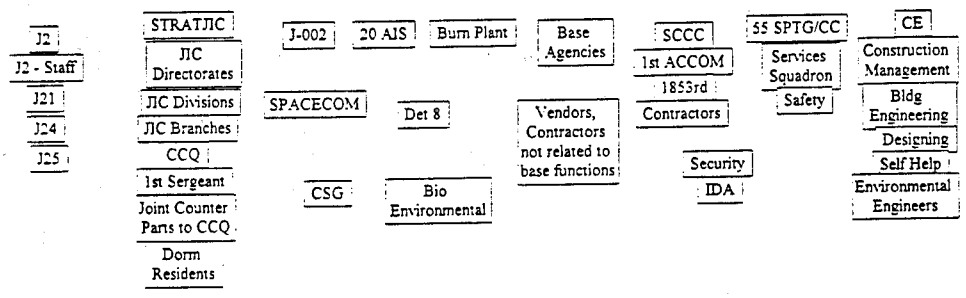
A. Identify Customers.

1. Penetration Analysis. The first step in the quality planning process is to identify the customers. The Penetration Analysis team researched, brainstormed, and constructed an Affinity Diagram (See Figure 1) of its customers. The Affinity Diagram is a tool for organizing a set of random thoughts into groupings of ideas which have affinity with one another. Customers included offices soon to be part of USSTRATCOM (HQ SAC staff as well as the Joint Strategic Target Planning Staff), SAC units (both within and outside the 544th Intelligence Wing), and the Penetration Analysis Branch itself.

FIGURE UNAVAILABLE
AT PRESS TIME

2. Facilities. The Facilities team, much like the Penetration Analysis team, brainstormed and constructed an Affinity Diagram (See Figure 2) to include both its internal and external customers. This was done to ensure a proper quality planning focus and would later aid the team to poll customers for input.

Figure 2. Facilities Branch customers.



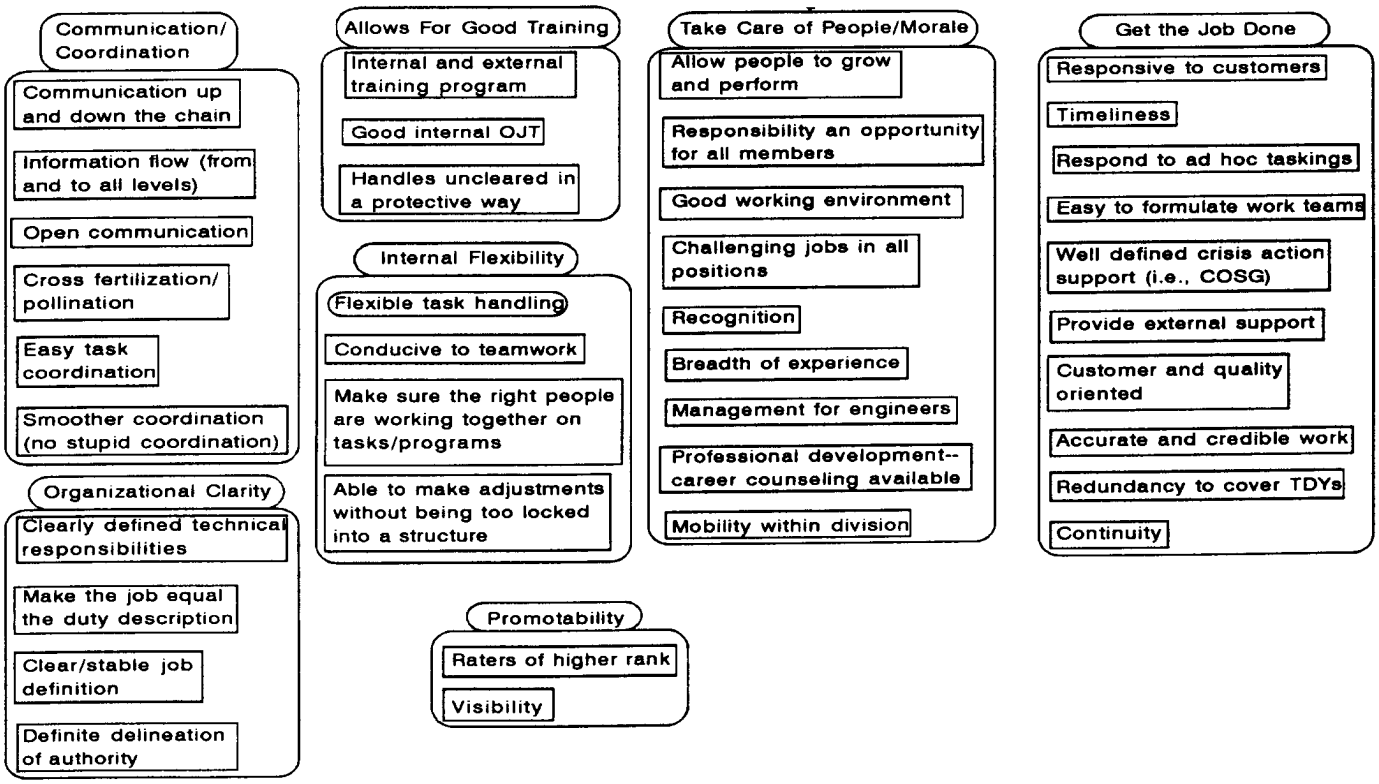
B. Determine Customer Needs.

1. Penetration Analysis. Brainstorming and the Affinity Diagram were the tools of choice for the next step in the quality planning process: determining customer needs. The team again researched and brainstormed to develop lists of customer needs. First, team members considered products and services the branch must provide to internal and external customers. These needs are reflected in the two Affinity Diagrams below (See Figures 3 and 4).

FIGURES UNAVAILABLE
AT PRESS TIME

The team then determined the requirements for an organizational structure which would allow the branch to effectively and efficiently produce the required products and services. These organizational structure requirements, reflected in the Affinity Diagram (See Figure 5), were based on wants, needs, and expectations which team members solicited from the entire branch.

Figure 5. Organizational structure requirements.



2. Facilities. The Facilities team, like the Penetration Analysis team, used brainstorming and the Affinity Diagram to generate and organize data. First, the team identified the services they were currently providing. Second, unlike the Penetration Analysis team, the Facilities team invited external customers from each category, identified in an earlier Affinity Diagram (See Figure 2), to participate in a meeting to determine what services the customers needed and expected (See Figures 6 and 7). The customers brainstormed and used an Affinity Diagram. The services they identified closely matched the services already being provided by the Facilities Branch. Then, using a weighting criteria to be used later by the Facilities team, the customers

ranked their needs and desires on a Simple Prioritization Matrix (See Figure 8). The Simple Prioritization Matrix is a tool for determining the relative importance of a series of items by individually comparing the importance of each item to every other item in the series. The criteria used were as follows: 10 = Exceedingly More Important, 5 = Significantly More Important, 1 = Equally Important, 1/5 = Significantly Less Important, 1/10 = Exceedingly Less Important.

Figure 6. Facilities Branch services.

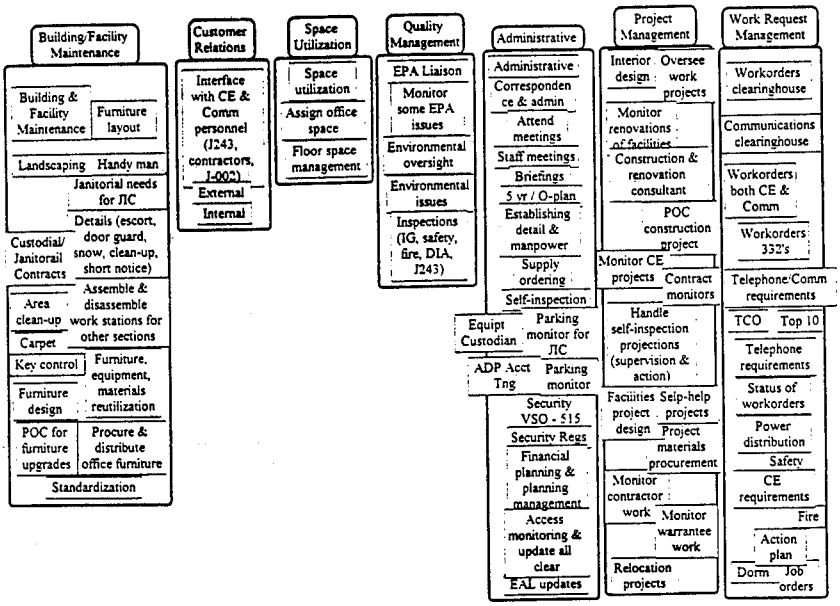


Figure 7. Facilities Branch Customer Needs and Expectations.

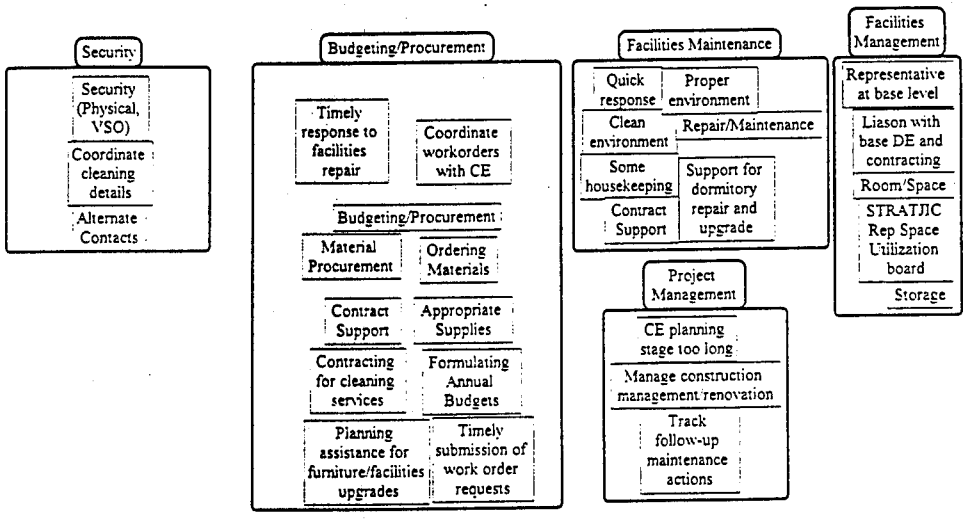
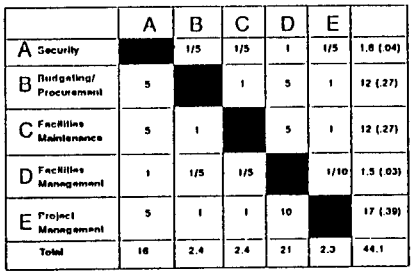


Figure 8. Prioritization of Facilities branch customer needs, and expectations.



	A	B	C	D	E	
A Security		1/5	1/5	1	1/5	1.8 (.04)
B Budgeting/ Procurement	5		1	5	1	12 (.27)
C Facilities Maintenance	5	1		5	1	12 (.27)
D Facilities Management	1	1/5	1/5		1/10	1.5 (.03)
E Project Management	5	1	1	10		17 (.39)
Total	16	2.4	2.4	21	2.3	44.1

C. Determine Optimal Solution

1. Penetration Analysis. After determining customer needs, the next step in the quality planning process is to examine some alternative solutions for meeting those needs. The Penetration Analysis team once again solicited inputs from fellow branch members and formulated ten candidate organizational structures (See Figure 9, Options A-J) for the Penetration Analysis Branch. The table below shows the characteristics which distinguished each proposed structure from the other alternative structures.

Figure 9. Candidate organizational structures.

Option A - Contains a tasking branch.
Option B - Two branches with two sections.
Option C - Status Quo: four deputy branch chiefs, three of which own two secs.
Option D - Four-five branches oriented by function (tech support, surface-to-air, air-to air, etc.).
Option E - Two branches (analysis and support) without sections.
Branch chiefs are raters. Compares with options B and J.
Option F - Three branches (much as today, but without section designations.
Option G - Three branches/five sections, much as today but with CAOPA grouped together with CAOPL & CAOPS.
Option H - Two branches with two and five sections (breaks out functional areas of models as the sections).
Option I - Two branches with two sections each (shooters & lookers, computer ops and hardware/intel resources.
Option J - Div chief, deputy, admin, two branches with raters dispersed throughout branches.

The team then evaluated the merit of the proposed structures using the Matrix Diagram shown in Figure 10. The Matrix Diagram is a valuable tool for showing relationships between two or more sets of items. In this case, the tool was used to identify the strength of the correlation between each organizational structure requirement identified (See Figure 5) and each candidate organizational structure (See Figure 9). In other words, the team asked

itself how much each proposed organizational structure would satisfy each requirement. The correlation values were as follows: 9 = Strong, 3 = Moderate, 1 = Slight or Weak, and 0 = None.

Additionally, the team rated the importance of each requirement using the following scale: 5 = Essential, Can't Live Without, 4 = Mostly Essential, 3 = Cool (to have), 2 = Somewhat Essential, and 1 = Not Essential, but Nice to Have. These ratings are shown in the first column of the Matrix Diagram above and served as weights to further refine the team's assessment of the proposed organizational structures. By multiplying the correlation values by these rate of importance weights, the team was able to consider which organizational structure would best satisfy the most important requirements versus the largest quantity of requirements.

Figure 10. Evaluation of organizational structure options.

	Rate of Importance	OPTIONS A	B	C	D	E	F	G	H	I	J
1. Communication/Coord	4	3- (12)	1 (4)	1 (4)	1 (4)	3 (12)	3 (12)	1 (4)	1 (4)	3 (12)	3 (12)
2. Allows Good Training	4-	3- (12)	1+ (4)	1+ (4)	1+ (4)	3- (12)	1+ (4)	1+ (4)	1+ (4)	1 (4)	1 (4)
3. Takes Care of People	5	1+ (5)	1+ (5)	1+ (5)	1+ (5)	3 (15)	3 (15)	1+ (5)	1 (5)	1 (5)	3 (15)
4. Promotability	4	3- (12)	3 (12)	3 (12)	3- (12)	1 (4)	3- (12)	3 (12)	3- (12)	3 (12)	3 (12)
5. Gets the Job Done	5	3 (15)	3- (15)	3- (15)	3 (15)	3 (15)	3 (15)	3 (15)	3- (15)	3- (15)	3 (15)
6. Internal Flexibility	4-	3 (12)	1 (4)	1 (4)	1+ (4)	9 (36)	3 (12)	1 (4)	1+ (4)	1+ (4)	9 (36)
7. Orgnztnl Clarity	4	1 (4)	3+ (12)	3- (12)	3 (12)	1 (4)	1 (4)	3 (12)	9 (36)	1- (4)	1 (4)
8. Equitable Workload	3	1 (3)	3- (9)	1 (3)	3- (9)	3 (9)	3- (9)	3 (9)	3- (9)	1 (3)	3 (9)
9. Manage Resources	3	3 (9)	3 (9)	3 (9)	3 (9)	3 (9)	3- (9)	3 (9)	3 (9)	3- (9)	3 (9)
10. Shields and Buffers	3-	9- (27)	3 (9)	1+ (3)	3 (9)	1 (3)	3 (9)	3 (9)	3- (9)	3 (9)	3 (9)
11. Self-Supportive	4	3 (12)	3+ (12)	3 (12)	3 (12)	3 (12)	1+ (4)	3+ (12)	3 (12)	1+ (4)	3 (12)
		123	95	83	95	131	105	95	119	81	137

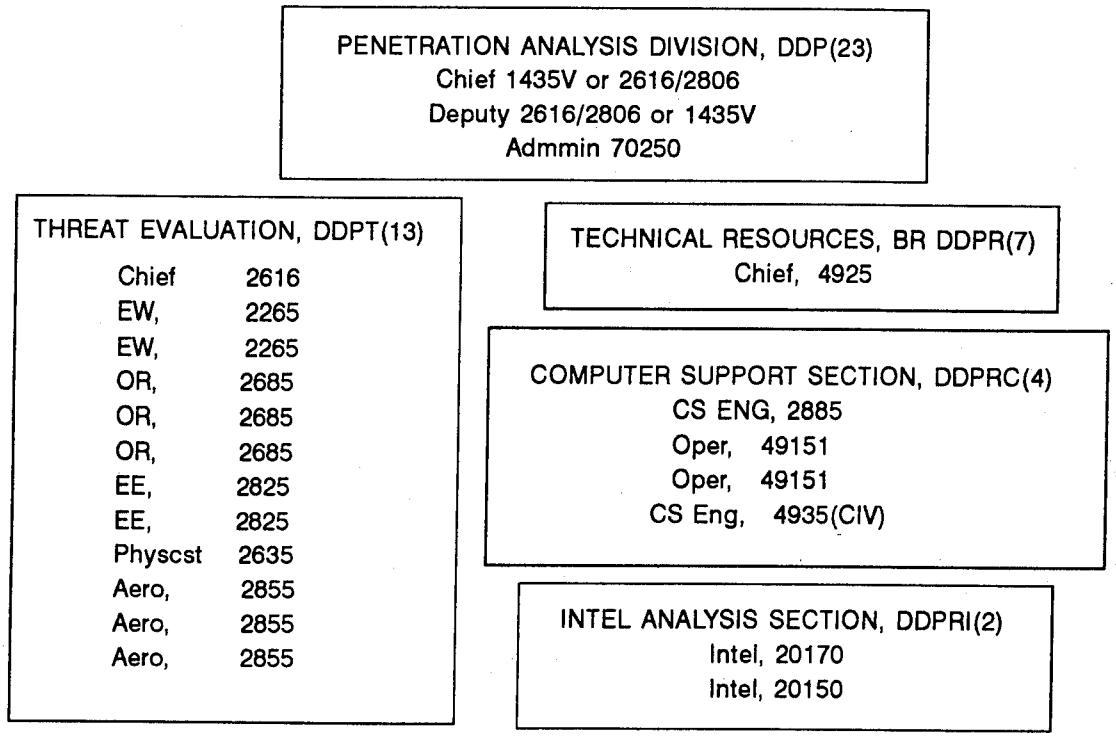
Correlations:
None = 0
Slight/Weak = 1
Moderate = 3
Strong = 9

The Matrix Diagram revealed options J, E, A, and H as the best organizational structure candidates. The team then looked for commonalities among these top four alternatives and crafted a proposal which incorporated the common features which were identified. This proposal is reflected below in Figure 11.

2. Facilities. Once the customers' requirements were compared to the services offered by the Facilities Branch, the team asked itself "What services can we continue to provide given the numerous constraints impacting our mission (e.g., reduced manning, reduced funds, etc.)? Due to the significance of the

Figure 11. Proposed structure.

Note: Details regarding proposed Penetration Analysis structure can be found in Appendix A.



services provided by the Facilities Branch and the importance of not degrading mission critical support, the team used the Full Analytical Criteria Method Prioritization Matrix (Brassard, 1989). In fact, the team was the first in USSTRATCOM to use the Full Analytical Criteria Method.

The Full Analytical Criteria Method is actually a series of matrices and is considered the most intricate and demanding of the Prioritization Matrices. It is most commonly used when decisions are critical to the organization. It is a tool designed to take into consideration numerous variables impacting a decision. Through the use of a ranking system and a series of matrices, a weighted rank is assigned to each variable. Then, an overall weighted rank is determined for all options being examined through numerical integration of all the weighted ranks calculated (Brassard, 1989).

The team's first step in following the Full Analytical Criteria Method was to create a Simple Prioritization Matrix to weigh all the constraints against one another to determine their overall significance to the decision (See Figure 12). The Facilities Branch used the same criteria used earlier by the customers. Once all the variables had been examined, totals were calculated and a percentage was discerned providing the data necessary to

determine importance of each constraint. For example, "person dedicated to building 515" (.30) was the most significant factor impacting the Facilities Branch's ability to provide services.

Figure 12. Constraints impacting mission accomplishment.

	A	B	C	D	E	F	G	H	Row Total (% of Grand Total)
A Ease with experienced manhours		1	5	1/10	10	5	5	1/10	26.2 (.13)
B Funds availability	1		1	1/10	10	5	5	1/10	22.2 (.11)
C Ease of meeting time limits	1/5	1		1/10	1	1/5	1/5	1/10	2.8 (.01)
D Ease to accomplish with 2 people	10	10	10		10	5	10	1	56 (.28)
E Ease to accomplish with short term deadlines	1/10	1/10	1	1/10		1/10	1/5	1/10	1.7 (.01)
F Ease to accomplish with long term deadlines	1/5	1/5	5	1/5	10		1/5	1/10	15.9 (.08)
G Ease to accomplish when allocated work/ storage space is required	1/5	1/5	5	1/10	5	5		1/10	15.8 (.08)
H Ease to accomplish with person dedicated to bldg 515	10	10	10	1	10	10	10		61 (.30)
Column Total	21.7	22.5	37	1.7	56	30.3	30.8	1.6	Grand Total 201.4

The next most important factors were "ease of accomplishing tasks with 2 personnel assigned to a permanent location" (.28) and then "ease of accomplishing tasks with experienced manhours" (.13). Note the rankings are in percentages to facilitate numerical integration in the final overall weighted matrix.

Once a ranking for each constraint was determined, the next step was to rank each of the services provided (See Figure 6) against one another in relation to each of the constraining factors. For example, Figure 13 shows all of the services being weighted against one another in relation to the constraint "ease of accomplishing tasks with experienced manhours" (the diagram refers to this as experienced manhours). Appendix B shows how each service's weighted rankings for each of the remaining constraints were determined.

Figure 13. Ranking services in relation to "ease of accomplishing tasks with experienced manhours".

Ease with experienced manhours	A	B	C	D	E	F	G	Row Total (% of Grand Total)
A Building/Facilities Maintenance		5	5	1	1/5	1/10	1/10	11.4 (.09)
B Customer Relations	1/5		1	1/5	1/5	1/10	1/10	5.8 (.05)
C Space Utilization	1/5	1/5		1/10	1/10	1/10	1/10	.8 (.01)
D Quality Management	1	5	10		1	1	1	19 (.15)
E Administrative Tasks	5	5	10	1		1	1	23 (.18)
F Project Management	10	10	10	1	1		1	33 (.26)
G Work Request Management	10	10	10	1	1	1		33 (.26)
Column Total	26.4	35.2	50	4.3	3.5	3.3	3.3	Grand Total 126

The last step was to integrate the weighted rankings from the individual matrices into a final overall weighted ranking matrix (See Figure 14). To do this, the weighted ranking for each constraint was multiplied by the individual service's weighted ranking from its respective matrix. For example, the constraint "ease of accomplishing tasks with experienced manhours" in column one was (.13). This was the weighted ranking determined from the first matrix constructed (See Figure 12). Next, the service "building/facilities maintenance" as it relates to the constraint "ease of accomplishing tasks with experienced manhours" was (.09) taken from Figure 13. The (.09) was then multiplied by the column (.13) resulting in a weighted ranking of (.012). This can be found in column one, row one of Figure 13. This was done for each column and row. Upon completion, the rows were added across for a total. Then the total column was totaled at the bottom right of the matrix for a grand total. Finally, each row total was divided by the grand total. This gave an overall weighted percentage ranking for each service currently being provided. The rankings would later be used to help determine which services could be eliminated and which had to be kept to continue meeting the highest priority needs of the customers.

Figure 14. Overall weighted ranking of Facilities Branch services.

Evaluation Criteria / Tasks/Services	Experienced Manhours (.13)	Funds Availability (.11)	Time Limits (.01)	Two People (.28)	Short Term (.01)	Long Term (.08)	Dedicated 515 Person (.30)	Total Acres Rows as % Grand Total
Building/Facilities Maintenance	.012	.018	0	.031	.003	.014	.042	.12 (.13)
Customer Relations	.007	.008	.001	.028	.001	.014	.030	.089 (.10)
Space Utilization	.001	0	0	.003	0	.002	.003	.01 (.01)
Quality Management	.020	.022	.002	.025	.001	.002	.027	.099 (.11)
Administrative Tasks	.023	.008	.001	.070	.002	.021	.108	.233 (.25)
Project Management	.034	.028	.003	.062	.001	.012	.030	.170 (.18)
Work Request Management	.034	.038	.003	.062	.002	.018	.063	.21 (.23)
Column Total	.131	.112	.011	.281	.010	.093	.303	.931

The Facilities team analyzed the data generated with the Full Analytical Criteria Method and the Simple Prioritization Matrix constructed by the customers to determine how to best serve their customers. To better serve the customer, the team realized they would need to eliminate some of the services they were already providing to offset the reduction in their manning. To do this, the team asked "what services are we currently providing which should be outside our scope of responsibility?"

For example, they identified the constraint "person dedicated to building 515" from the Full Analytical Criteria Prioritization Matrix as the heaviest weighted factor impacting the Facilities Branch's ability to accomplish its mission. Further, the reason for the constraint "person dedicated to building 515" was the Building 515 Vault Security Officer (VSO) task identified in Figure 6 under the "Administrative" category. However, the customers noted the Vault Security Officer task (See Figure 8, "Security") very low as a service they needed and expected from the Facilities Branch. Therefore, the Vault Security Officer task was a good candidate to recommend for exclusion from the Facilities Branch's mission. In much the same fashion, other options were examined for elimination. After much deliberation the following were identified for deletion from the branch: Environmental Services (listed as "Quality Management" in Figure 6) and Telephone Control Officer.

The team knew these functions would have to continue to be done, therefore, the team had to identify alternatives for accomplishing the tasks being deleted from their mission. To this end, the team brainstormed on alternatives for accomplishing the responsibilities identified as outside the scope of their responsibilities. For example, the Vault Security Officer function being eliminated would be converted to a rotating additional duty to be carried out by the junior officers located within building 515. This in turn would eliminate the constraint "person dedicated to building 515."

D. Implement Solution.

1. Penetration Analysis. The Penetration Analysis Quality Planning Team Leader undertook the quality planning effort described above on his own initiative with the blessing of his immediate supervisor. During the six-month period that the quality planning team was meeting, members of a provisional command were planning the stand-up of the Strategic Joint Intelligence Center (STRATJIC), the USSTRATCOM organization which would replace the 544th Intelligence Wing. While the Penetration Analysis team was developing a detailed organizational structure, the provisional command was drafting a Joint Table of Distribution (JTD) for manpower requirements. Coincidentally, both the draft JTD and the proposed organizational structure were based on a Penetration Analysis function divided into two sections. Although there were a few minor disconnects, the proposed organizational structure could be supported by the manpower outlined in the JTD. The Penetration Analysis team's efforts were presented and accepted by the new STRATJIC chain of command. The STRATJIC's manpower people worked to revise the JTD to reflect the final refinements necessary to make the manpower documents match the Penetration Analysis team's organizational structure.

2. Facilities. This project was initiated by the Logistics and Training Division Chief to rewrite the mission statement for the Facilities Branch. Specifically, he wanted to identify tasks which were outside the scope of a typical facilities office. Since the recommendations of the team involved the reassignment of functions from the Facilities Branch to branches in another STRATJIC directorate, the proposal was presented to the STRATJIC Quality Council. The Quality Council accepted the proposal to remove the Vault Security Officer and Environmental Services tasks from the Facilities Branch, but recommended that the Telephone Control Officer task remain within the branch at present.

DISCUSSION

The Penetration Analysis and Facilities team projects resulted in a better integration of manpower allocation, customer requirements, and smoother operations. Additionally, these efforts facilitated quicker acceptance of change which had historically been directed by management without involving employees in the decision making process. What were the commonalities between these two team efforts which produced such great results?

A. Focus on End User Customers and Employees as Customers.

Both efforts were based on customer wants, needs, and expectations. The teams identified end user customers and studied the customers' requirements.

Additionally, both reorganization plans considered a manager's need to serve his subordinates as internal customers. In the case of the Penetration Analysis Branch, employees wanted the new organizational structure to address their morale and promotability concerns. Members of the Facilities Branch were concerned about a number of constraints which were beyond their control, but impacted their ability to accomplish the Facilities mission.

When developing infrastructure which will be used to produce products and services--regardless of whether that infrastructure is a new process or a new organizational structure--the developer should consider both the user of the products and services and the employees who must use the infrastructure. This approach supports two of W. Edwards Deming's fourteen points: Point 9 "Break Down Barriers Between Staff Areas" and Point 12 "Remove Barriers to Pride in Workmanship" (Deming, 1982). Barriers are dissolved by the process of soliciting users' inputs and involving users in the design of the infrastructure.

B. Use of Structured Process and Tools.

Both teams followed a modified version of Joseph M. Juran's Quality Planning Road Map. Additionally, the teams each used

some of Michael Brassard's management and planning tools. The Penetration Analysis team used the Affinity Diagram and the Matrix Diagram. The Facilities team used the Affinity Diagram, and two types of Prioritization Matrices.

As one might imagine, it can be difficult to evaluate and incorporate as many inputs as these two teams considered in the development of their realignment plans. Some kind of tools would be needed to transform the quagmire of ideas gathered from all the different sources into a salable, implementable plan; a process would be needed to keep such massive team efforts focused. The quality planning process and the management and planning tools provided the necessary structure.

CONCLUSION

In conclusion, these two case studies are examples of how organizations can be restructured based on an analysis of customer requirements--including those of the employees. They demonstrate the utility of following the quality planning process and using the mangement and planning tools for such efforts. Since these two projects were completed, two additional USSTRATCOM organizational realignment teams have successfully followed this approach.

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Appendix A. Background for Penetration Analysis proposal.

NOTE: Penetration Analysis will become a "division" rather than a "branch" in the new STRATJIC.

-Division will have chief, deputy and admin on top
  --Chief and deputy will have interchangeable AFSCs
  --One is bomber pilot, other is scientific/engineering manager
  --Highly focused use of team concept across division
    ---Team leaders rotate among all branch members
    ---Div chief, deputy and branch chiefs manage the rotation for the standing and ad hoc teams
-Two branches: Threat Evaluation (DDPT) and Technical Resources (DDPR)
  --DDPT
    ---DDPT branch chief controls and directs taskings
    ---Branch is broken into cells and teams
    ---Cells are informal, care and feeding type subdivisions
      ----The 3-5 majors/senior captains are cell chiefs
    ---Branch members assigned to cells w/o regard to AFSC
    ---Enables everyone to be rated by people senior to them
    ---Rater and ratee may have dissimilar AFSCs
    ---Cell chiefs will be workers, responsible for:
      ----Rendering OPRs/EPRs/PFWs
      ----Granting leave (informal coord w/ branch chief)
      ----Advising branch chief
      ----Assist with allocation of people to teams
      ----Counseling
      ----Military Professional Dvlpt (Officership/NCOship)
    ---Taskings from branch chief to team leaders/individual
    ---Conventional delegation to cell chiefs still possible
    ---Cell chief not required in tasking process
      ----This approach would be very personality dependent and would be semi-fluid, evolutionary concept. Some kind of change would be required every time someone PCSed.
  --DDPR broken down into two sections
    ---DDPRC (Computer Support Section)
      ----Section chief reports to DDPR branch chief
      ----Involvement with teams
    ---DDPRI (Intelligence Analyst Section)
      ----Intel specialists remain together
      ----Section chief reports to DDPR branch chief
      ----Duties:
        -----Provide/analyze CADOB
        -----Tactics/doctrine
        -----Provide intel for theater/crisis
        -----Database management
        -----Mission planning
        -----Heavy involvement with teams, take advantage of mission planning experience and applications experience

Appendix B. Full Analytical Criteria Method matrices.

Ranking services in relation to "funds availability."

Funds availability	A	B	C	D	E	F	G	Row Total (% of Grand Total)
A Building/Facilities Maintenance		10	10	1 -/+	5	1/5	1/5	26.4 (.18)
B Customer Relations	1/10		10	1/10	1	1/10	1/10	11.4 (.07)
C Space Utilization	1/10	1/10		1/10	1/10	1/10	1/10	.6 (.00)
D Quality Management	1 -/+	10	10		10	1/5	1/5	31.4 (.20)
E Administrative Tasks	1/5	1	10	1/10		1/10	1/10	11.5 (.07)
F Project Management	5	10	10	5	10		1	41.0 (.25)
G Work Request Management	5	10	10	5	10	1		41.0 (.25)
Column Total	11.4	41.1	60	11.3	36.1	1.7	1.7	Grand Total 163.3

Ranking services in relation to "ease of meeting specified time limits."

Ease of meeting specified time limits	A	B	C	D	E	F	G	Row Total (% of Grand Total)
A Building/Facilities Maintenance		5	5	1/5	1	1/5	1/5	11.8 (.09)
B Customer Relations	1/5		10	1/5	1/5	1/10	1/10	10.8 (.08)
C Space Utilization	1/5	1/10		1/10	1/10	1/10	1/10	.7 (.01)
D Quality Management	5	5	10		1	1/5	1/5	21.4 (.16)
E Administrative Tasks	1	5	10	1		1/5	1/5	17.4 (.13)
F Project Management	5	10	10	5	5		1	36 (.27)
G Work Request Management	5	10	10	5	5	1		36 (.27)
Column Total	18.4	35.1	55	11.5	12.3	1.8	1.8	Grand Total 133.9

Ranking services in relation to "accomplishing with 2 people."

	A	B	C	D	E	F	G	Row Total (% of Grand Total)
A Building/Facilities Maintenance		1	5	5	1/5	1	1	13.2 (.11)
B Customer Relations	1		10	1	1/10	1/10	1/10	12.5 (.10)
C Space Utilization	1/5	1/10		1/10	1/10	1/10	1/10	.7 (.01)
D Quality Management	1/5	1	10		1/5	1/5	1/5	11.8 (.09)
E Administrative Tasks	5	10	10	5		1	1	32 (.25)
F Project Management	1	10	10	5	1		1	28 (.22)
G Work Request Management	1	10	10	5	1	1		28 (.22)
Column Total	8.4	32.1	55	21.1	2.8	3.4	3.4	Grand Total 126

Appendix B. Full Analytical Criteria Method matrices.

(Continued)

Ranking services in relation to "ease of accomplishing with short term detailees."

Ease to accomplish with short term detailees	A	B	C	D	E	F	G	Row Total (% of Grand Total)
A Building/Facilities Maintenance		10	10	10	5	5	5	45 (.27)
B Customer Relations	1/10		10	10	1	1	1/5	22.3 (.13)
C Space Utilization	1/10	1/10		1	1/10	1/10	1/10	1.5 (.01)
D Quality Management	1/10	1/10	10		1/10	1/10	1/10	10.5 (.06)
E Administrative Tasks	1/5	1	10	10		10	5	36.2 (.22)
F Project Management	1/5	1	10	10	1/10		1/5	21.5 (.13)
G Work Request Management	1/5	5	10	10	1/5	5		30.4 (.18)
Column Total	.9	17.2	60	51	6.5	21.2	10.6	Grand Total 167.4

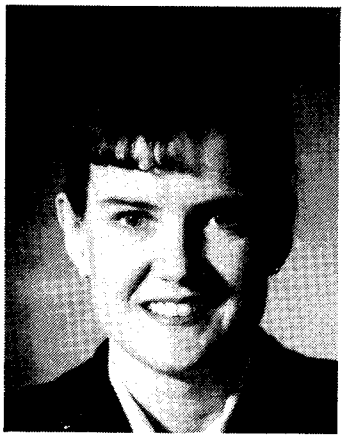
Ranking services in relation to "ease of accomplishing with long term detailees."

Ease to accomplish with long term detailees	A	B	C	D	E	F	G	Row Total (% of Grand Total)
A Building/Facilities Maintenance		1	5	5	1	5	1	18 (.17)
B Customer Relations	1		5	5	1	5	1	18 (.17)
C Space Utilization	1/5	1/5		1	1/10	1/10	1/10	1.7 (.02)
D Quality Management	1/5	1/5	1		1/10	1/5	1/5	1.9 (.02)
E Administrative Tasks	1	1	10	10		5	1	28 (.26)
F Project Management	1/5	1/5	10	5	1/5		1/5	15.8 (.15)
G Work Request Management	1	1	10	5	1	5		23 (.22)
Column Total	3.6	3.6	41	31	3.4	20.3	3.5	Grand Total 108.4

Ranking services in relation to "person dedicated to building 515."

Ease to accomplish with dedicated 515 person	A	B	C	D	E	F	G	Row Total (% of Grand Total)
A Building/Facilities Maintenance		1	5	5	1/5	5	1	17.2 (.14)
B Customer Relations	1		5	5	1/10	1	1/5	12.3 (.10)
C Space Utilization	1/5	1/5		1/10	1/10	1/10	1/10	.8 (.01)
D Quality Management	1/5	1/5	10		1/10	1	1/5	11.7 (.09)
E Administrative Tasks	5	10	10	10		5	5	45 (.36)
F Project Management	1/5	1	10	1	1/5		1/5	12.6 (.10)
G Work Request Management	1	5	10	5	1/5	5		26.2 (.21)
Column Total	7.6	17.4	50	26.1	.9	17.1	8.7	Grand Total 124.9

BUY IN: ESSENTIAL INGREDIENT FOR SUCCESS



Mary Pat Szutenbach

Buy in: Essential ingredient for success

by Mary Pat Szutenbach

Sound leadership is key to the success of Total Quality. Some beginners, when implementing the quality principles wrongly assume that leadership is of less importance than when using other management practices. More than ever before, under the TQL banner, leaders are called to lead.

My definition of leadership has changed since we incorporated Total Quality Leadership. The new leader leads in a way similar to the pied piper. The many who followed, did not walk in the exact path as the piper. They followed, but to the tune as they heard it. Some walked, some ran to keep up, others danced and still others skipped; individuals with individual talents and needs, they all followed.

In his book, On Becoming a Leader, Bennis asked leaders to do some self assessment. He not only asked, "Are you driven and do you drive others? He also asked, but do you have vision?" He described the old culture; that of many of our current leaders, and talked about the dog-eat-dog world where you either proved yourself and were rewarded or you fell behind, and were trampled in the rush to the top (Bennis p. 30).

This is a new era and the old rules have become ineffective. To be a successful leader, it is essential to have vision, and to be wholly committed to it. You must listen to your inner voice and uphold your vision. For this we have to choose our mentors carefully. This is a time of great change and confusion. That makes the choices difficult. Most importantly though, the leader must give oneself over to guiding the vision (Bennis, p. 31).

I have found that it is absolutely essential to have a good solid leader out in front providing vision for the organization. Without it the organization has no direction. Individual groups within the organization begin to pull it in varying directions, and actually begin to pull the organization apart. The organization is weakened, it flounders and may even collapse.

At first I was confused as to how and where leadership's role fell in a quality organization. Initially, it appeared to me that the leader had a very minor role in a quality organization. I know now, that's not true. It is essential for the leader to have a clear vision and be able to convey personal motivation toward the vision to the people. Translated that means the organizational leader must "buy-in" and be willing to promote the cause.

To start our implementation of TQL, our entire executive staff attended a one week TQL seminar. On their return our commander stated that the concepts were very logical and sound, but he was "not going to get religious" about them. His statement gave credibility for minimal commitment by other members of the group. It was evident from that day forward that some members played along, but really did not "buy into" the principles of TQL. They said the right things and showed that they had an introductory knowledge, but they made no attempts to make the personal shift toward TQL. They made no move to begin implementing TQL in their worksites.

Conversely, a few of executive members came back to our facility with strong "buy-in, and began to apply bits and pieces of what they had learned in their daily operations. From those

individuals with fervor, a number of middle management personnel were energized, and began to promote changes in pockets within the organization. Many did so without any formalized training.

Within a few months of the executive's seminar, our commander was reassigned. Our new commander was supportive of the executive staff's suggestion to set up a quality council and begin steering the organization toward quality. The newly created quality council was adversely effected by the incomplete "buy-in" of its group members. The group had great difficulty forming the cohesion necessary to work together. It took them months to develop an organizational vision and mission, and then when they finished that they did not take the vision to the staff. They wrote them in documents and put them in books. Staff members eventually read the vision and mission statements and quietly voiced their dissatisfaction with the focus created by the quality council.

One thing the quality council readily agreed on, was the need for a TQL education program for the rest of the staff. They made it the highest priority, and within eight months of their own training, they held their first, three day course. There was no available pool to draw instructors from, so the executives took the course outlines home and developed their lesson plans to teach the first course. Again, the less than optimal committment from some of the executives was evident, and effected the overall success of the first few courses. New instructors were drawn from the first course, and each subsequent one, to build a strong committed body of instructors. Since that time the sound cadre of people who "bought-in" have instructed 494 people in a series of 17 courses.

Another early goal of the quality council was to start one simple Process Action Team (PAT) during the early phases of TQL implementation. They chose an uncomplicated process to improve and proposed the membership. At that time only twenty percent of the team members had had TQL training. Because of the low numbers who had been through the course, much of the initial activity of the PAT was training. Soon after, several other PATs were started in the middle layers of the organization and all experienced the same challenge, to train members as they progressed.

The "train as we go" tactic created difficulties at times, because team members did not fully understand the concepts of TQM, they struggled with the steps of process change. We couldn't possibly expect those without training to be motivated toward the implementation of TQL, if they really didn't know what it was. We spent a great deal of time, reviewing and introducing the TQL process, and worked hard to earn the trust and support of team members.

We encountered other challenges too. Our Quality Officer returned from that first seminar very motivated to adopt the TQL principles. She attempted to change our entire quality system to a TQL process, but could only change isolated parts of it. Her parent organization had not yet made the paradigm shift to TQL and required her to send specific "old style" reports and data to them. Her attempts to initiate their interest in change failed, and she was caught between the two worlds. We have repeatedly attempted to change the parent organization's expectations of us, and we now see the door opening for some of those changes.

After we had worked hard for 8 months to apply TQL within our organization, we ran into another road block. We had to prepare for an inspection. The entire quality council lost their momentum, and focused totally on inspection requirements. The inspection checklist had not yet evolved to a TQL format.

By the time the inspectors arrived, there were precious few indicators of the many advances we had made toward TQL. Most of our accomplishments had either been covered over or had been changed back to "old" forms to meet the inspection criteria.

A few executives bravely met the team without unit Goals and Objectives. They marched forward with Opportunities for Improvements and Indicators, and they succeeded. The inspectors lauded their new focus and processes.

As our training program progressed and most of our middle management staff had been through the course, the number of individuals who "bought-into" TQL grew. Some went back to their work units to work for those executives who chose not to "buy-in". These newly trained people found their attempts to introduce TQL into their worksites often thwarted.

One such work unit had a physician director who absolutely refused to go to the TQL course. The other physicians in that clinic had attended and started to hold quality circle meetings with all of their clinic staff. They invited their director, and he occasionally attended. They began to incorporate TQL despite many barriers thrown in by their director, and their momentum picked up, rapidly. After a year, and pressure from his boss, their director finally relented and attended the course. When he returned from the class he supported his staff more fully, but had still not committed himself to TQL.

Think about the many barriers there are, to limit this change. I've identified that it could be your boss, or maybe your organization. In our case we began to adopt TQL principles a year and a half ahead of our wing. Our wing commander routinely held staff meetings with his executive staff; people who like himself, were Colonels, and were experts in their individual fields. In his meetings his executives were allowed to "report" to him, but otherwise said very little. The commander rarely gave ear to his executives' ideas, he dictated terms, and those dictates were passed down through all the organizations on base. This caused anger and confusion within our staff. Words like these were often heard, "I thought we were using TQL, this isn't TQL."

There were many mistakes made; people mislabeled things as TQL and gave it a bad name. Others took a few steps toward TQL and then clung onto old comfortable practices, and confounded the process. We attempted to create PATs but failed to empower them to change the processes they were chartered to improve. We learned the hard way, that not every "process improvement group" is a PAT. It has been hard to keep the committment going through the ranks of the facility with inconsistencies and growing pains like these.

Our command had started to shift toward TQL before we did, but like us had pockets of new and old within their organization, We struggled to make our changes and be responsive to Command's requirements. Some parts of the command organization welcomed our new ideas and formats for reporting and others did not. During the change process we have had to cope with a great deal of discord.

Finally, in our own time we have learned to build strong teams with members who "buy-in". We have gradually restructured our quality council, so it consists of leaders who are committed to quality improvement. This is not to say that we avoided the non-supporters. We planted new ideas and challenged our non-supporting members and worked to build their "buy-in". We now recognize the need to build strong, cohesive teams and have begun to promote those qualities in our groups. Despite our efforts, there were still some members, who would not change. With time they have left, by normal attrition.

The most exciting thing about this change has been watching it take place and grow, in spite of the many barriers we have encountered. Most of our successes started from small beginnings. Many were started by leaders within the ranks. We had numerous small separate areas of activity that started and grew. Others observed what was happening and wanted similar things to happen in their sections, and so they sparked interest among their co-workers and got things rolling. The many circles of activity have grown so much that they are beginning to connect together. They are crossing more and more stovepipes and we are truly on the way to becoming a quality organization.

It has been just over two years now since we started, and we continue to forge ahead using the principles of TQL. We are still very much infants as a quality organization. Total Quality Leadership is strongly imbedded now, and will be part of our organization until the end; until our base closes in 1994.

IMPLEMENTATION THROUGH EMPOWERMENT AND INVOLVEMENT

Maj Mary Ann Maier

IMPLEMENTATION THROUGH EMPOWERMENT AND INVOLVEMENT

Abstract:
After attending a conference or reading about quality improvement, many return excited and energized with the potential this new concept offers. Back at the workplace, the hectic pace and deadlines soon overcome that energy and we wonder how to bring about the positive changes of quality improvement. Many supervisors and managers know they practice participative management and work with teams, but that isn't enough. The "breakthrough" thinking is not occurring. This methodology of education combined with implementation overcomes this road-block. As the supervisor/manager introduces each concept of quality improvement, the staff participates in the implementation of that concept. They now own the change; they made the change.

Would you like to see changes occur that demonstrate the implementation of quality improvement as you begin the organization's education/awareness? "Impossible!" you say. Yes, it can be done.

The writings of the quality improvement "gurus" tell us that management must drive the implementation of quality improvement; it must come from the top. The organization should see senior management doing things differently. The implementation plan for the organization begins with the executive team's desire to pursue continuous improvement. Their education and early demonstration of that change must become evident to the organization. That demonstration of a new way of doing business gives credibility to the change. The executive team must be the first to pursue further knowledge of quality improvement. As the executive team recognizes their early success, it is time to further develop the education plan.

Senior managers need to become the teachers of quality improvement in the organization. To start, identify the senior managers and plan for their education. In many organizations, this is a rather nebulous term, often confused with supervisors, middle managers, and other terms identifying those with varying levels of authority and responsibility. Consider senior management to be the level just below the executive team. Begin their education with the expectation that THEY EDUCATE those who work for them, and that THEY IMPLEMENT CHANGE as they educate. Once identified, provide the senior managers an educational opportunity to learn the component parts of quality improvement. To assist the senior manger, identify one other individual who plays an significant role in that department. The two become a team to facilitate the implementation of quality improvement in their department. Ideally, some time should pass between the executive team's education and the education of senior management or the pursuit of "wall to wall" awareness training. Members of the organization will become excited about the opportunities evident in quality improvement and look for support of their innovative ideas for change in their work sections. Many managers may deny the value of the tools and techniques of quality improvement and will refuse to listen to the ideas brought forward by their staff. This will frustrate the staff and deny the change spoken of by the executive team. Allow the time this process needs to become an integral part of the organization. The education of senior managers and their "facilitator" can usually be accomplished in about five days. After attending the course, the executive staff must recognize that the senior mangers will "buy in" at varying levels, from the terrorist who sabotages the implementation of quality improvement, to the zealot who successfully

champions the implementation in their department. The executive team provides reinforcement and gentle persuasion to overcome resistance. Once senior management completes their awareness training they can begin the education/implementation in their department. The organization's education plan must occur by departments because the implementation will be unique to the department. All members of the department should attend together. If classroom space is a constraint, plan multiple classes to include representatives of all sections in the department. Begin to be cross-functional from the start.

The key components of the organization's education/implementation plan are the vision, goals, objectives, metrics, key processes, customer list, and opportunities for improvement. As the members of the organization learn about each of these component parts they create or identify the components in their department.

The first key component is the organization's Vision - that description of the department in its improved future state. The executive team must go through the visioning process. Their vision for the organization must reflect the desires of the people in the organization. This vision must be in place before the departments begin their education/implementation because they must create their own vision and it must align with that of the organization. The department leader and their facilitator introduce the concept of visioning to their staff. They teach and then they create a vision for their department. Link the vision statement with the mission statement of the department. During the class, take time to brainstorm where each member identifies what they want in the vision statement. Using Nominal Group Technique (NGT), the senior manager receives the staff's votes for the ideas that will make up their vision. Each department member has the opportunity to contribute and to decide what will be in their vision. The will own that vision and buy in to its message.

The second key component is to identify the department's key processes - what they do. The department members learn about processes and how to combine tasks to produce a product or service. They begin to think about the relationship between tasks and the importance of their coworkers who are responsible for these tasks. The department members begin to learn more about the value of each section in their department. Brainstorming and NGT are again used by the staff to identify the key processes of their department.

You can see the pattern developing. Learning about a key component of quality improvement and developing that component by the members of the department for their department results in the implementation of quality improvement. Allowed four to eight hours for this process. It isn't just classroom time interspersed with exercises. You don't walk away excited about the idea but unsure of how to start. You don't get overwhelmed with your job responsibilities before you can make changes. You validate the unique culture of each department and allow the staff to work within that culture to change their culture. They are empowered to define themselves, identify themselves, and plan their own change.

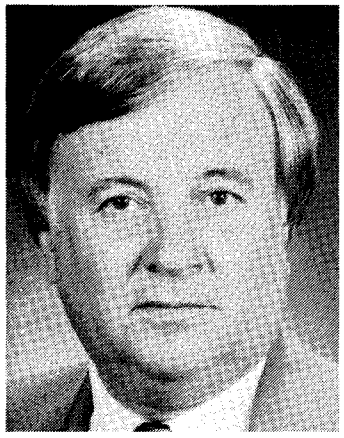
A challenge to the senior manager is to ask their staff where their problems are; their opportunities for improvement. They may be "taking the lid off a boiling pot", but the tools and techniques of quality improvement provide methods to "harness that steam". Controlled brainstorming keeps that session from becoming a gripe session. NGT identifies the priorities. The members of the

department have the opportunity to define the priorities, to determine where they will begin the improvements. This prioritized list of opportunities can now be incorporated into the goals and objectives of the department. Merge them with the assigned responsibilities of the department. This list probably reflects an inherent desire to improve the way the department accomplish their responsibilities.

Continue to work with the staff to develop their customer list, objectives and measurable indicators for the objectives. After this awareness training, change has begun, implementation has begun.

THE KEY TO SUCCESSFUL TQM/TQL IMPLEMENTATION: SHIFTING THE PARADIGM

Dr. Curtis Page



Larry Sagely

Donald Midgett

The Key to Successful TQM/TQL Implementation:

Shifting the Paradigm

by
Curtis W. (Duke) Page, Ph.D., Larry S. Sagely and Donald M. Midgett

During the last decade, change agents in Government and industry have exalted TQM/TQL. This increased focus on quality is more than just another management fad. But many organizations report that TQM/TQL are not working. Negative experiences with TQM/TQL often result from incomplete application due to the failure to shift the paradigm. To better understand the keys to successful TQM/TQL implementation, we will examine history and our past and present paradigms.

Historically, What Can We Learn?

It was in the 1950's that the term Operations Research was coined by those who set forth in detailed tomes how things ought to be done. In the 1960's, while Operations Research concentrated primarily on segments of a larger process rather than the whole, Systems Management was born. In this same decade the behavioral sciences took the position that Operations Research and systems technology did not consider the important "people factor." Indeed, Organizational Development was promoted to the point that managers and leaders were literally running from (or for) that "touchy feely" 1960's version of sensitivity training.

Finally, in the 1980's, Deming's and Juran's work gained stature in America, and gave birth to something called TQM (Total Quality Management), most recently known as TQL (Total Quality Leadership). Now in this decade of the 90's, a number of business gurus have selected methodology from these disciplines and devoutly claim these methods to be a cure-all for every organizational ill, even though their methods are vastly different in approach and composition (3:44-52).

What can we learn from these lessons of organizational history? Further, in today's environment of chaos and change, with only a small helping of stability and a knock-out dose of uncertainty, *what do we do now?* The answer is complex: use a combination of proven precepts from multiple disciplines -- precepts that have withstood the tests of time. There is no future in creating cure-alls from a single discipline because no single discipline has worked *completely*. Today's approach should stress the absolute necessity of dealing with and giving equal priority to issues involving the dynamics of groups, not just focusing on changes in work processes. This expands the concept of Total Quality beyond doing things *right*, the focus of most TQM/TQL programs, and creates a paradigm of doing *RIGHT* things *right* (14:2-6,2-7).

Paradigms: Past and Present

Before learning how to shift paradigms, it is useful to seek a full understanding of paradigms because they have a profound effect on our ability to enjoy a successful future. Simply put, a paradigm is a set of assumptions about how the world works (6:46). Derived from the Greek word *paradeigma* meaning pattern, model or example, our paradigms drive our decision-making process resulting in actions that mold our future. By examining some common attributes dominant in American culture, it is possible to gain insight of how to change and improve paradigms.

THE GREAT AMERICAN PARADIGM

1. A preoccupation with answering questions and taking actions when we really have not asked the *RIGHT* question (8:1).
2. The reliance on a manager or leader thought to have knowledge complete enough for all decisions required by the organization.
3. A reliance on obsolete reward systems that give the lion's share to those at the very top and reward superior performance with only about 5% more than mediocre performance.
4. Planned approaches that exclude those on the front lines and often those responsible for plan implementation and assume growth or increased budgets as a way of life.
5. At best, a very superficial understanding of what a vision is and even less understanding of the power of vision on the future of all organizations.
6. An "instant pudding" view of the world. If it doesn't happen immediately, it must not be any good so let's scrap it and start over.
7. Let the means (processes or activities) become the end -- especially true for very bureaucratic organizations.
8. A completely unbalanced priority criteria that concentrates almost exclusively on changes in systemic (work) processes and all but ignores integrating these processes with the human element.
9. A faulty concentration toward doing things *right* at the expense of doing *RIGHT* things.

Even a brief look at this paradigm suggests there are monumental problems in applying Deming's precepts in the American culture, particularly in today's turbulent environment. No wonder there are comments like "this stuff (TQL) takes too long" and "it beats the obvious to death." Given this paradigm, it is no surprise that the Tom Peters of the world say that twenty years from now TQM won't even get a footnote in history, "though maybe a couple of laughs"(18).

Toward A New Paradigm

Successful organizations of the future will not be bounded by paradigms of the past. They will accept new paradigms, ones that shift away from what worked in the past and toward what will work for the future. The model for the new paradigms will include:

GOING AWAY FROM	GOING TOWARD
1. Wasting time working on answers to the wrong question, considering questions a personal affront, and pushing for instant answers to all questions -- resulting in spending a lot of time doing the *wrong things*.	1. Gaining time through the effective use of group processes to assure that the appropriate issues or "right things" receive attention and time. Considering questions as helpful and important.
2. Lacking understanding about vision, its priority and how to use it to empower organizations.	2. Visionary organizations that use tiered visions as a way to genuinely empower employees and give everyone a piece of the organization's dream.
3. Reward systems that give superior performers only marginal benefit.	3. Creating monetary and non-monetary reward systems that really link performance and rewards in a meaningful way.
4. A preoccupation with tasks, projects and programs with little or no attention to the dynamics of group processes that are pivotal to success.	4. Considering group processes as being as important as tasks, projects and programs -- and working with and knowing that it is the group dynamics that will drive their success. Teams are powerful.
5. Counting on a stable external environment to be able to respond to the future.	5. Creating and maintaining the ability to reconfigure and respond to chaotic environments and also to reasonably predict a course of action for the often unknowable.
6. Accepting that large organizations are by nature bureaucratic, avoiding accountability and focused on concentrated power.	6. Fostering organizations that are entrepreneurial throughout -- regardless of size -- and developing entrepreneurial rather than bureaucratic cultures. Shared power.
7. Avoiding organizational conflict and considering it as bad or negative.	7. Developing the ability to accept managed conflict as something good that enhances the quality of decisions and creativity in dealing with an unknowable future.
8. The rigid box-type organizational wiring diagrams that limit response and creativity.	8. Creating organizational structures that are fluid, circular in nature and able to function in stable or chaotic environments (10:51-53).
9. A single charismatic manager with all of the answers, in "know it all" cultures.	9. Developing leaders, not managers, that are comfortable using group processes in learning organizations.

So, How Do We Get There?

In reviewing the attributes of successful paradigm shifts for the future, the question might be raised: Isn't that too idealistic to hope for? The answer is: No. In our consulting, we have exercised precepts that have gained these attributes for organizations in both the public and private sectors. How to begin?

Start With Vision

Talk about a precept that has stood the test of time! Well over three thousand years ago the writer of Proverbs knew that, "Where there is no vision the people perish" (7). Vision is crucial to organizational success. More recent writers have observed that vision is a precedent for passion (1:19) and an *absolute necessity* for organizational empowerment. And these testimonies are validated by more than two decades of management experience. Some organizations like I.B.M. had a vision at one time, but lost it and started a downward spiral. There are also organizations with success stories like Federal Express where the vision of on-time delivery is recognized by their leader, Fred Smith, the drivers, the communications center and everyone in the organization. Though it can be argued how specifically detailed Smith saw his vision in the beginning (15:132-134), there is little doubt that he saw Federal Express as a truly reliable mail service.

We must learn that there is a significant difference between *Mission* and *Vision*. This difference can be easily understood by viewing a Mission as addressing why an organization exists. A Mission concentrates on what the organization provides at the present time (although many mission statements really address what the organization has provided in the past). Often, mission statements are so outdated that they are useless and serve only to allow a positive response when asked if one exists.

Vision, on the other hand, stresses the future by addressing what the organization wants to become. Said another way, vision is concerned with values whereas mission is concerned with purpose (2:108). Vision statements by their very nature force us to deal with the uncertainty of the future by determining what attributes are desirable and should exist. It is suggested that successful organizations will have a vision, not only at the top, but other tiered (division and department-level) visions communicated throughout the organization.

The creation of tiered vision is the bedrock upon which desired organizational cultures are created. In today's downsizing exercises a lot of reorganization is being done on the basis of past and present markets and organizational functions rather than using a knowledge of why the organization should exist and what those responsible for its future think it can or needs to become. Tiered visions, in effect, carry the message to the people. They encourage full participation in our collective hope for the future. As Block observes, "A vision exists within all of us, even if we have not made it explicit or put it into words" (2:107).

When creating a vision often our own intellect works against us. Creating a vision is a process of dreaming; it must come from the heart and not the mind. Creating a vision for a future which is truly unknowable goes beyond the intellect. Visions should have depth, clarity, and create the assignment of accountability. A tiered vision sets into motion some powerful consequences for the entire organization that must be lived -- by its leaders as well as by all of its members. It is the heart of successful cultural change and organizational transformation. By developing and living their vision, organizations are taking a seeing (visualizing), aiming (charting the position), then doing (activating the plan) approach to the future (8:8,9), rather than the approach of doing, sometimes aiming, and forget about seeing-approach that has been prevalent in our culture for the past decade.

At the risk of incurring Deming's wrath by going against his tenth point of no slogans (17:viii), we recommend developing an organizing principle. The organizing principle does not ask or exhort; it assists with the communication of the vision by capturing the essence of what the organization will be -- in a few words or short phrase. A good organizing principle will speak to future direction and values in a few words. Note that an organizing principle is not an advertising slogan, although it is sometimes effective in advertising. An organizing principle is a brief statement that condenses the attitudes of employees and purports a company image for its service or product(s). Examples of some current and past well-known organizing principles:

Federal Express -- "On Time"

People Express -- "Low Prices" (5:59-62)

IBM -- "Superiority and Service"

Sears -- "Convenience"

Change The Culture: A Prerequisite to A Quality Shift in Paradigm

Few organizations, particularly technical organizations, believe they can do anything about their cultures. Some do not consider organizational culture at all. They just do what they do and the culture evolves to be what it will be. However, in the past two decades a lot of excellent work has been done toward developing and refining precepts that have proven successful in designing and implementing organizational change (6,11,12,13). So this lack of attention to cultural change is fascinating, particularly since some of the concerns with TQM/TQL have been centered around the ability to apply Deming's work to the American culture and to knowledge-based as well as production organizations. Too often it is assumed that systemic changes will automatically result in the desired culture or cultural changes. Many a disappointment has resulted from this faulty logic.

Organizational culture is the "shared values, beliefs, expectations and norms" (6:310) of an organization. It is comprised of the basic assumptions that are held and taken for granted by members of the organization (13:15). Culture can and must be consciously developed if we are to create quality paradigm shifts. Rarely does a desirable culture happen by accident. Cultural change must be meticulously designed and worked in parallel *and* with the same vigor as systemic change. In *Corporate Transformation*, Kilmann and Colvin write, "Corporate transformation is serious, large scale change that demands new ways of perceiving, thinking and behaving by all members of the organization" (6, xiv).

Briefly, what do we know about cultural change? We know that without cultural change any transformation of an organization will be flawed if not impossible. Too often, managers have tried with poor success to change culture by implementing a plethora of programs -- many of which have been manipulative games. We also know that cultural change is most likely to happen when people see the present as negative and see an alternative as being more attractive (6:50,51). Unfortunately, negative conditions exist in most parts of the world today. The good news is the environment is ripe for change. The positive alternative can be presented through the vehicle of vision and a series of short and long term successes.

Victor Vroom's expectancy theory points out that if you want to motivate people and work toward a positive future, there has to be a link between performance and reward. When managers hear this they think, "that's great but it will cost me a bundle." The problem is usually an equitable allocation of resources based on performance. This demands the re-creation of performance appraisal and compensation systems. "There is the pain of accountability and there should be the pleasure of appropriate rewards" (7:78). The subject of compensation is so steeped in tradition and obsolescence that many believe it to be unchangeable. However, the volatility of our environment will not exempt even this sacred cow from change.

There are many opportunities for non-monetary rewards that have barely been considered in organizational change activities. For example, a great deal of time is spent in writing job descriptions and other functional descriptions. We know how to describe work. However, we spend little time looking at what behavioral requirements are necessary to succeed at a job, given that the requirements of the job description are being fully met. Although we might have exactly the same job description across departments, membership in different groups with unlike bosses means that a significantly different set of behavioral expectations is necessary (5).

Most jobs have a set of specifications (education, experience, skills, etc.) -- the things you put on a resume. At the same time we all have preferences (ways) in which we wish to apply our skills and abilities to meet the demands of the job. But individual preferences are all but ignored in job design. When there is a large gap between the requirements of the job and our preferences, we will probably either change the job and tell no one, be bored and retire on the job, be stressed and not be as effective as we could be or quit (5). Job requirements and individual preferences can be measured and matched very inexpensively, especially in relation to the large cost savings as a result of increased productivity and greater worker satisfaction.

If we agree that changing organizational culture takes energy, then we should be able to accept that if individual preferences are being met as much as possible by the job and work environment, individuals will have the energy necessary to meet the challenges of change. This is not to say that to change you must give people everything they want, that's impossible, but it is possible using many no-cost or low-cost opportunities to match people with their jobs and work environments. Today there are many excellent inexpensive instruments with very high validity and reliability for optimizing these matches. These instruments also help to create a language for discussing culture. From our point of view, it is as important to communicate on the subject of culture as it is to communicate on other subjects of technology.

The use of multiple instruments or data gathering tools, coupled with the right questions, gives us a way to view an existing culture and define a more desirable new one. Some questions that give us insight about an organization's culture include: What is the image of your organization? What would you like it to be? What are your sources of power? What do you think they will be in the future? What set of assumptions got the organization where it is today? What are right assumptions for the future? By knowing how an organization's future is viewed and having insight into how a desirable future can be viewed, cultural change can occur. Organizations must work toward eliminating bureaucratic attributes and establishing a culture that is entrepreneurial (2:48-91 and 7:78-87) and capable of global competition.

Bureaucratic Cultures	Entrepreneurial Cultures
• Rigid thinking -- few or no alternatives	• Flexible, innovative options are a way of life
• Minimizing the space for maneuvering	• Maximizing space, autonomy and self-organization
• Strong cloning influence; through rigid controls	• Shared values and understanding, maximizing individual freedom in gaining results
• Maneuver situations and, at times, people	• Service oriented
• Manage information and plans carefully, to our own advantage	• Share information and plans for the common good
• Being strategic and instrumental in our relationships	• Make commitments and keep them
• Preoccupied with gaining approval from those above us	• Encourage self-expression
• An "it's not my fault, no matter what" mentality	• An acceptance of accountability
• Being cautious in telling the truth	• Strongly advocate integrity and openness

As Morgan observes, bureaucratic organizations tend to be variety-reducing systems that take complex and uncertain patterns of information and through rules, programs and standard frames of interpretation, try to filter the variance and create conformity (7:17,18) . This all but eliminates innovation and entrepreneurial maturation. Creative organizational designs of the future will concentrate on creating learning organizations. These organizations will avoid simply designing their actions using a single loop learning model which approaches a group learning experience with the assumption that they are there to win and not lose, that they should secure unilateral control of group situations and that, at the same time, they should suppress any emotions. Learning organizations will use a double loop style which makes explicit and continuously explores not only the issues themselves, but also the learning behaviors, defense routines and personal interactions engaged in by group members and identifies the mental models that have led to the way problems and opportunities are being framed. The second loop means developing a different learning model and changing mind sets. The behavior here is one of openness, real listening and a readiness to change one's mind (15:115-119). These organizations will concentrate on formulating and responding to the *RIGHT* questions as opposed to wasting time on answers that have addressed the *WRONG* or *convenient* questions.

A Move From Management to Leadership

Recently there has been a push to differentiate management and leadership. The notion is that management is more interested in creating efficient systems, whereas leadership is also interested in creating the quality relationships that make the systems work. Leaders are intensely interested in selecting and developing the right people for the right jobs and giving them the freedom to figure out the "how-tos." Rather than relying on excessive controls, leaders tend to focus on (7:77-78):

- A shared sense of overall vision and values
- Agreement on accountabilities
- Resources that flow in both directions
- Bi-lateral information systems
- Appropriately rewarding performance

It has been observed that leaders create and change cultures, while managers live within them (13:5). Relationships are at the heart and center of the capitalistic system (4:64). Relationships are the catalyst that make systems work, not only in responding to future environments but in helping to create them.

A doctorate in psychology isn't necessary for leaders to effectively nurture relationships. It does, however, require some degree of perception and a fundamental understanding of group dynamics that can be gained either through formal education or through the assistance of business educators or consultants. Group dynamics has been defined as "behavior and interaction of a group as a whole" (15:118). When we understand group dynamics we understand how individuals impact the group and how they are impacted by the group, and we have a language to discuss pertinent issues. Successful paradigm shifts of the future will rely on group processes to accept conflict as a way of life and use it as a vehicle for creativity and a way to build the organization. Leaders will learn the nature of defense routines and work with them effectively for the benefit of individuals and the group as a whole. They will avoid the traps associated with "making matters undiscussable and to make the fact that they are undiscussable itself undiscussable" (15:115,116). In the past, managers of technical organizations had to rely primarily on knowledge of their own technical discipline for success. Technical leaders of the future must also employ group dynamics precepts to succeed. They will be adept at applying teambuilding and collaboration skills to address such common group issues as those detailed below.

Issues for New or Evolving Groups

- Discovering conditions for "membership"
- Discovering behavioral boundaries
- Handling deviant or unpopular behavior
- Developing decision-making mechanisms
- Inventing procedures or working agreements
- Determining what types of leadership functions are needed for each situation
- Determining how power is acquired
- Considering how to organize for activity
- Inventing communications patterns
- Discovering ways of giving appropriate feedback

Facilitation tools such as brainstorming, nominal group techniques, and multi-voting often are used improperly and assumed to foster behavioral changes in groups and individuals. Although these and other similar tools are excellent for certain applications, they are not designed to sustain lasting behavioral change. The deeper behavioral modifications essential for cultural change and a quality paradigm shift go beyond the bounds of classical facilitation.

Unquestionably there are a number of uses for facilitation in TQM/TQL activities; however, we must realize that rules and procedures do not create lasting internal changes in the way groups or individuals view the world or each other. The effective use of group dynamics produces changes in perceiving and thinking, as well as doing.

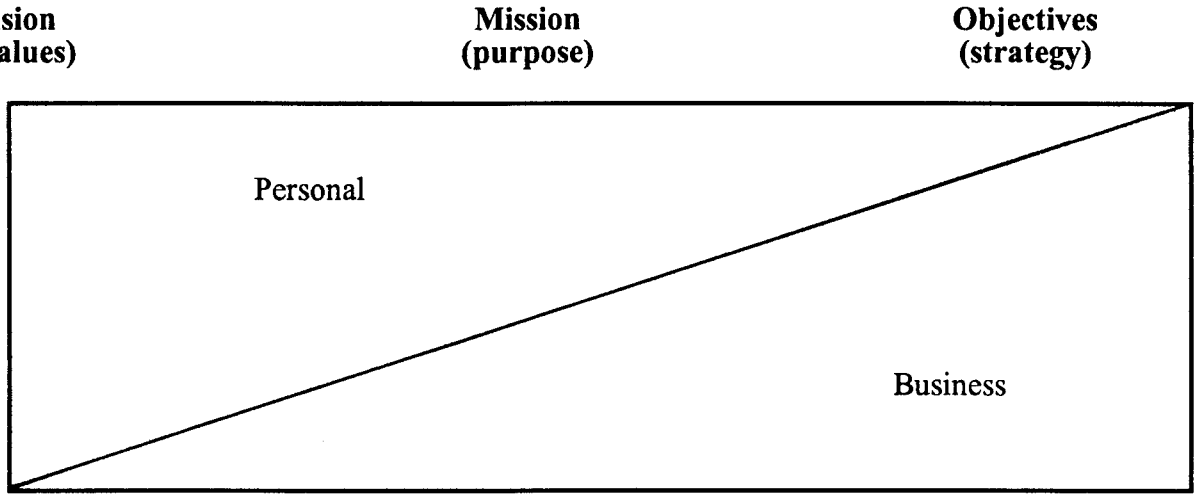
Successfully Shift the Paradigm

Successfully shifting the paradigm requires the integration of vision, strategic planning and work processes, all within a framework of group dynamics. Stacey points out that without operational content, strategic plans, mission statements and visions can become bypass games (15:116). Plans are often entombed in volumes that fit into large binders that no one reads, much less uses and updates. At the other extreme are plans with lofty sounding objectives that do not specify the *who* and the *when* -- the specifics necessary for implementation. Strategic plans, like visions, should be formulated by those responsible for their implementation.

Strategic planning and goal setting, coupled with a clear and precise vision, are precursors to successfully shifting the paradigm. Effective strategic plans should include clearly and concisely stated objectives, goals, strategies and tactics.

> Objectives: clearly stated desired results that must be accomplished for an organization to achieve its vision; it is these objectives that set the overall direction of the organization, communicate the organization's vision in tangible terms, and set targets.
>
> Goals: quantification of an organization's objectives to provide a mechanism to measure progress. Goals are specific, measurable, and have a time limit.
>
> Strategies: specific methods or approaches to be used to accomplish the goals; organizations should identify and organize around what they do best -- called core competencies -- and strategies are based on these competencies.
>
> Tactics: detailed actions developed to accomplish the strategies; the tactics specifically define *who* and *by when*; tactics provide the operational content of a strategic plan.

In order to sustain a quality cultural change and complete the paradigm shift, the implementation of vision, mission and strategic planning requires the integration of work processes and group dynamics. TQM has excelled in the area of work process, but to achieve a meaningful change in culture, the further use of group dynamics and a thorough understanding of how to develop team relationships is fundamental. It is through group dynamics that the successful integration of mission, vision, strategic planning and work processes is achieved and a successful paradigm shift is made. The figure below is a representation of vision, mission and strategy and the relationship that each has to the individual and the organization (2:108). The larger the area designating personal (individual) or business (organization), the more dominant the existence of either vision (values), mission (purpose) or objectives (strategy).



What does it take to keep a cultural change alive and progressing indefinitely? The application of group dynamics by individuals who work together to shape organizational cultures. Human performance technology is a field of practice that has evolved as a result of the experience, reflection and conceptualization of professional practitioners striving to improve human performance in the workplace (16:3). This emergence of human performance technology will give leaders of the future the multi-disciplined perspective needed for managing the unknowable; however, as we strive for excellence, we must recognize that externally measured excellence isn't enough and that true, sustainable change begins with real change inside organizational leaders. Cultural change and transition is a complex process that must be managed, with the recognition that the results take time, but that without cultural change any TQM implementation process will be flawed if not impossible.

Application of the Change Process

For the last twenty years we have applied many of the organizational change precepts presented herein to *Fortune 500* companies and small businesses. We have applied them to private sector organizations as well as to Government organizations. The range of application covers financial institutions, aerospace, health care and a variety of other organizations and agencies.

For the past two years we have refined the process of selecting and honing the precepts that we think will be most appropriate for the chaotic unknowable environment of the 1990's and beyond.

These precepts were recently applied to a DoD agency that does work in the area of weapon systems. This agency is responsible for a wide range of functional areas including: engineering, logistics, business operations, program management, technical documentation, and weapons field/technical support services. The agency is in an extremely turbulent environment. Since this program was initiated they have been hit with downsizing, being merged with another organization, and the leader having to spend about 75% of his time at a geographic location away from his organization. When the effort started, each functional area was a fiefdom unto itself. There was no team work, no vision, no plan. Having shifted their paradigm, even with the merger and a turbulent future they now function as a team pulling in a common direction although their leader is missing most of the time. The precepts work and are the way to successfully implement TQM/TQL by shifting the paradigm through systemic and cultural change -- change that will be continuous, alert for increased effectiveness and efficiencies, vigilant for complacency and sensitive to any deviation from shared values.

In Summary

The world has changed so significantly in the first few years of this decade that business conditions and premises that existed as recently as the 1980's are already outdated in the early 1990's. World conditions will continue to dominate; both public and private enterprise must learn to monitor and manage continuous change. A transformation of management and organizational precepts are required, and **only those organizations prepared to make a true paradigm shift will be around to usher in the new century.** The keys to successful TQM/TQL implementation and a quality paradigm shift are summarized in the following points.

> True change must be developed, not decreed. It takes a parallel effort of systemic and cultural change; it requires a concentration on less management and more leadership.
>
> Behavioral change is the foundation of any organizational cultural transition. Successful cultural transition and quality change implementation is dependent upon the integration of vision, strategic planning and work processes within the framework of group dynamics.
>
> Employing a double-loop learning style, successful organizations gain time and momentum through formulating the right questions, rather than perfecting the wrong answers -- *doing RIGHT things right.*

Cultural transformation and change occurs in sputtering fits and starts, sparked by ideas and incidents, and can smolder for years. Organizations have been trying to create strategies for a quality change. A clear, vibrant vision is required; until you have that, all talk of strategy is meaningless. Once an organization understands why it exists (mission) and where it wants to go (vision), it can construct bridges between the old and the new and can began the process of successfully shifting the paradigm.

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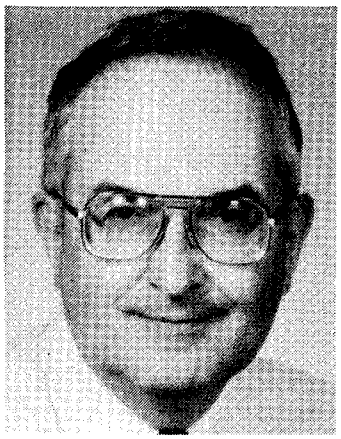
CONSTRAINT ANALYSIS: THE MISSING INGREDIENT IN PROCESS ACTION TEAM ASSESSMENTS



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CONSTRAINT ANALYSIS: The Missing Ingredient in Process Action Team Assessments

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ABSTRACT

The typical Process Action Team (PAT) often relies heavily on conventional StatisticalProcess Control (SPC) tools to identify problems and develop solutions. A good PAT will focus on the big picture as it integrates the interests of the customer, organization, and workers. Using conventional methods, bottlenecks are perceived as something to be overcome and not as a cornerstone for systematic analysis. Using a Theory of Constraints (TOC) approach, bottlenecks provide the basis for defining capacity of a system, and with that definition, to better develop process improvements that support goal attainment.

This paper presents the notion of a system constraint, the implications of a constraint, and the benefits of its recognition to the assessment and improvement of a process.

OVERVIEW

A process action team (PAT) has as its charter (ideally) the task of "improving" a designated process. The PAT will set its sights on what is accomplished by the process. Then, it tackles inputs and necessary conditions of the process - how, who, when, and where. PATs with a "big picture" focus, will assess activity that works well, as well as activity without apparent problems. A PAT using theory of constraints (TOC) is more likely to identify "bottom line" considerations and develop a "bottom line" improvement.

In this illustration, a PAT has been chartered to improve the process, although the widely acknowledged complaint was "turn-a-round time is too long." The PAT will use a conventional approach and recommend an improvement that falls short of the mark. The analysis will be carried further using a TOC approach to achieve a more comprehensive assessment and a better solution.

THE PROCESS AND THE PAT

To illustrate the asssessment with and without a recognition of constraints, a hypothetical administrative process is used. It consists of five work sites - A, B, C in one building, D and E in two different buildings. Workload (inputs to the process) averages 250 authorizations (work units) per week. Process time at each work station (WS) and transfer time between stations are known. A PAT has been chartered. None of the PAT members knows about theory of constraints, none has read The Goal.

METHODS AND DATA

After completing flow charts and collecting a variety of information on the process, the PAT proceeds to assess the movement of work through the process. An overview of the process is used to develop a data collcetion plan. Data for the current process (status quo) is shown in Table 1, details follow.

Table 1. Queue, Process, and Transit Times per Unit for Status Quo

Work Station (WS)	Avg Units in In-box (Queue)	Process Time/unit (avg)	Out-box + Transfer time (avg)
A	25	5 min	240 min
B	25	4 min	240 min
C	125	10 min	480 min
D	48	3 min	480 min
E (in)	48	6 min	
(out)	48		480 min
		28 min	1920 min

Average units in the queue is the average in-box count determined at the time of transfer (receipt), except for E, where both intake and output are counted. Processing time per unit is stable with no more than +/20% variation. Out-box and transfer time refers to average time from completion (placement of unit in out-box) to arrival at the next WS.

Two times each day (8 AM and noon) a clerk from A, B, or C moves completed work to its destination in the building. Thus, out-box time plus time in transit averages 240 min (480 min / 2). Movement between buildings is once per day and averages 480 min. Except for station C inbox, number of items in the pipeline approximates the average daily requirement (50) divided by the number of transfers each day. Some handcarry units are processed each month, all requiring average process time - but their queue and out-box/transfer times are not considered here.

Average in-box count is based on 15 sample days taken at the time of transfer from the previous station, except at A and E out-box. At A, in-box items arrive at random. They are counted two times (noon and 4:30) and entered into the process. Each count is based on units added to the queue plus any units remaining unprocessed from prior transfers. Except for C, in-boxes are usually clear when the next batch is delivered, due to the priority nature of the work.

The backlog at C is not incidental. Overtime work is authorized when workstation backlog exceeds three (3) days. Station C has needed overtime about once every five or six weeks since the 'early out' of an experienced worker whose slot could not be

filled. However, C has always had a full in-box, especially when volume is above average.

PROCESS LEAD TIME (PLT) - THE PIPELINE

The PAT wants a measure of Process Lead Time (PLT), the actual time it takes to process authorizations from the in-box at A through the out-box pick-up at E. They considered definitions for measurement, including: (1) queue time - in-box time awaiting process, (2) process time, (3) delay time - delays during process, (4) down time - process is stopped, (5) hold time - out-box time awaiting transfer, and (6) transfer time. They debated not using a time value for in-box units, queue time (1), at each work station, since the amounts vary from day to day and the large amount at C might bias their analysis. Further, queue time might be viewed as double counting, since the out-box and transit time from the previous station is already counted. This position was not supportable since in-box time (time awaiting process action) is part of the pipeline, and is separate from the out-box & transit time. Another form of time requirement, delays while in process (3), was found to be of no value to the study since all information and resources (forms, stamps, computer files, etc.) are always available. Down time (4) was not an issue. It was agreed that (5) and (6) be combined for simplicity. (A similar classification for industrial applications is given in The Goal [1], pp 231-2.) Using the above categories, Table 1 data accounts for all time categories required.

A meaningful reduction in turn-around was envisioned. PLT has been reduced in industry by using small transfer batches. In this administrative process, an increase in the number of times work is moved to the next station will reduce the number of items moved. This would reduce the average number of items in each queue and would reduce the out-box hold time as well.

The experiment was planned to run for 10 work days. It involved a transfer of out-box items every two hours within the one building, and every four hours between buildings. At A, work would be counted and available every two hours. At workstation E, the off-cycle delivery of units would involve a corresponding movement of completed work back to the central mailroom. Data measuring the status quo (15 workdays) and the 10 day experiment are given in Table 2.

As can be seen in Table 2, increasing transfer frequency has the expected major effect on PLT. Out-box/transit times are all reduced by 50%. In-box queue times are also reduced by 50%, except at station C. Reduced out-box waiting and transfer time is considered permanent if retained, since it is not subject to work load variation. The in-box queue count (and time) is subject to variation in demand (work load), and will increase with above average requirements. With these gains locked in, the PAT sought other areas to improve.

Table 2. Process Lead Time - Experiment #1 vs Status Quo

a. Queue Time:

Work Station	Time/Unit (avg)	- Status Quo - Avg Units in Queue	Queue Time	- Experiment #1 - Avg Units in Queue	Queue Time
A	5 min	25	125 min	13	65 min
B	3 min	25	75 min	13	39 min
C	10 min	125	1250 min	117	1170 min
D	4 min	48	192 min	24	96 min
E	6 min	48	288 min	24	144 min
Totals			1930 min		1514 min

b. Out-box & Transit Time:

Within bldg	<480m /2 =240m	480 min	480m /4 =120m>	240 min
A-->B, B-->C				
Between bldgs	<480m /1 =480m	1440 min	480m /2 =240m>	720 min
C->D, D->E, E->mail rm				
Totals		1920 min		960 min

c.	Process Time:	28 min	28 min
d.	Totals (a+b+c)	3878 min (8.1 days)	2502 min (5.2 days)

Increasing transfer frequency has a major effect on PLT. Out-box/transit time is reduced by 50%. The in-box queues are also reduced by 50%, except at station C. Reduced out-box time is permanent, not subject to variation in workload. Reduced in-box queue will vary, and be increased during times of above average requirements. With these gains locked in, the PAT sought for other areas to improve.

IMPROVEMENTS at WORK STATION C.

The PAT was concerned about the queue at C. Even during experiment #1 the in-box count (queue) increased by one or two units per day. On checking the sequence of tasks performed at B, C, and D, it was determined that work station B could handle portions of the normal activity of C. Both B and D had substantial reserve capacity. An improvement at C could be achieved by shifting one worker from B to C. For a clear test of the impact on B and on the queue at C, an experienced worker was transferred from B for one week test.

The increased transfer rate from Experiment #1 was continued for this test. This was considered a minor change, having little effect on the process, so data was collected at B and C only. Table 3 shows the impact of Experiment #2 on B and C, and the respective process totals.

Table 3. Experiment #2 - Resource Transfer from Station B to C

Work Station	- - Experiment #1 - Avg Units in Queue	Time/Unit (avg)	- Experiment #2 - - Avg Units in Queue	Time/Unit (avg)	Difference per Unit
B	13	3 min	15	4.5 min	+ 1.5 min
C	123	10 min	117	9 min	- 1.0 min
Process Tot.		28 min		28.5 min	+ 0.5 min

Units in the queue at C dropped to only 117. Further, the sharp increase in unit process time at B (+ 50%) was not a desired outcome. Although output at C was higher (unmeasured), the negligible decrease in the queue at C was disappointing. It led to the hasty conclusion that the lower queue may have been due to reduced capacity at B. It was noted that input at A had increased to 265 during the test, but this was considered routine volume, much less than a surge (280+). The negligible gain at C was not worth the cost, and, total processing time would be increased by two hours per week (250 units * 0.5 min/u = 125 min)

INITIAL PAT FINDINGS.

The PAT would recommend keeping the increased delivery schedule of Experiment #1 in place. It would recommend overtime at C to keep its backlog under 100 units (2 days' work). This would retain the significant reduction in turn-a-round time achieved by Experiment #1 and put a lid on the queue at C. The PAT believed it could safely claim a process improvement, its charter objective.

THE CONSTRAINT - A REASSESSMENT.

But wait, has the PAT really addressed the underlying problem? No, not if you recognize constraints as revealed by Eli Goldratt in "The Goal." He defines a constraint or bottleneck in a process as any resource (work station) whose capacity is equal to or less than the demand placed upon it ([1], p 139), or as a resource that limits throughput (goal attainment). Bottom line question - is the system capable of processing the volume of work required of it? We can make that determination using information already at hand.

First, determine for each station the time requirement for processing its tasks, then determine the number of units that can be processed per hour (or other time increment if task times are longer). The resource or work station with the lowest capacity (per hour, day, week, pay period, etc.) is the system constraint. Other things being equal, output at the constraint limits output of the system. Table 4 shows capacity of each resource and identifies the system constraint.

Table 4. Work Station Capacity and System Capacity - Status Quo

Work Station	A	B	C	D	E
Process Time/Unit (min)	5 min	3 min	10 min	4 min	6 min
Capacity (units/hr)					
As independent stations	12	20	6	15	10
As a system: per hour =			6		
per 8 hour day =			48		
per 40 hour week =			240		

Work station C is the constraint. Its output limits output of the process. Even without Table 4 data, identification of the constraint can be made. The presence of a backlog at C could occur due to any of several causes: a side effect of some major "down time" incident at A, B, or C; a surge in requirements (defined as 280 or more); a scheduling goof; or a capacity limitation. A major down time incident did not occur, neither did a surge of requirements (265 is considered routine). Scheduling is not an issue because requirements enter the system randomly (at 250 per week average). Limited capacity is the cause of the backlog at C. The shortfall in capacity has been endured by periodic use of overtime.

SYSTEM CAPACITY

It is useful to view the process as a system. Response to the weekly workload of 250 units requires prompt performance by all 5 work stations. All must be able to handle the full requirement, otherwise a queue will form at the constraint. The early-out of a station C employee seems to have down-sized its capacity below 250, and a queue developed.

Every process will have a capacity ceiling. It is not a stigma to be employed at the constraint - every process has a capacity ceiling and a constraint. It is better to know what that ceiling is, where the constraint is, and be proactive - rather than let things slide and see where a queue develops. In this situation, the capacity ceiling is below the current work load, the constraint is at C, and an adjustment to system capacity is needed.

Status quo capacity is given in Table 4. Its data shows system capacity (based on the constraint) is less than the average workload of 250 per week. At this capacity, the queue at C will increase at an average rate of 2 units per day or 10 per week until offset by overtime work. A surge in requirements, however small, will directly add to the queue at C. During Experiment #2 (one week), input to the system was 265 units, directly adding 15 units to the queue (265 - 240), which offset most of the increased capability at C. While important to the PLT target, shortening transit times and queue times has done nothing for this underlying capacity problem.

EXPERIMENT #2 REVISITED.

The proposed shift of resources from B to C (Experiment #2) looks good from a TOC perspective. Station B is a non-constraint with extensive reserve capacity, and C is the system constraint. What is the impact of Experiment #2 on the capacity of B and C and the process? Table 5 shows its effects.

Table #5. Capacity Under Experiment #2 Resource Transfer

Work Station	A	B	C	D	E
Time / Unit	5 min	4.5 min	9 min	4 min	6 min
Capacity (Units/hr)					
As Independent stations	12	13.33	6.66	15	10
As a System: per hour =			6.66		
per 8 hr day =			53		
per 40 hr week =			266		

Output of C increases from 6 to 6.66 per hour, while output of B is reduced from 20 to 13.3. With fewer resources, B can still complete twice as many units per hour as C, and does not limit the system (become the system constraint). Longer process time at B generates no added cost, and, adds nothing to overall processing time because it the extra increment of time is reserve capacity used between the scheduled out-box transfers.

At C, the seemingly trivial increase of 0.66 per hour is an 11% improvement in system capacity (0.66 / 6). This increase enables C to reduce the current in-box queue by an average of 16 units per week (266 - 250). At that rate of gain, the queue at C will stabilize in about 8 weeks (123 u / 16 u per wk = 7.7 wks). The queue at C will stabilize at about 13, the average transfer batch level (50 u/day / 4 trans/day = 12.5). Improved capacity at C enables the process to function smoothly with requirements at or less than 266 per week (Table 5.). The long term queue performance at all stations under combined Experiments #1 and #2 is shown in Table 6.

Table 6. Original Queue Times vs Experiment #1 Transfer Plan and Experiment #2 Resource Reallocation - Five Days and Long Term

		Exp #1 and Exp #2 combined (one week trial)		Exp #1 and Exp #2 combined (long term)	
Station	Table 2 Queue Times	Time/Unit (avg)	Av Units in Queue	Queue time	Av Units in Queue	Queue time
A	125	5 min	13	65	13	65
B	75	4.5 min	13	59	13	59
C	1250	6.66 min	117	779	13	87
D	192	4 min	24	96	25	100
E	288	6 min	24	144	25	150
	1930			1143		461
	(3.8 days)			(2.4 days)		(1.0 days)

Table 2 data is displayed in Table 6 to show the status quo queue times before the resource shift from B to C. Data for the one week trial is shown to expose the unwitting rejection of a good proposal. The queue at C was reduced due to the more frequent transfers, but had absorbed the full impact of the above average demand (265 vs 240 capacity). Queue counts at D and E are higher (25 vs 24) in the long term due to increased capacity at C (50 units per day / 2 transfers per day = 25). Variation in work requirements exceeding 266 per week will cause a temporary backlog at the C which it will diminish at a rate consistent with its new capacity.

REVISED PAT RECOMMENDATIONS

The PAT has tested two alternatives to the status quo. Both of these proved to be significant. Experiment #1 increased the frequency of transfers of work units. This reduced the number of units moved, the number of units in the queue, and the number of units awaiting transfer in each out-box. Reductions in PLT were significant. Experiment #2, based on a TOC approach, addressed the bottom line issue of capacity. By increasing capacity at the system constraint, the system is better able to meet average and above work loads. A summary of performance data is presented in Table 7.

Table 7. Process Lead Time Comparison

	Status Quo	Experiment #1 only	Experiments #1 and #2
Queue time	1930	1534	461
Process time	28	28	28.5
Out-box/transit	1920	960	960
	3878	2522	1449.5
	(8.1 days)	(5.3 days)	(3.0 days)

It can be seen that the small increase in process lead time due to the Experiment #2 reallocation is meaningless. Improvement in system capacity due to Experiment #2 looks small but is significant. The PAT has little choice but to recommend the changes proven significant by Experiments #1 and #2. The impact of each is important, the impact of both is a significant improvment in customer service via capacity and lower turn-a-round time.

POST MORTEM

The PAT an excellent job in reducing transfer times. It did not surface the "bottom line" question regarding capacity to provide service until TOC concepts were applied, late in the assess-

ment. Without identifying work station capabilities and the constraint, capacity was not clearly defined and reallocation of resources from a non-constraint was little more than a guessing game. Assessment of process capacity, identifying constraint and non-constraints, and determining reserve capacity, are areas that TOC can add to the typical PAT assessment of administrative or services activity. The pay-offs can be significant in a down-sizing environment

LESSONS LEARNED

1. Processing time may be a very small fraction of the process total.
2. In-box queue time will be shortened with more frequent transfers at non-constraints.
3. Out-box hold time will be reduced with more frequent transfers.
4. The driver may have been turn-a-round time, but the real issue was capacity
5. When downsizing, the impact on process capacity should be assessed.
6. An increase in processing time at a non-constraint may have no impact on PLT or cost.
7. System (process) capacity is determined by level of output at the resource with the lowest capacity, the constraint.
8. Degrading capacity at a non-constraint may have no impact on process capacity (but could establish a new constraint).

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3. Eliyahu M. Goldratt and Robert Fox. The Race. North River Press, Croton-on-Hudson, NY. 1984

4. Eliyahu M. Goldratt. Theory of Constraints. North River Press, Croton-onHudson, NY. 1991

MODERN FLOW CHART SOFTWARE

Vade Forrester

Modern Flow Chart Software

By Vade Forrester

Process improvement is a basic Quality goal. One must thoroughly understand a process to systematically improve it, and no instrument in the Quality toolbox gives more insight into a process's operation than the flow chart. Although it is the underlying process logic that we seek to understand, at some time it will be important to present the process flow chart for others to inspect, whether in a periodic report from a Process Action Team (PAT) to the process owner, or perhaps in a training document. It will then be necessary to print the flow chart. Fortunately, there is an abundance of personal computer (PC) software designed to perform that task. The purpose of this article is to survey some of those programs and evaluate the strong and weak points of each.

Let's begin by establishing criteria appropriate to judge the software. First, the software must be **easy to use**. Most people use flow chart software infrequently, so having to master a complex, unintuitive program is unacceptable, and, fortunately, unnecessary. Factors contributing to ease of use are availability of **graphic shapes**, **text handling**, and **connector technology**. Flow chart programs should automatically generate the relatively few shapes used to construct a flow chart. Entering text inside those shapes should also be easy, with automatic horizontal and vertical centering inside the shape and expansion of the shape if the text overflows. Finally, it should be easy to draw the lines that connect the shapes and indicate process flow.

Second, the program must produce flow charts that are **attractive and easy to read**. Third, the flow charts must be **easy to modify** in case we either change the process or perhaps gain new insight into how it performs. Fourth, the flow chart program should readily **exchange data with other programs**. For example, we may want to incorporate a flow chart in a storyboard. If the storyboard is developed with a graphics program, such as Corel*Draw!*, there should be an easy way of transferring the image. Or perhaps we need to include a flow chart in an article - like this one. It should be easy. Let's use a rating scale of one to five points, where one is poor, two is fair, three is good, four is very good, and five is state of the art.

Most software companies currently focus most of their development effort on Microsoft's Windows environment, since it offers major advantages, especially for graphics programs. But there are still quite a few non-Windows flow chart programs, which we shall refer to as DOS programs. (DOS is slang for Microsoft Disc Operating System.) DOS programs generally require less powerful computers than Windows programs. Windows manages computer memory better than most DOS programs, and makes exchanging data and images quite easy, at least with other Windows programs. With a DOS program, you must save the flow chart as a graphic image and then import it into another document. Thus, any Windows flow chart program should score well on the data exchange criterion.

Windows programs.

System requirements. Microsoft's Windows 3.1 manual claims the operating system will run on a computer with an Intel 80286 processor chip, one full megabyte (Mb) of random access memory (RAM), and six Mb of hard disk space. That means it should run on a Zenith Z-248 machine. While it's true that the operating system will load and run on such a machine, it would be excruciatingly slow. Minimum realistic equipment requirements for running Windows, and the Windows programs mentioned below, are a computer with an Intel 80386 (or equivalent) running at 20 megahertz (MHz), 4 Mb of RAM, and a 120 Mb hard disk. Windows' performance improves as you add memory and increase processor speed. Eight Mb of RAM will make a noticeable performance improvement, and should be sufficient for most users. Hard disk prices are currently in the range of $1 per Mb, so a 250 Mb hard disk is a reasonable requirement, especially since Windows programs typically take lots of room. Ami Pro 3.01, which was used to write this article, takes 12.5Mb of space, while Microsoft Word for Windows takes about 15 Mb. A designer graphics program such as Corel*Draw!* 4.0 is so large that it ships on two CD-ROMs, which are capable of storing 680 Mb each! But that includes 18,000 pieces of clip art and 750 fonts. In addition to disk size, disk speed should be as fast as possible. Windows stores lots of program code in dynamic link libraries (DLLs) and reads them from the disk when required. Most hard disks available today (August 1993) have average access speeds in the 10-16 millisecond (ms) range, which is adequate. Windows ships with a disk cache program called SmartDrive that speeds up disk operations considerably.

VISIO

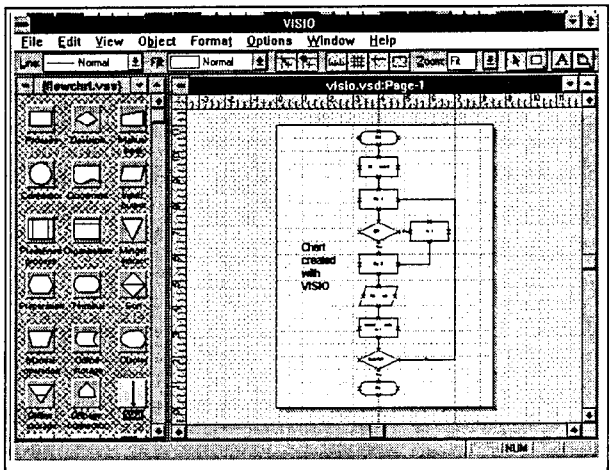


Figure 1: main VISIO screen

Billed as a graphics program for non-artists, VISIO uses shape collections it calls *templates*. To draw a flow chart, first choose the flow chart template (FLOWCHRT.VST). Then, with the mouse, click on a shape with the left mouse button, and, holding the mouse button down, drag the shape onto the working area. The working area has a grid which makes it quite easy to align the shapes, which snap into alignment with the grid lines. As you can see in Figure 1, VISIO has quite a few shapes to use in the flow chart, and that's just one of 17 templates available. To enter text in a shape, just click on the shape with a mouse and start typing. The text is centered vertically and horizontally within the shape. To connect two shapes together, find an appropriate connector on the template, and drag it onto the working area. Place the connector so one end connects to the exit point on one shape. Then click on the other end of the connector and drag it to the connecting point on the next shape. The connector's ends turn red to show they are *glued* (to use VISIO's term) into place. What that means is that if you move a shape, the connectors stay attached at the connecting point. But VISIO makes you use different connectors for different connecting routes, while most other programs get by with a single connector tool, which is decidedly more convenient.

Sometimes when the connectors follow a path other than a straight line or a simple curve, they run under some of the shapes or on top of other lines, making them virtually unreadable. You can work around this problem by combining several connectors and modifying their line characteristic so only the one pointing to a shape has an arrowhead, but that's not a straightforward process.

Like most Windows programs, VISIO lets you select some or all of the shapes on the working area with the mouse, copy them to the Windows clipboard, and then paste the shape into another Windows program, like a word processor or graphics program.

It's fortunate that VISIO is quite intuitive, because it suffers from a poor manual that scarcely explains how the program works. Oddly, for a program that touts usability by non-artists, VISIO's manual seems preoccupied with ways to achieve advanced artistic effects.

VISIO's printed output (Figure 2) is quite attractive. If you get the connectors to follow your preferred routes, you can produce charts that look as good as any program's. But that's not always possible.

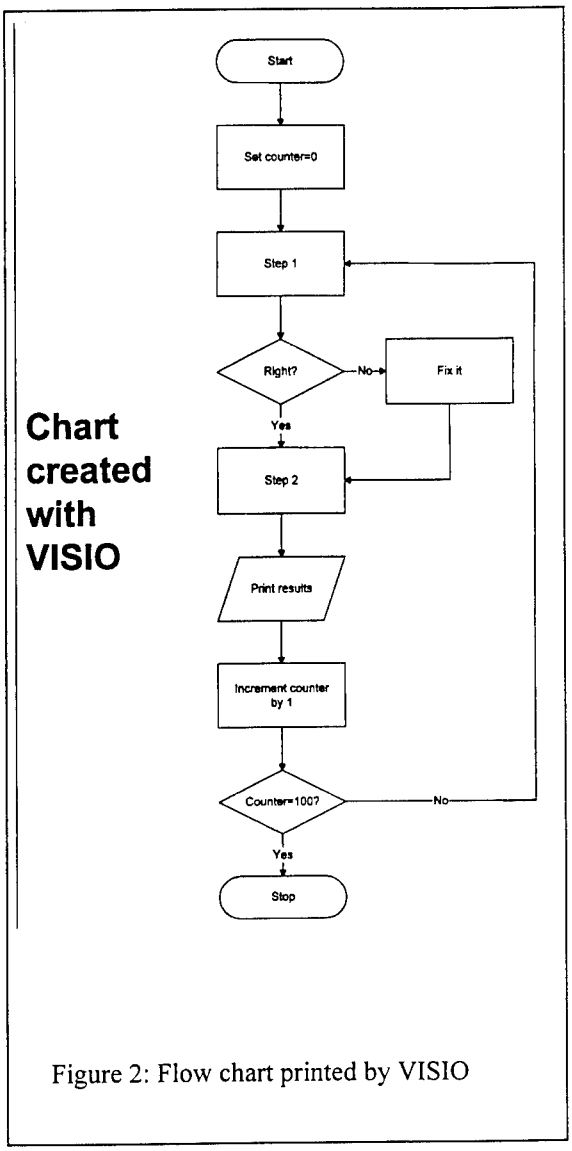


Figure 2: Flow chart printed by VISIO

The ratings: Ease of use - 3.0
Attractiveness of output - 4.5
Ease of modification - 3.5
Data exchange - 5.0

Chartist.

Chartist is a shareware program, which means it is not distributed commercially. Instead, its author places it on electronic bulletin boards or in shareware libraries and encourages people to try it out for 30 days to see if it meets their needs. If you want to use it beyond the trial period, you must pay the $70 registration fee, which is quite reasonable.

The screen shot in Figure 3 shows that Chartist is fairly austere; no fancy screen like VISIO. However, it provides most of the essential functions needed in a flow chart program. The center of the screen is the work area where the flow chart is built. On the right side of the screen is the shape collection, called the *palette*. You can select the shapes you use most often from Chartist's library and place them on your palette for easy access, just as an artist places certain colors of

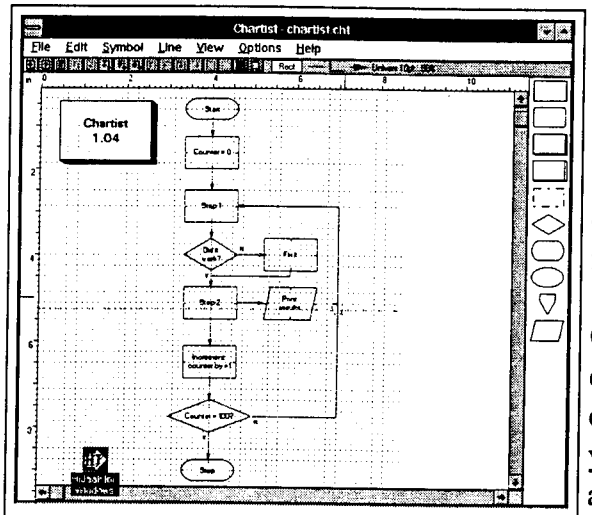


Figure 3: main Chartist screen

paint on the painter's palette. Along the top of the screen, just under the menu line, is a series of somewhat cryptically labeled buttons that control the program's operation. The first button on the left, with the + sign adds a shape to the chart. You can achieve the same result by clicking on a shape in the palette, a more intuitive method.

Once you get accustomed to Chartist's controls, it's easy to use. Click on a shape, and the pointer changes to a crosshair. Place the crosshair where you want the shape and click the left mouse button and the selected shape will appear on the work area. Click on the button with a + and a bent arrow (sixth from left) and another type of crosshair appears, this one for adding lines. Click on a shape near a connecting point, and the crosshair turns to a pencil. Draw a line to another shape with the pencil, and a connecting line appears, neatly bent at right angles, with an arrowhead pointing at the second shape. There's only one type of connector, but it draws all possible connections. The lines are glued in place, so if you move a shape, the lines stay attached. That makes it easy to modify the chart. Like VISIO, Chartist will sometimes route a line under a shape or on top of another line. But Chartist gives you a way to fix that. You can add a *waypoint* to a line, which is like a handle you can click on and drag the center of the line away from other lines or shapes, while the ends stay glued to their shapes.

Adding text to a shape is easy. Just double-click on the shape and an editor dialog box appears. Type your text into the box. If the text overflows the shape, the box outline turns red on the offending side. You can stretch the box by grabbing its handles and tugging them until the box is big enough to hold the text. Unfortunately, there is no way to add text outside a shape, so you must place a shape on the work surface and type text into it to add labels and titles. If you double-click on a line, a dialog box will appear and give you several line control parameters to change. It also lets you add text to a line, perfect for "Y" or "N" routing.

The finished output (Figure 4) looks very clean and easy to read. Placing text only inside shapes is not a serious drawback, since you can use a

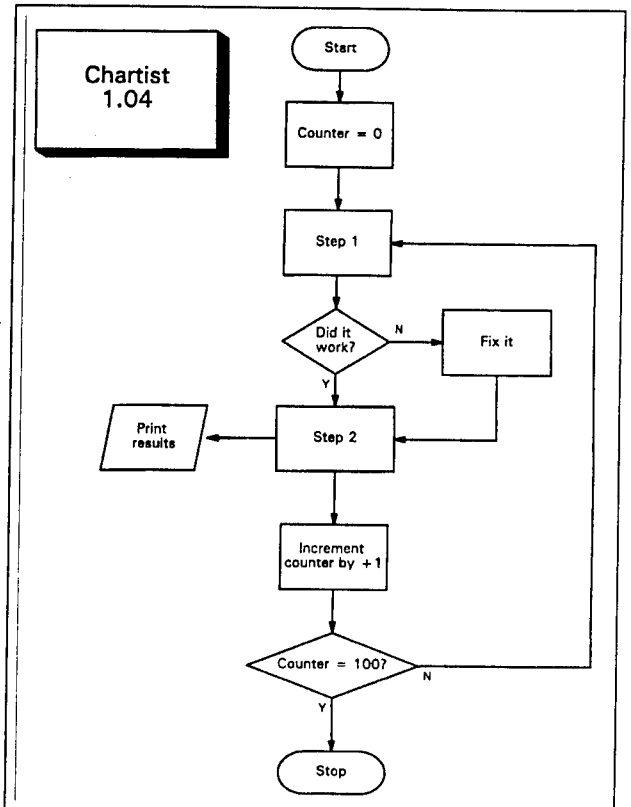


Figure 4: flow chart printed by Chartist

fancy shape to hold your labels. Chartist transferred copies of the sample chart via the Windows clipboard easily, and the chart pasted flawlessly into the graphics programs Arts and Letters Editor and Graphics Works. Start and Stop ovals were distorted when pasted into Corel*Draw!* 4.

The ratings: Ease of use - 4.2
Attractiveness of output - 4.0
Ease of modification - 4.5
Data exchange - 4.5

Not bad for a $70 program!

ABC FlowCharter

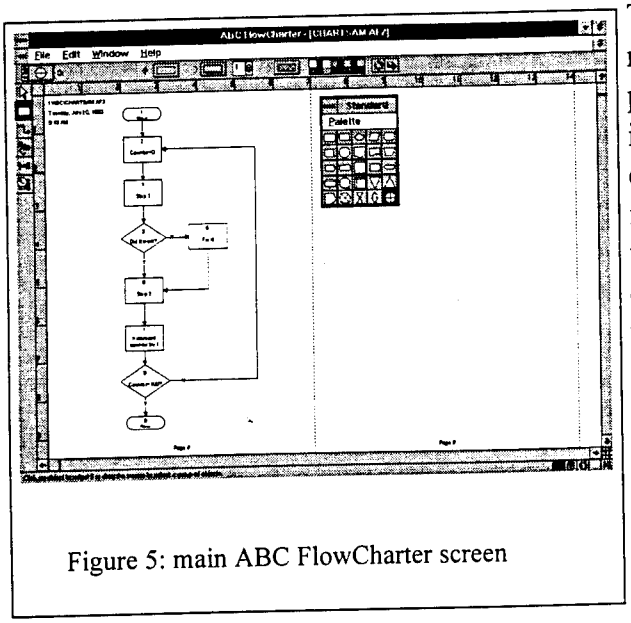


Figure 5: main ABC FlowCharter screen

This is the "Cadillac" of flow chart programs, not only for its quality, but also for its $500 list price. Actually, it's more akin to a BMW, since it's a lean, high-performance program. As you can see in Figure 5, ABC FlowCharter's screen is uncluttered. The shape palette is a floating window which you can move around so it doesn't block your view. If you don't want to see the shape palette, just click on the grid-like icon on the bottom line to toggle it off. Just under the short Windows menu at the top of the screen is an icon ribbon. On the right side of the screen is a series of six tools arranged in a column called the toolbox. Each tool has its own assortment of icons, which appear on the icon ribbon when you select the tool. The top tool is the pointer, which selects or moves objects. Three of the pointer's icons are unusual. The right-most icon has a picture of the space shuttle being launched. When you click on it, it launches another program. That could be very useful if you need to refer to a set of data in, say, a spreadsheet. Of course, when you're using Windows, you can run several programs simultaneously. To the left of the launch icon is an icon with linked rings. Clicking on it lets you link a shape to another flow chart. When you click on that shape, it brings up the linked flow chart. You could use that feature to show an expanded view of the subprocess represented by the shape. The fourth icon on the ribbon aligns the shapes, either horizontally or vertically. It also controls the icon spacing, so icons can be space equal distances apart vertically or horizontally. That makes the chart look very neat.

Under the pointer is a button with a rectangle on it, which is the shape tool. Select a shape from the shape palette, click on the shape tool, and your cursor changes to a pencil with a box at its tip. Click on the work area with the shape tool and it places the currently selected shape on the work area. A grid keeps the shapes aligned, or you can pull a guideline off the ruler for alignment, if you prefer.

The tool beneath the shape tool is the line or connector tool. As you would expect, it lets you connect shapes together. Like Chartist, one tool serves all connection purposes. However, you can change the type of line the tool makes by clicking on one of three icons on the right of the icon ribbon. You can pick a straight line, a line which makes only right angle bends, or a curved line which creates an arc. The arcs are Bezier curves, complete with control points so you can alter the degree of curvature. ABC FlowCharter sometimes routes a line under a shape or on top of another line. However, by clicking and dragging one of the line handles, you can pull the line away to an area where it doesn't interfere. The line connections stay glued in place if you move a line or a shape.

The icon marked with "ABC" is the text entry icon. Use it to enter text in a shape, on a line, or anywhere on the work area. Of course, since ABC FlowCharter is a Windows program, you can use any font you have available for the text. If the text overflows a shape, the right-most icon on the icon ribbon expands the shape to enclose the text. The icon two spaces to the left, looking like a tic-tac-toe board, controls where the text is placed inside the shape. The default placement is vertically and horizontally centered.

ABC FlowCharter automatically numbers each shape as it is added to the chart. If you are writing a training manual, for example, you could refer to the shape number in a description of the process. Automatic numbering to be on as the default. Moving down the toolbox column, the next icon has numbers on it, and controls the numbering of the shapes, and lets you hide the numbers if you prefer not to see them. It also lets you renumber the shapes.

The icon that looks like a magnifying glass switches among three levels of magnification: full-size, full-page, or full-chart, for multipage charts. The tic-tac-toe board icon in the lower right-hand corner is a scroll controller. Clicking and holding down the left mouse button on the appropriate sector makes the screen view scroll in the corresponding direction.

Figure 6 shows an example of ABC FlowCharter's output. It looks as good or better than any other program.

The ratings: Ease of use - 4.8
Attractiveness of output - 5.0
Ease of modification - 4.8
Data exchange - 5.0

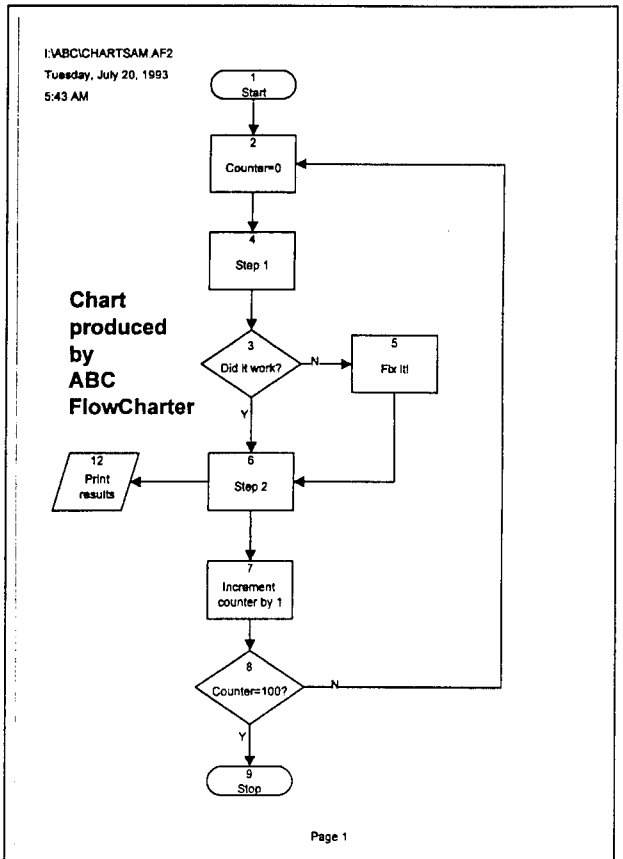


Figure 6: flow chart printed by ABC FlowCharter

PowerPoint, Version 3.0

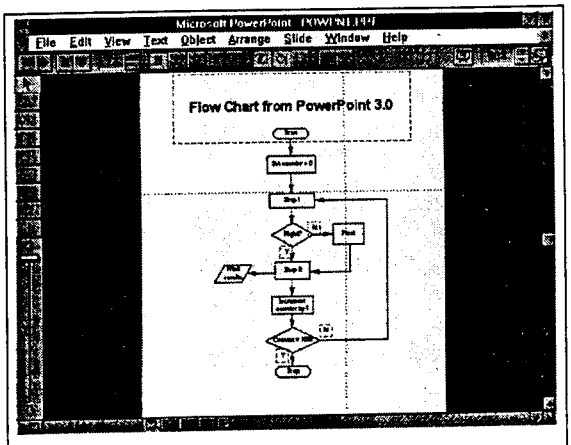


Figure 7: main PowerPoint screen

PowerPoint is the presentation graphics program included in Microsoft's popular Office bundle, standard issue on the Air Force Desktop IV contract or available separately. Although not specifically tailored for drawing flow charts, it can be pressed into service for that purpose. PowerPoint has flow chart shapes in its shape tool, the eighth tool in the tool palette along the left side of the screen. There are additional flow chart shapes in the TimeSavers collection, in the TIMESAVR subdirectory, and also in the clip art collection in the SHAPES.PPT file.

Like other programs mentioned so far, PowerPoint's underlying grid in the work area helps align shapes. PowerPoint also lets you place guidelines where you want shapes to align. There is only one vertical and one horizontal guideline (Figure 7) , but you can drag them around with the mouse and place them wherever you wish. The Arrange menu selection has an Align command that aligns selected shapes. PowerPoint centers text vertically and horizontally within a shape. When the text overflows, you can click on a shape handle and enlarge the shape to fit the text.

The line tool draws straight lines to connect shapes. Placing arrowheads on ends of lines is semiautomatic. Unlike dedicated flow chart programs, however, PowerPoint's connecting lines do not stick to connection points, so if you move a shape, the connecting lines don't move with it. Also, arrowheads are fixed in size, so if you try to use short lines, the arrowheads can be longer than the lines.

PowerPoint exports charts in Windows metafile format, which all Windows programs can use, and which can be expanded without lines becoming jagged. The output from PowerPoint is good, but doesn't approach programs like ABC FlowCharter which provide greater precision. Figure 8 shows a PowerPoint flow chart.

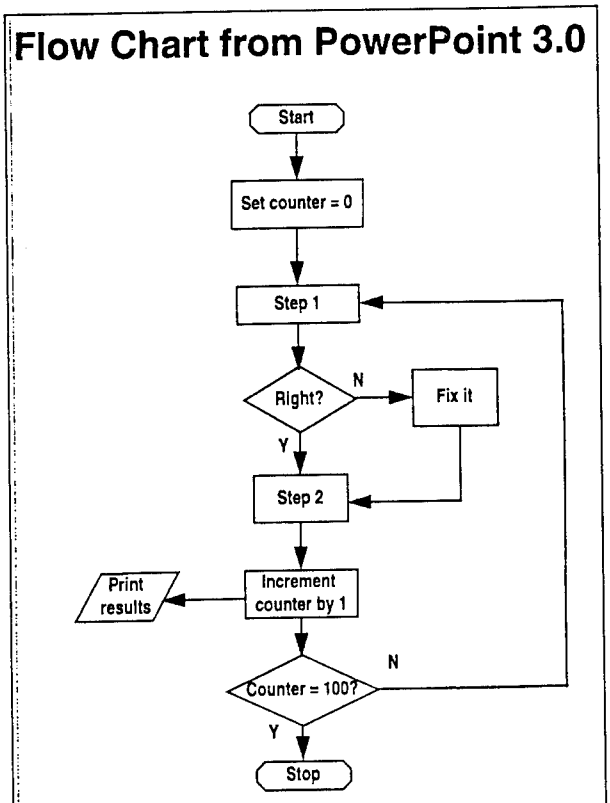


Figure 8: flow chart printed by PowerPoint

The ratings: Ease of use - 3.8
Attractiveness of output - 4.0
Ease of modification - 3.0
Data exchange - 4.5

DOS Program

allCLEAR

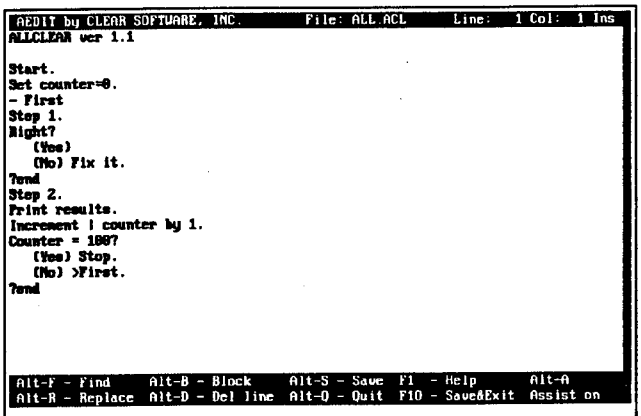


Figure 9: allCLEAR script in the AEDIT editor

Unlike every other program in this survey, allCLEAR is not a drawing package, at least not in the traditional sense. To produce an allCLEAR flow chart, you first write a script file to describe the process logic. Then you select appropriate choices on a style sheet that controls the layout and graphics elements of the chart. Finally, allCLEAR lets you view the chart before printing it. Figure 9 shows the script needed to generate the example flow chart that we have used to illustrate other programs, while Figure 10 shows how the printed chart looks. As you can see, allCLEAR's rendering of the chart is different from previous versions, but just as valid. Note allCLEAR's unique connectors, with tightly curved right-angle bends.

AllCLEAR's approach to flow charts has one distinct advantage: it is quite easy to change the layout of a drawing - you just rewrite the script! Then allCLEAR does the hard part: drawing the chart for you. AllCLEAR handles multipage flow charts with aplomb, inserting page connectors to help trace a path between different pages. It even draws adjacent pages so you can tape them together to create a large composite page that shows the whole process. AllCLEAR handles complex processes well, but can be overextended when the chart becomes too large or complex. Although it will still draw the chart, connector lines may overrun each other, so it becomes hard to follow a path.

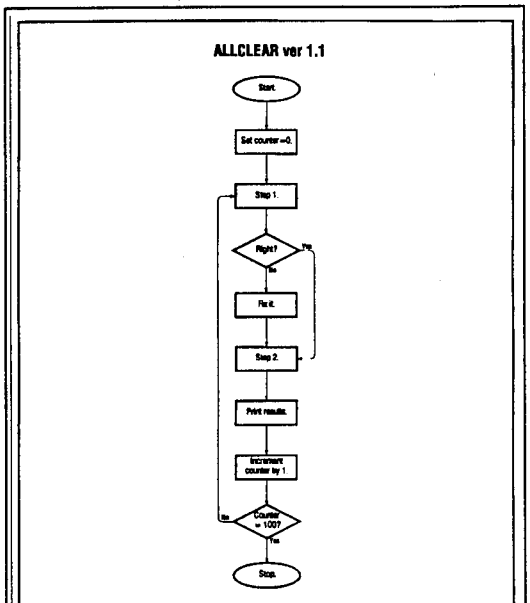


Figure 10: flow chart printed by allCLEAR

AllCLEAR's scripts (which are really simple programs) are not difficult to write, but take a little practice to master. It's not nearly as easy as the more intuitive drawing programs, however. The manual is quite good, and offers a separate section on the script language. You can use an editor of your choice to write scripts, or use allCLEAR's own editor (called AEDIT), which automates script development by inserting some required text for you. AllCLEAR script language

includes a CASE command that generates multiple-choice branches. Context-sensitive on-line help is actually helpful.

AllCLEAR's charts have a distinct look. They are clean and very easy to read, and the style sheets give you precise control over the charts' appearance. AllCLEAR's scripts, once mastered, make changing the charts quite easy, and substantial modifications require only changing the script. AllCLEAR frames each page with a border, unless you switch that feature off — a good idea if you paste several pages together. You can save charts in several graphics formats: PCX, PIC (Lotus' graphic format), EPS, CGM and DXF (for CAD programs). Any program that imports graphics should handle one or more of those formats.

One of allCLEAR's advantages is its ability to run on older computers with fewer resources. Minimum computer requirements are an IBM XT-compatible computer with a floppy disk drive (to load the program), a hard disk (allCLEAR files take less than 1 Mb), 640K RAM (recommended; 512K minimum), a CGA or Hercules graphics card or better, and a printer capable of printing high-resolution graphics (any good dot matrix printer). For a Hewlett-Packard-compatible laser printer (most are), allCLEAR will download fonts to provide an attractive printed product. Although allCLEAR is a DOS program, it runs fine in a window under Windows. A real Windows version of allCLEAR has just been announced.

The ratings: Ease of use - 3.0
Attractiveness of output - 4.0
Ease of modification - 5.0
Data exchange - 3.5

Sources			
Program	Company	Telephone/Fax	List Price
VISIO	Shapeware Corporation 1601 Fifth Avenue, Suite 800 Seattle, WA 98101-1625	800-446-3335 206-467-6723 206-467-7227 fax	$249
Chartist	NOVAGRAPH 10014 Lawler Rd Dallas, TX 75243	214-231-2169 214-235-0607 fax	$69.95
ABC FlowCharter	Micrografx 1303 Arapaho Richardson, TX 75084	800-326-3632 214-234-1769	$499
PowerPoint	Microsoft One Microsoft Way Redmond, WA 98052-6399	800-426-9400	$495
allCLEAR	CLEAR Software, Inc. 385 Elliot Street Newton, TX 02164	800-338-1759 617-965-6755	$299

Technical notes

Except for PowerPoint and VISIO, all software was evaluated on a personal computer with an Intel 80486DX2-66 processor, 16 Mb of RAM, a 1.4 gigabyte hard disk, and a 17 inch Super VGA monitor viewed at 1024 x 768 resolution. MS-DOS 6.0 and Windows 3.1 comprised the operating system. PowerPoint was evaluated on a machine with an 80486DX-33 processor and standard VGA monitor. To evaluate VISIO, the 486DX2-66 machine was used with standard Windows VGA video drivers, to avoid an incompatibility with the 1024 x 768 drivers for the Diamond Viper video card. Newer drivers eliminated the problem. VISIO showed incompatibility with another video card running at the higher resolution, also. Figures showing printed output really were printed, not just exported directly to a graphic file, which might have introduced inconsistencies. A 600 dots-per-inch Hewlett-Packard LaserJet 4 first printed the charts, which were then scanned into PCX graphic files using a Hewlett-Packard ScanJet Plus scanner. The HiJaak Pro program captured screen views. The author wrote *Modern Flow Chart Software* with the Ami Pro 3.01 word processor, inserting the graphics for the figures in frames. The LaserJet 4 printed the final 16.6 Mb file.

COMPUTER TOOLS FOR TQM

John Cachat

Computer Tools for TQM

John M. Cachat
IQS, Inc.

1. Introduction

"The worldwide quality revolution has permanently changed the way we all do business. Where once quality was limited to technical issues, it is now a dynamic, perpetual improvement process involving people in all aspects of the business."

Robert C. Stempel
Chairman, General Motors Corporation

The question is: in the face of increasing pressure to improve quality, why isn't the Quality Assurance function supported with computers? In the past, to comply with the quality requirements of its customers, an organization had to allocate people to do the necessary tasks. Software tools can significantly reduce costs and increase productivity in the Quality Assurance functions. Computer-generated information regarding Quality Assurance, not possible in a manual (file cabinet) environment, is now available, thus speeding and easing the process of analysis and decision-making. Computerizing the quality function creates an environment for rapid and continuous improvement. When input is accurate and complete, computer-generated information is accurate and quickly accessible in a variety of formats. Support can be given for decision making from the shop floor to the executive boardroom.

Adding people in the Quality Assurance Department initiates an expensive fixed cost. At best, the new personnel will design and implement manual systems. Manual systems require clerical help and generate files crammed with data that seldom gets converted to the information needed by decision-makers. Regularly, within the manual system, paper-processing devours time that should be spent thinking, as highly-qualified and well-paid personnel are reduced to "power clerks." Successful organizations will let the computer perform clerical tasks, which will free their technical people to creatively solve current problems and prevent future ones.

During the final decade of this century, a significant opportunity exists for organizations that can obtain and maintain ISO9000 certification. The requirement for ISO9000 (or similar quality standards) is becoming a popular addition to many contracts. Larger corporations are subcontracting more frequently. However, these corporations want to subcontract to fewer organizations. The result is more business for fewer companies. How should organizations react to this trend? For the 1990's one message is loud and clear: Quality is a strategic and competitive weapon (Figure 1).

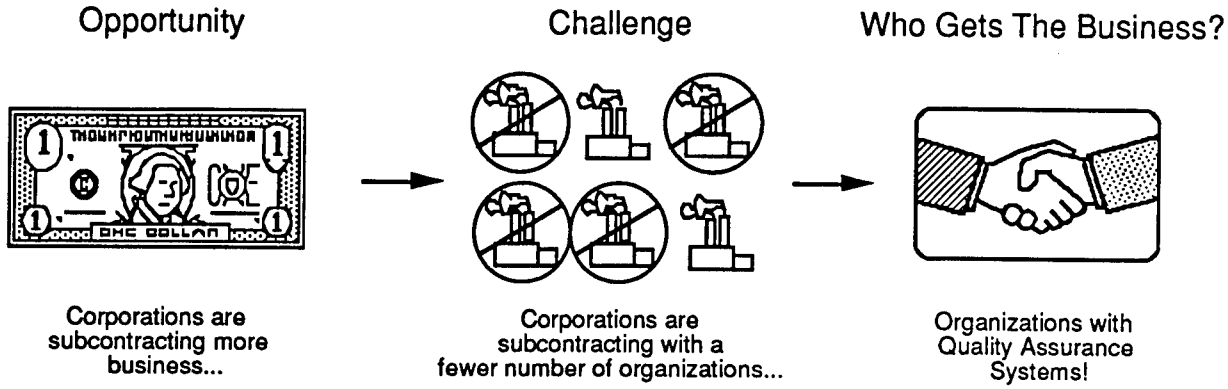


Figure 1 - The Quality Challenge

The challenge faced by today's organization's is large and complex. In the past, it was sufficient to produce a quality product or service at a low cost. Today, though customers still demand high quality and low cost, customers are also performing on-site surveys of quality systems to verify the existence of acceptable quality assurance systems. Since quality requirements vary from customer to customer, the organizations have a very difficult time responding to these quality surveys. Unlike the field of accounting, for example, in quality assurance no "generally accepted quality practices" exist. Based on specific customer demands, suppliers often end up changing their systems and documentation, instead of taking a pro-active position in quality system design and implementation. This paper briefly discusses the Integrated Quality System™ method, pioneered by the author , that meets or exceeds automotive, aerospace, military, nuclear, ISO 9000, and medical quality requirements, including the conceptual design for the computerization of this system.

Imagine the power and competitive advantage of a paperless quality system. Customer requirements communicated via Electronic Data Interchange (EDI). CAD systems automatically feeding FMEA's and Control Plans. Electronic change control of one master file to eliminate distribution and change headaches. Costs of the entire quality system determined by live transactions that are then posted, similar to a general ledger in an accounting system. Imagine the feeling of being able to go from "talking about" quality to "doing quality". The solution to the quality challenge of the 1990's is the Integrated Quality System.

2. The Integrated Quality Systems™ Method

During IQS' analysis of numerous government and manufacturing quality system requirements, there were fourteen common areas. Figure 2 provides a graphical overview of the IQS architecture which consists of fourteen modules that share information and support each other to provide an efficient quality information system. A survey conducted in November 1991 by the Quality Management Division of ASQC and IQS, Inc. suggests that the quality challenge involves much more than Statistical Process Control. The problems of manufacturing are extensive in the 1990's. The ability to better define, measure, and control a process requires an extensive quality information system. A brief description of the modules follows in the order presented above.

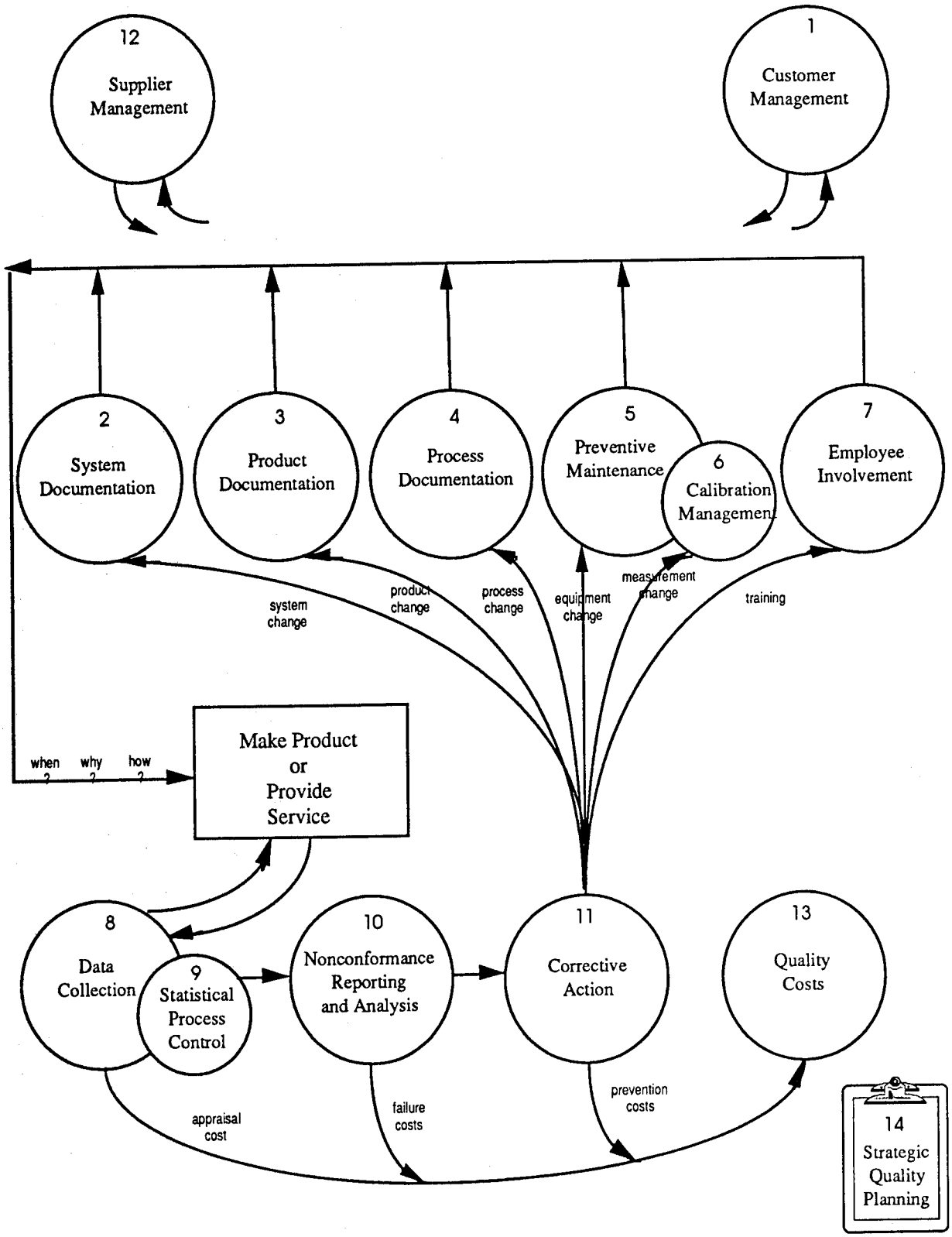


Figure 2 - IQS Quality System Architecture

2.1. Customer Management

"When it comes to winning and keeping customers, a company without a well-planned system of customer feedback is burying its head in the sand and hoping for the best."

Michael LeBeouf
Author: How To Win Customers And Keep Them For Life

Statistics show that the number one reason why customers leave their suppliers is not because of unsatisfactory products but rather because of an attitude of indifference toward the customer (Figure 3). An organization that intends to listen to its customers will need a system designed to improve its ability to manage customer interface. The Customer Management module provides the means for listening and responding to your customer's complaints, suggestions, questions, and compliments. Complaints show where requirements are not being met. Suggestions show where you can add value to the customer. Questions identify areas for improved marketing and sales efforts. Compliments verify customer satisfaction A simple, but often neglected task of maintaining a customer file, complete with customer contact names, phone numbers, and personal information is required. Imagine the power of asking the computer system for all the customer contacts working in Quality, or Sales, or Engineering. Imagine going on the next sales call with a complete history of all the feedback your customer has given you, and the ability to inform the customer of the action taken based on that feedback. Simply responding to complaints is not enough to meet the quality challenge. There are two ways to collect customer data: (1) listen to their feedback; (2) stimulate their feedback with surveys. Imagine the power of being able to easily generate a variety of customer surveys, send them to customers, receive and analyze the results, and change your organization to meet their expectations. Most managers like to make decisions based on customer surveys - they don't like administering them.

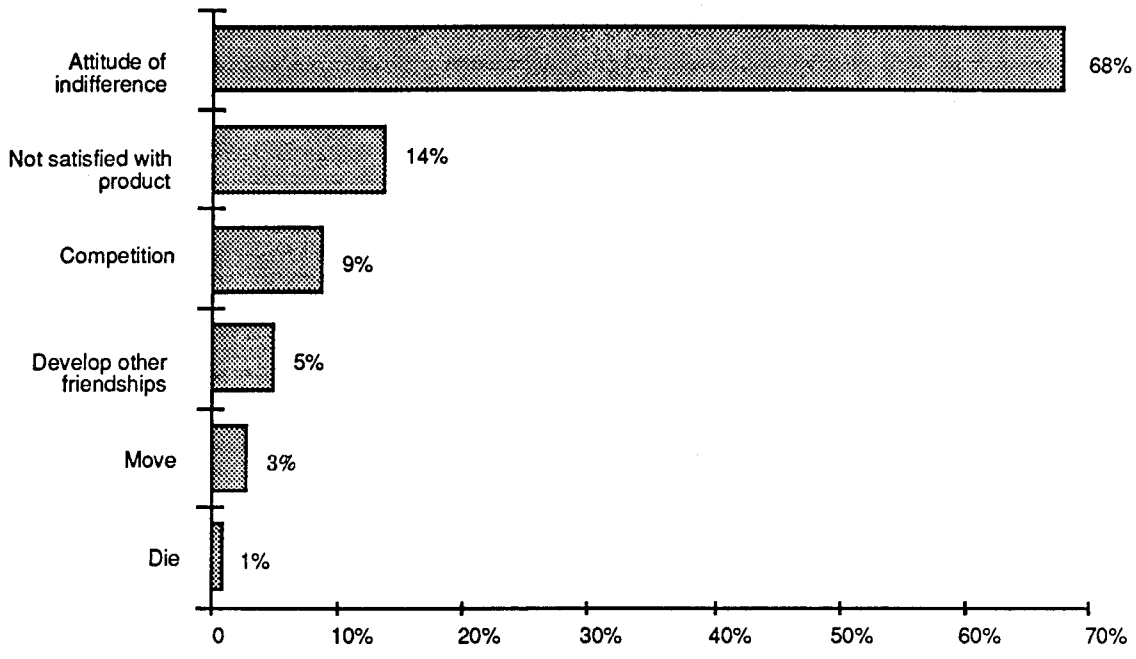


Figure 3 - Why Customers Leave(Source:U.S. News & World Report)

A Customer Management module is a simple, but powerful first step to quality improvement. Analysis of both customer satisfaction and problems provides input to business planning activities. The key information for Quality Function Deployment (QFD) is now readily available, and the organization now has the vehicle for customer-driven decision making.

2.2. System Documentation

"The preparation and maintenance of and compliance with work instructions shall be monitored as a function of the quality department."

MIL-Q-9858

You can only control and improve what you define. Organizations often invest substantial time and money into the generation and maintenance of procedures, work instructions, forms, reports, etc. and receive little or no return on this investment because employees do not read them. The computerized System Documentation module is very effective because it allows access to information in a variety of formats. For example, imagine the ability, as a new employee, to go to a computer and see all the procedures in a specific company function, e.g., Accounting. Or imagine having the ability to see all the procedures with the word "Expense" in the title. If you are a new manager in a department, this module will show all the procedures approved by the person you have replaced. Once this retrieval capability is developed, the return on investment from the procedures will increase.

In addition, the quality requirements state that an organization's procedures must be "living documents." Complete change control history and internal audits are required. Change control history, scheduling audits, and recording results of the audits are clerical tasks that should be performed by a computer.

2.3. Product Documentation

"Design output shall be documented and expressed in terms of requirements, calculations and analyses."

ISO9000

As stated in the System Documentation module, you can only control what you define. A product is manufactured based on the customer and/or internal requirements and specifications. Blueprints, material specifications, processing specifications, and performance requirements must be developed, controlled, and maintained. The manual process is slow, prone to error, and wasteful using technical resources to perform clerical tasks. The Product Documentation module will provide an information database required to communicate what is to be manufactured.

A critical facet of the Product Documentation module is the request, review, and implementation of changes. Technical resources are too often spent on the clerical task of moving

paperwork, and therefore less time is spent engineering. The computerized system will perform the clerical tasks and provide automatic updates to inspection plans. Imagine being able to capture the entire product development and design review process, documenting questions like why was or wasn't the requirement added? deleted? tightened or loosened? Imagine being able to find out the engineer or project team members names so you can call them. Imagine having the requirements classified (perhaps by critical, major, minor) and being able to use that information when deciding when and how to collect data. Imagine product Failure Mode and Effect Analysis (FMEA) being a natural and easy part of the process.

2.4. Process Documentation

"Before people can work effectively in a system, there has to be an effective system for them to work in. IPM (Integrated Process Management) breaks down an immense, complicated mission into small, simple tasks."

Roger H. Slater
Author: Integrated Process Management: A Quality Model

Process Documentation is an approach to quality management that involves the entire organization - not just product related areas. Improving an organization's performance and bottom line is a complex undertaking. Process Documentation eliminates the complexity and provides a powerful, proven approach to true process-driven quality improvement.

In his book, Integrated Process Management, author Roger Slater describes a specific approach to transforming "results oriented" organizations to "process oriented" organizations. The Process Documentation module will provide the format for building key output variable (KOV) tables, process models, and process control worksheets. The Process Documentation module applies to administration and manufacturing areas. Imagine performing process Success Mode and Effect Analysis (SMEA) by focusing on the key things required to get the customers what they expect - and more. A Senior buyer at LTV Steel Company in Cleveland, Ohio, indicated in today's marketplace, the office areas make up a significant part of cost. He applied the Process Documentation approach in his purchasing department and found significant variation in how different buyers (operators) processed the same paperwork (product).

2.5. Preventive Maintenance

"At a minimum this program shall include the following: rotating schedule of preventive maintenance items (not breakdown/repair items); communication of maintenance schedules to skilled trades, production, and production scheduling prior to scheduled maintenance dates; documentation of actual jobs performed to schedule and updates to future schedules for jobs missed."

General Motors Targets For Excellence

The performance of equipment in a manufacturing operation can be a major source of variation. The equipment used to produce the product must be managed to minimize costs and

variation. Equipment usage must be monitored, all maintenance activity documented, and equipment performance analyzed. Maintenance costs can be a significant waste of money. In addition to reducing equipment failure costs, the Preventive Maintenance module is a highly visible process that employees recognize as an important step to improving product quality. However, most organizations agree that preventive maintenance systems like calibration systems, are a good idea, but they neglect to implement them. Research has shown that without a computer tool to perform the clerical tasks of scheduling and recording results, the implementation of a preventive maintenance system takes a back seat to fighting today's fires.

Documenting both reactive and preventive maintenance activities will provide historical data for use in the analysis of quality problems and calculating quality costs. For example, an equipment database allows for the recording of what equipment is used in a specific manufacturing operation. This information will then support analysis of what machines produce quality products and what machines are having problems.

Another immediate cost savings is the management of spare parts. The Preventive Maintenance System can often reduce downtime by not ordering parts that are already in inventory and making re-ordering easy with the use of automatic reports for purchasing.

2.6. Calibration Management

"The supplier shall control, calibrate, and maintain inspection, measuring, and test equipment, whether owned by the supplier, on loan, or provided by the purchaser, to demonstrate the conformance of product to the specified requirements. Equipment shall be used in a manner which ensures that measurement uncertainty is known and is consistent with the required measurement capability."

ISO9000

The measurement & test equipment in any inspection system can be a major source of variation. Measurement device usage must be monitored and calibration activity recorded. Calibration activity must proceed according to a predetermined schedule, and the status of any measurement device must be known at all times. Measurement device performance must be analyzed for both accuracy and variation. Although this analysis is relatively simple, calibration systems are often neglected or non-existent because of the clerical work involved, such as generating due date reports, recording results, and performing time consuming Repeatability & Reproducibility (R&R) study calculations. A R&R Study is a device study that involves the analysis of the variation of a measurement device and the variation of measurement of an operator. The title R&R is derived from the study of an operator's Reproducibility and a device's Repeatability.

A computerized Calibration Management module cannot only generate due date reports quickly, but also in a variety of formats, e.g., reports sorted by device type, location, or by the employee to which the device is assigned. This flexibility allows technical people to concentrate on the technical function of the process. The computerized Calibration Management module can

perform an hour long R&R study calculation in seconds, with no errors. Traceability as to what master was used to calibrate what devices is available in seconds.

Imagine being able to search a measuring device or gage file to see if equipment exists to measure the requirements in either the Product or Process Documentation modules. Imagine knowing a gages variation that could be subtracted from a SPC Cp/Cpk study. Imagine graphical displays of calibration results over time an algorithm to statistically determine and adjust calibration intervals.

2.7. Employee Involvement

"Despite conventional wisdom about the value of employee involvement in meetings and communications about quality, the actual practice of involving a large number of employees in regular meetings is pervasive only in Japan."

International Quality Study℠: Top Line Findings
A Joint Project of Ernst & Young and the American Quality Foundation

Although people represent another source of variation in any system, they are also the only source of innovation. In order to reduce variation and increase innovation, employee involvement can be managed, and more important, encouraged. In a typical manual system, employee questions, problems, and suggestions are slowly processed within the system for review and response. Most employee suggestion systems fail because the clerical task of updating a list of outstanding suggestions is not done. By the time the technical people acknowledge, review, and make decisions upon the suggestions, a long delay has occurred. From the employees' point of view, the delay signals a lack of interest from management, an erroneous perception that creates new morale and quality problems that management must then confront, reducing the time available for success focused activities.

Employee selection and training is a key element of a quality system. If training is performed, why not let the computer take care of the record keeping? As the technical challenges of the 1990's continue to develop, knowledge of people's capabilities for task assignment and scheduling will play an important role in employee management.

In addition, almost every transaction in the Integrated Quality System™ will require an employee to acknowledge that they performed the transaction. Every calibration, maintenance, system documentation change, etc., will be performed by a person from the employee file. This environment will allow employees to access individual performance data that will enable them to see their specific continuous improvement efforts. For example, show me all the procedures approved by "John Cachat," or show me all the inspection performed by "Craig Young."

Imagine being able to ask the Employee Involvement module, who are the organization's experts on FMEA? reliability testing? or any other subject you need to know. Imagine continuous improvement teams supported by an easy-to-use computer system that schedules meetings, keeps meeting minutes, and tracks assignments. Imagine being able to quickly know how many teams

exist, what they are working on, when it is supposed to be done, and how much money was spent and saved.

2.8. Data Collection

"If you measure, then record. If you record, then analyze. If you analyze, then take action. If you take action, then follow-up."

John Cachat
President, IQS, Inc.

The previous modules provide the foundation for manufacturing a product or providing a service.

- System Documentation module specifies how, and why.
- Product and Process Documentation modules specify what.
- Preventive Maintenance module identifies the manufacturing equipment.
- Calibration module identifies the measuring equipment.
- Employee Involvement module identifies who.

Given the what, when, why, who, how, and the MRP system to tell us when, the quality information process is just beginning. You can only control what you measure. Although a substantial amount of time and money is invested into data collection, very little return on investment is realized because the data is often not recorded or analyzed. Forms that contain a wealth of data are often stuffed into file cabinets and never retrieved. The Data Collection module receives requirements from the previous modules, and then begins a planning process. Given the requirement classification and sampling plan definition, data is then collected and recorded. The data collection results are used to determine if sampling should be increased or decreased - a means to go from detection to prevention. If a nonconformance is found when comparing the actual condition with the requirement, the information is sent to the nonconformance module for processing. Imagine asking what data do I need to collect, given I am making this product, with this process, using this equipment, measured by this device. Imagine having a system smart enough to feed information back to the Preventive Maintenance module to update maintenance intervals based on usage. If a gage is found to be out of calibration, imagine being able to ask the Data Collection module for everything that was checked with that specific gage.

2.9. Statistical Process Control

"Is Statistical Process Control (SPC) utilized for Significant and Critical product characteristics and process parameters? Describe the SPC methods used. Are they appropriate to the process being controlled?"

FORD 20 Questions

Statistical Process Control concepts and techniques can be applied to any organization with the Integrated Quality System™ environment. The Data Collection module will record the actual conditions, with both attribute and variable data types. Product and Process Documentation contains the specifications. Control chart interpretation rules can be programmed so the computer identifies out-of-control processes. In addition, the power of the Integrated Quality System™ environment is that when a specific situation is identified, the system can quickly be reviewed to determine the assignable cause, because:

- System Documentation module records changes to the system.
- Product Documentation module records changes to the product.
- Process Documentation module records changes to the process.
- Calibration module record changes to the measuring equipment.
- Preventive Maintenance module records changes to the equipment.
- Employee Involvement module records changes to the employee.
- Supplier Management module records changes in raw materials.

SPC is no longer something for special studies. SPC is the key to continuous product and process improvement, and is therefore an inherent part of the system.

2.10. Nonconformance Management

"The supplier shall establish and maintain procedures to ensure that a product that does not conform to specified requirements is prevented from inadvertent use or installation. Control shall provide for identification, documentation, evaluation, segregation when practical, disposition of nonconforming product, and for notification to the functions concerned."

ISO9000

When a problem exists, the Data Collection module will send the appropriate information to the Nonconformance Management module. Because the required information is available in the Data Collection module, the generation of a nonconformance report, or inspection tag, is automatic. The requirement, actual condition, measuring device, machine, operator, inspector, etc., are all derived from their respective modules. The nonconformance module then manages the disposition process and performs trend analysis. Nonconformances are assigned to an employee for review; the product disposition is developed, documented, and implemented. Problem solving activities can now analyze problems from a variety of viewpoints. Trends can be identified by part number, characteristic, machine number, operator, inspector, cause code, etc.

2.11. Corrective Action

"The supplier shall establish, document, and maintain procedures for: a) investigating the cause of nonconforming product and the corrective action needed to prevent recurrence; and b) analyzing all processes, work operations, concessions, quality records, service reports, and customer complaints to detect and eliminate potential causes of nonconforming product;".

ISO9000

Corrective action should be directed to the important few areas identified by the nonconformance trend analysis. Often, quality circles or other forms of group problem solving efforts do not perform as well as expected. Without nonconformance history and formal corrective action management, the employees have little information to guide their efforts. If an adverse trend is identified in the Nonconformance Reporting and Analysis module, then root cause corrective action is warranted.

The Corrective Action module manages the entire process; it records the trend, assigns the task to an employee, documents the response, and issues a follow-up notice to ensure effectiveness. If the corrective action is not effective, then the process is repeated.

2.12. Supplier Management

"Does the producer have an effective system for assuring the quality of incoming products and services? Assess its adequacy."

FORD 20 Questions

Suppliers can be an asset or a liability. In any relationship, communication is an essential element. A process for evaluating new suppliers, communicating requirements, and issuing trial orders is required. Satisfactory performance will result in supplier approval, and sustained performance will result in certification. Access to the System, Product, and Process Documentation modules improves communication. A complete data collection system with nonconformance reporting and corrective action is used with the supplier base. An informative supplier rating system can be developed.

While it is true that experienced buyers know the strengths and weaknesses of their suppliers, many of these buyers do not have access to accurate and detailed vendor information that would increase their powers of negotiation. Many organizations have several new or unseasoned buyers who know little to nothing about the current and potential vendors. The Integrated Quality System™ will provide these buyers with supplier ratings and accurate, detailed, information regarding supplier price, quality, and delivery.

2.13. Quality Costs

"The main objective of quality cost reporting is to provide means for evaluating effectiveness and establishing the basis for internal improvement programs."

ISO9000

Every organization spends money finding, fixing, and trying to prevent mistakes. Successful organizations spend more time trying to prevent mistakes by placing more effort into the early stages of the product and system life cycle. This strategy reduces mistakes along with the associated costs of finding and fixing the mistakes. Traditional accounting systems are not set up

to report this type of quality cost information, and more critically, do not have Integrated Quality System™ that:

- Know the cost of finding the mistakes from the Data Collection module.
- Know the cost of fixing the mistakes from the Nonconformance Management module.
- Know the cost of preventing mistakes from the Corrective Action System, Product and Process Documentation, and Preventive Maintenance modules.

2.14. Strategic Quality Planning

Why don't organizations have strategic quality plans? Same reason they don't have effective business plans. These plans, after significant man-hours to produce, are usually stuffed away and die from lack of use. The Integrated Quality System will begin the Strategic Quality Planning with what is entered into the Customer Management module as the focus for the plan. The customer's liked..., they dislike..., they asked about..., they suggested... The Process and Product Documentation modules can then produce Cp and Cpk reports on all customer requirements, focusing on the key ones. This provides the ability to link prevention investment to reduction of failure cost. The organization can then spend more on preventing problems and planning for success.

3. Benefits to the Organization

The purpose of Integrated Quality System is to improve an organization's profitability and competitiveness by implementing quality information system technology. There are benefits to the entire organization. Benefiting organizations include: Management, Market and Sales, Operations, Quality Assurance, Human Resources, Engineering, and Finance/Accounting. Management will find that quality audits will be significantly easier to pass. In addition, an effective Quality Assurance system reduces errors in all functions and fewer errors means higher profits. The Marketing and Sales staffs will find that customers feel more confident and will take a chance on a new supplier with an efficient and effective Quality system. The company will be able to break into new markets that due to quality requirement were previously not possible to compete in. The Integrated Quality System brings together the "islands" of information and systems supporting the Quality Assurance function. This means that more information is available for problem-solving and corrective action activities. With respect to Human Resources, an IQS will result in; more employee involvement, improved suggestions which are formally recognized, reviewed, and implemented, and smaller learning curves for new employees.

4. Conclusions

Quality Assurance information system technology is a critical element for doing business in the 1990's. A computerized Integrated Quality System can provide the environment for rapid, continuous improvement without adding a small army of personnel and without creating a paperwork nightmare. An Integrated Quality System will provide competitive strength and higher profits to any organization that efficiently and effectively implements them.

A STATE-OF-THE-ART TEAM BUILDING SYSTEM

Lt Col Larry Voss

A State-of-the-Art Team Building System

Lt Col Larry B. Voss
Director of Quality Programs
Air Force Operational Test and Evaluation Center

OVERVIEW

Fifteen months ago the Air Force Operational Test and Evaluation Center (AFOTEC) changed from a traditional hierarchical organizational structure to a team-based, flattened organization. In order to provide the basis for a successful transition to a non-traditional management structure, several techniques and tools were examined and selected for use in a team building process. This paper describes one of those tools, The Team Management Systems (TMS), and how AFOTEC employs it to build high performing work teams. To illustrate its use, a case-study based on observations of one of AFOTEC's support teams will be used. If you are leader of an organization contemplating moving to a team-based structure, or if you have teams in-place and what to help them perform at the next higher level, the TMS may be a tool you want to consider.

TEAM MANAGEMENT SYSTEMS OVERVIEW

The TMS, developed by Dr Charles J. Margerison and Dr Dick J. McCann, is a management tool designed to measure individual work preferences and to the relate the team roles necessary to mission accomplishment with those preferences. In other words, the TMS helps define the roles an individual performs best or would find most satisfying so a leader can match those preferences to the roles required in any given team.

The theoretical basis for measuring individual work preferences is the work of Dr C.G. Jung regarding personality types. The Myers-Briggs Type Indicator (MBTI) is a widely available and used instrument for measuring individual Jungian preference types. However, the MBTI was developed to aid individuals in assessing their "whole-life" personality preferences and does not center on work place roles. In addition, the ethical application of the MBTI precludes its use as a work place placement tool because it is not designed for such use. The centerpiece of the TMS is the Team Management Index, a Jungian preferences based instrument designed specifically to measure work place role preferences and provide managers with feedback useful to building teams.

In addition to the Team Management Index, the TMS consists of a model describing the types of work performed by a team (the Types of Work Model), a system for explaining individual differences in work styles, and a model to aid managers (the Team Management Wheel).

The Types of Work Model

The Types of Work Model is based on information gathered on the types of work carried out by managers working in teams. From interviews and group discussions eight major components of managerial work were identified. These types are:

Advising: Obtaining and disseminating information

Innovating:	Creating and experimenting with new ideas
Promoting:	Searching for and persuading others of new opportunities
Developing:	Assessing and testing the applicability of new approaches
Organizing:	Establishing and implementing ways and means of making things work
Producing:	Operating established systems and practices on a regular basis
Inspecting:	Checking and auditing that systems are working
Maintaining:	Ensuring that standards and processes are upheld

These types are work are present in every team, albeit in varying proportions, proportions derived primarily from the team's mission. For example, a team with a mission of developing new products may require more Innovating and Developing than a team whose mission is providing a standardized product or service.

In addition, most people are capable of performing in any of these eight roles, but with different degrees of success and job satisfaction. The majority of people rate three or four of the roles as relative strengths and assess their capability to perform the others as moderate or weak. In this regard, the function of the team leader is determine the proper balance between the types of works vis-a-vis mission requirements and then building a team which brings together the right proportion of skills to accomplish the mission and ensure a high degree of individual satisfaction.

Types of Work Index

To ensure job satisfaction, the type of work a person is asked to perform should match the individuals underlying work preferences. Margerison and McCann extended Jung's work to build a matrix of four bipolar axes which, when assessed in combination, indicate how people prefer to perform work activities. The four scales are:

How we relate to others (Team members/Co-workers)
Extroverted_____Introverted

How we gather information
Practically_____Creatively

How we make decisions
Analytically_____Belief-based

How we organize self and others
Structured_____Flexible

The first axis, Relating with Others, describes how managers prefer to establish and maintain relationships with his/her subordinates, associates, and superiors. The terms used, extroverted and introverted, are directly related to the same terms used in descriptions of the "energy direction" axis of the Myers-Briggs Type Indicator and Jung in his description of personality types.

The second axis, Gathering Information, is directly related to Jung's "irrational" or data gathering function. The information a person gathers in the work place may either be concrete, highly correlated to the world as it is, or visionary, correlated to the possibilities and opportunities perceived to be available.

The manager's preference for using the information he or she gathers is described by the third axis, Making Decisions. As before, the factors described by Margerison and McCann relate directly to Jung. This axis is a description of the Jungian "rational" function as applied to the work place. A manager whose preference is Analytical will tend to make decisions based on rules, either internally developed or externally imposed. These decisions can be described as "logical" and based on well understood principles. A manager who indicates a preference for Belief based decisions emphasizes values and outcomes on people rather than adherence to rules or logic.

The last axis, Organizing Self and Others, indicates the way a manager prefers to deal with the external environment. Managers with a preference for structure will tend to set goals, objectives, and deadlines. A preference for flexibility indicates a manager's comfort with accommodation, effectively dealing with unplanned events.

The Team Management Index is an instrument developed by Margerison and McCann to measure a manager's preferences along these axes. The instrument is straight forward to administer and the results are presented in a computer generated report. Information about the TMI and related certification courses are available from Assessment Systems International, Inc. 15350 West National Avenue, suite 205, New Berlin, Wisconsin 53151-5158.

The Team Management Wheel

The link between an individual manager's preferences for the four factors described above and the eight types of work associated teams is described by the Team Management Wheel. This wheel is the basis for understanding team roles, how those roles relate to each other, and how the roles preferred by individuals support the team missions. In addition to the Types of Work outcomes, the Team Management Wheel adds a descriptor to emphasize the way people work. By adding these descriptors, the model is more illustrative of team roles rather than simply delineating the types of work necessary for mission accomplishment. Figure 1 shows the Team Management Wheel with its associated team roles. The profiles for each of these roles are computer generated based on individual response. Individual profiles are approximately 4000 words in length, reflecting at least 256 combinations and permutations. However, short overviews of each of the eight major roles follow:

Reporter-Advisers

Reporter-Advisers are good at generating information and gathering it together so that it can be understood. They feel it is better to be accurate than be in error. Their concern

Team Management Wheel

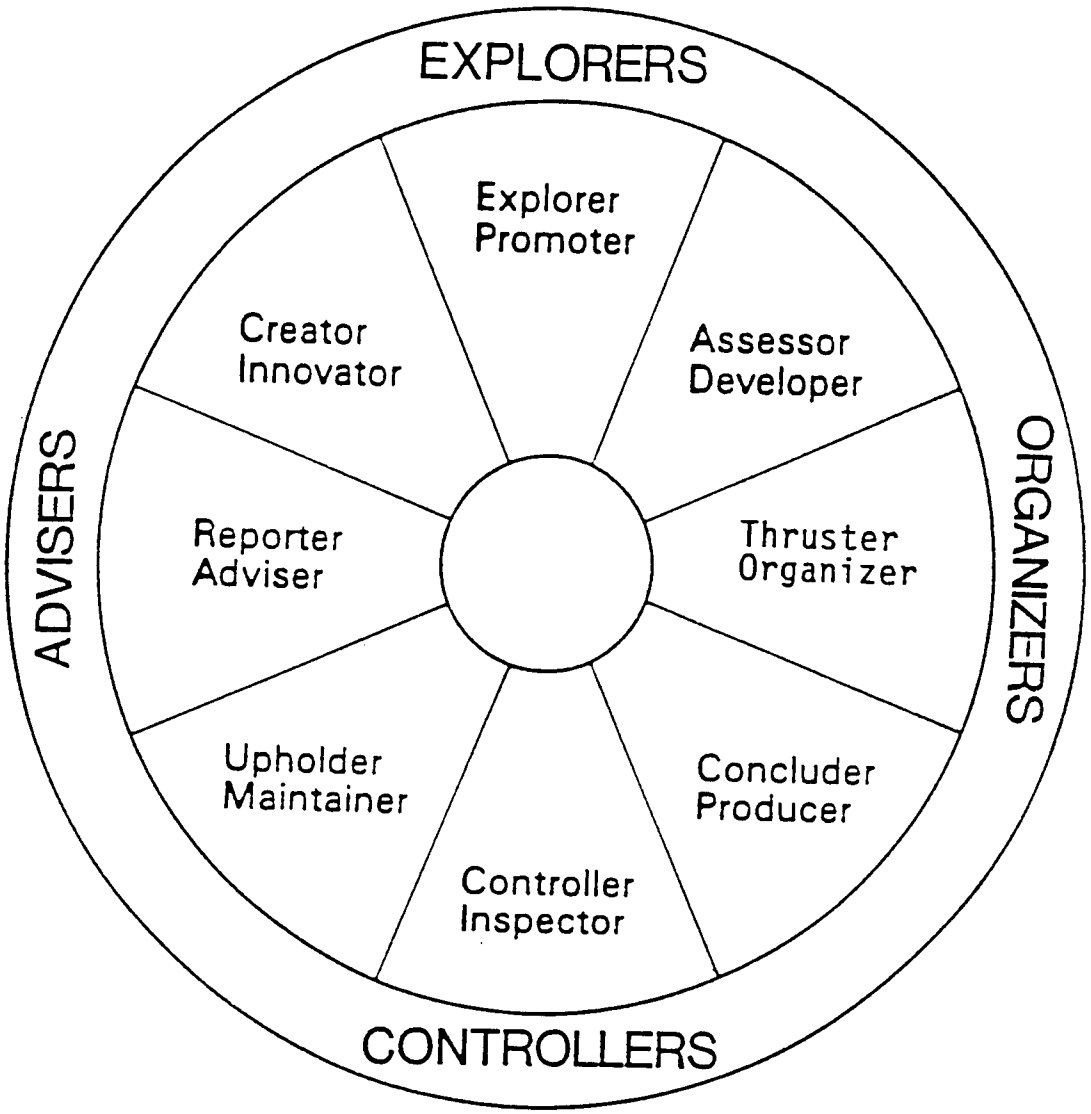


FIGURE 1.

TM OHT-3

is to make sure the job is done correctly. Usually knowledgeable and well-liked people who prefer an advisory role.

Creator-Innovators

People who have a number of ideas which may contradict and upset the establish way of doing things. Very independent experimenters.

Explorer-Promoters

People who take ideas and develop enthusiasm for them. Good at networking and establishing contacts in and out of the organization. Not detail oriented.

Assessor-Developers

Strongly analytical and enjoy developing prototypes, looking for new markets, and seeing if the ideas will work. Not usually interested in already proven ideas.

Thruster-Organizers

Make things happen. Their concern is to produce action. Enjoy organizing and press for results.

Concluder-Producers

Take pride in producing a product or service to a set standard. Can do this on a regular basis and feel fulfilled when standards are met. Not bored by repetitive processes.

Controller-Inspectors

Enjoy detailed work and making sure facts and figures are correct. Careful and meticulous. Able to concentrate for long periods of time on a particular task.

Upholder-Maintainers

Very good at insuring the team has a sound basis for operations. "Conscience" of the team providing support and help to other team members. Strong views and convictions.

The outer circle of the wheel describes the four major categories of preferred working roles: Advisors, Explorers, Organizers, and Controllers. Each major category includes three of the eight role preferences defined by the Team Management Index. For example, managers with role preferences of Creator-Innovators, Explorer-Promoters, and Assessor-Developers can be collectively referred to as Explorers. Likewise, Assessor-Developers, Thruster-Organizers, and Concluder-Producers are Organizers, Concluder-Producers, Controller-Inspectors, and Upholder-Maintainers are the Controllers, and Upholder-Maintainers, Reporter-Advisers, and Creator-Innovators are the Advisors. As seen in this illustration of the model, the roles are not mutually exclusive. The Conclud-

Team Management Wheel

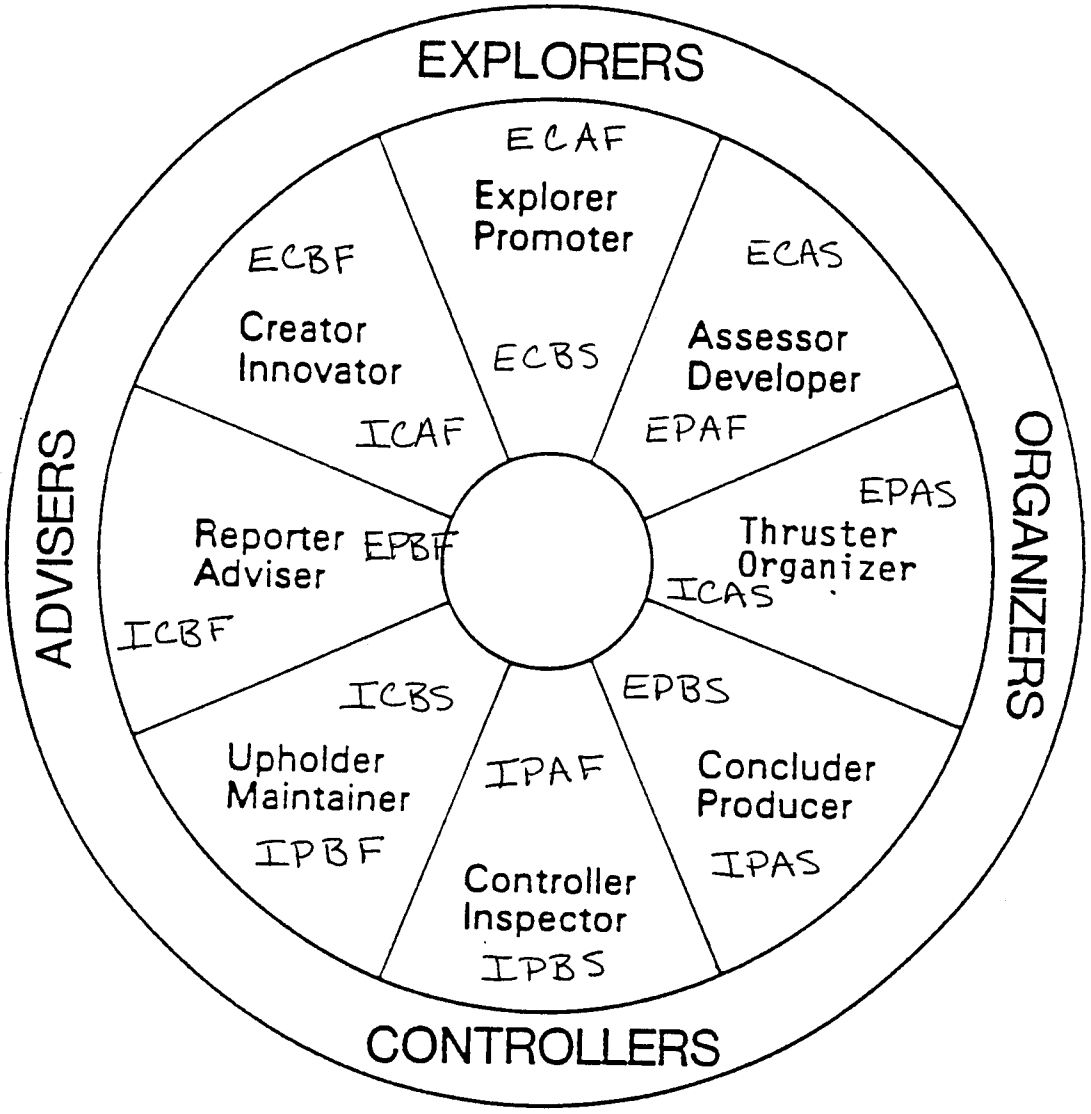


FIGURE 2.

TM OHT-3

er-Producer shares attributes of both the Organizers and the Controllers. Using the four axes and eight factors described above, the roles preferences described by the Team Management Index can be mapped into the Wheel. For example, a manager indicating a preference for Extroverted-Practical-Analytical-Structured (EPAS) work behaviors would map into the Wheel as a Thruster-Organizer. In addition to the major profile the TMI also allocates two related profiles, based on individual responses, which would provide satisfying work areas for the respondent. Other relationships are illustrated in Figure 2.

TMS Application/Case Study

The TMS is designed specifically for use in the work environment. Applications range from its use as a tool to enhance personal understanding, to recruitment and selection, and as a basis for training and appraisal feedback. However, primary use by the author is in the area of team formation and development.

Team Formation

The TMS allows managers and leaders to build teams tailored to the specific mission of that team. To do this, the leader must determine the type of work to be done to accomplish the mission. For example, a team with a mission of implementing plans provided to it by other agencies (production) does not have the same need for innovation and promoting as a team that completes the planning process. The nature of the work to be performed determines the make-up of the "ideal" team to accomplish the job.

Once the proper balance of work is postulated, the manager can then build his/her team using the preferences indicated by the TMI, hiring the right people to do that kind of work. After initial team set-up, the TMI can be used to screen replacement team members when the need arises. Using the TMS to build a team tailored to the mission is an ideal situation, one not likely to arise in practice. A more practical application is diagnosis of an in place team to determine strengths and opportunities for improvement.

Team Development

Usually, a manager does not have the opportunity to build a team from the ground up. The mission must be accomplished with the people in place. The TMS allows the leader to determine what types of work individuals prefer and match that preferences with the work necessary to accomplish the mission. In addition, the TMS can indicate areas of "no matches", that is work that needs to be done to complete the mission but where no team members exhibit a preference to do that type of work. In these case, the leader can choose to bring other members into the team to fill these voids or develop skills within the team to accomplish this work. In practice a leader or manager already knows that required work is not being accomplished; the TMS simply allows him/her to determine why.

Case Study

The Quality Programs Team at the Air Force Operational Test and Evaluation Center ha the mission of providing Quality Air Force education and training, teambuilding

services, and work process analysis consulting to the 850 person staff. The team consists of four people, the Team Leader, two officers, and an office/facility manager. The material used in the classroom was developed in-house from Air Force and contractor provided courseware. The consulting services are based on education and training received from a wide variety of sources. The Team Leader is also the Commander's Quality Advisor and facilitates the senior leadership's council on quality improvement.

The team had been in place and functioning for eight months. Emphasis during this time was on classroom production; each instructor was spending 7 to 10 days per month doing platform instruction. This production, based on the number of staff members attending courses, was seen by the team lead as evidence that the team was getting the job done. However, several team members were not convinced that this was the case.

Every member of the team had taken the Myers-Briggs Type Indicator and had validated and shared their own personality type. Communications among team members was (and continues to be) open and productive. They were doing the job but there was a sense that things were not matching up.

At this time two members of the team were certified in the TMS. All team members were administered the TMI with the following result: Team Leader, Thruster-Organizer; Team members, one Explorer-Promoter, one Concluder-Producer, and one Assessor-Developer. It is interesting to note that there was a one-for-one correlation between the MBTI types and the associated TMI roles. As you can see the preference for gathering information and making it available to the team is almost missing. This team has a natural preference for developing ideas and then putting them into practice without checking to see if anyone is listening. In addition, two of the team member's natural preferences are not in the area of production, teaching the same material week in and week out could lead to dissatisfaction.

As a result of analyzing the TMI results, the team revisited its mission statement and division of labor. The two team members with a natural preference for production took on an additional teaching load and a plan was developed to train additional instructors from other staff agencies. The two team members with a preference for innovation and exploration were given more time to investigate better ways to accomplish the team mission. Team members established networks within and outside the organization to gather information about new courses and techniques and how well customer expectations were being met. In other words, the work preferences of individual team members were matched with the work to be done and where there was no natural match processes were developed to fill the voids.

The results, while not dramatic, were obvious. Team members were more comfortable in their assigned roles. Much more information about what was going on in other organizations was available. The team developed a network internal to the organization to find out what really needed to be done to accomplish it's mission. Job satisfaction and mission accomplishment increased.

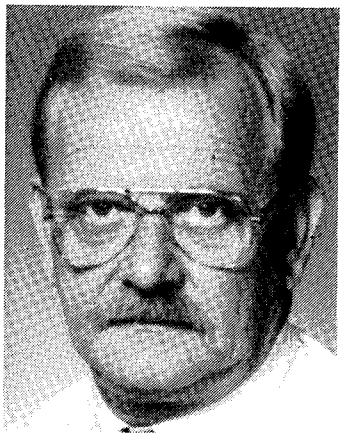
SUMMARY

The TMS is a system of tools that allows the manager to match individual work preferences to the work that needs to be accomplished. Unlike the MBTI, the TMS is designed to be used for decisions in the work place. In practice, the TMS allows managers to understand why certain mission areas may be neglected and make decision to address these voids.

AUTHOR

Lieutenant Colonel Larry Voss is the Director of Quality Programs, Air Force Operational Test and Evaluation Center (AFOTEC). He advises the Commander on Quality Air Force implementation and assists the leadership and staff in analyzing work processes. He oversaw the development of AFOTEC's Teambuilding process and teaches QAF Awareness, Process Improvement Team training, and Teambuilding. Lt Col Voss is certified to administer the Myers-Briggs Type Indicator and the Team Management Systems.

TEAM BUILDING IN THE PACER SHARE PROJECT



Joseph Prater

Debra Schwartz

TEAM BUILDING IN THE PACER SHARE PROJECT

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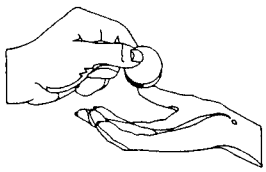
TIME

The clock on the wall slowly counted off the wasted seconds in perfect accord with the tapping finger of the harried painter. Waiting, waiting, waiting, time and money slipping away while he waited for replacement supplies. Seconds drifted into minutes, one minute into thirty. An idea began to form...get a cart for each two man team...would management listen?

The paint wagon blocked the warehouse aisle, forcing the gentlemen to detour from their course, reminding the manager of potential hazards and accidents waiting to happen. An idea began to form...what if the painters used a different way to transport their materials...would the team listen?

Team meeting day came, two members arrived with new ideas...we wait too long...we have a hazardous situation. Eliminate shared transportation, buy two person carts...add a flammable locker. Waiting time costs $69,000.00 a year, cart purchase $27,445.00...first year savings' $42,299.00. The work team, with their managers, improves their process and corrects a potential hazard.

Fantasy? Private industry? Too radical a concept for government service? No, an actual team at work in the Distribution Division at the Sacramento Air Logistics Center, McClellan Air Force Base in California.



INNOVATION

During 1988-1993 the employees and managers in the Distribution Division worked together as partners under a demonstration project formed by legal authority of the Civil Service Reform Act of 1978, and approved by the Office of Personnel Management (OPM). The Pacer Share Demonstration Project improved the human resource management process through six initiatives: 1)pay banding, 2)job series consolidation, 3)on-call hiring, 4)organization approval of supervisor grades, 5)productivity gainsharing, and 6)elimination of individual appraisals.

These six radical changes merged together as a system to increase productivity and forge a new management partnership with organized labor. Remarkable things developed as management empowered the workforce to innovate, adapt, and develop goals. Natural

work teams were formed, given ownership of their processes, and told to improve their products and satisfy their customers.

At first employees, and some managers, found the project intimidating. Change of this magnitude took courage and commitment and few were sure the new system could be trusted. During the first year of the project a positive atmosphere started to develop as people began to understand the new freedom of owning their work processes. Outside evaluators, first the Rand Corporation of Santa Monica, CA, later the Navy Personnel Research and Development Center (NRPDC) in San Diego, CA, conducted yearly attitude surveys. The baseline measurement of the project confirmed that only 25% favored the changes about to be made. By the fourth year 66.7% supported the new system.

TEAM BUILDING

Shortly after implementation of the project, management recognized that their fledgling partnership with the workforce needed bolstering. People weren't used to working as teams, and managers hadn't learned to share decision making and policy setting. Formal team building workshops were developed to break down long-standing communication barriers. An outside consultant was selected to lead the team building effort and bring an impartial perspective to the organization. The entire workforce, at that time over 1,800 people, attended the two day workshops. Over two year period, 126 natural work teams attended 97 sessions.

Team building dared employees to improve their process, change the way they did their job, identify their customers, and ensure customer satisfaction. Management gave the teams process ownership and sent them to the workshops where they learned how to take responsibility and be accountable for results. Team building taught teams how to work together, trust each other, and ultimately define problems and develop better ways to get the job done.

The workshops taught management that employees could be trusted to not only do the job but improve the product or service. Given the trust and opportunity, teams could accomplish the mission better and with fewer people. The team building concept soon spread to the entire installation, and team building workshops were developed and taught throughout the ALC.

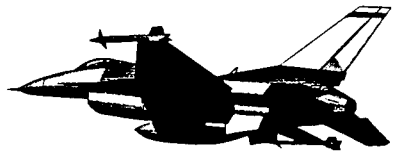
TRUST AND BONDING

Rumors stacked up faster than the crates waiting for shipment to the middle east. Everyone on the packing line looked grim, the usual banter forced. Tension coiled around the conveyor belt, emphasizing the destination marked on each crate -- Desert Storm. More crates arrived every hour. The packers couldn't keep pace with the increases. Time to test the worth of the new system...bring in workers from other processes.

An office manager answered the call, releasing five supply clerks to report for work on the packing line. A transportation supervisor led four truck drivers to the shipping line where he took charge of expediting material for shipment, four airmen arrived to operate

forklifts. Pay banding and series consolidation freed teams to support the customer.

Overtime expenditures to support Desert Shield/Storm minimized. Pride and team spirits soared. Customer demands met, supply support exceeded goals...project tested under fire.



The first step in developing team work was to learn to trust the very people the work force had not trusted for years. Not only did they have to trust management, but they had to recognize that management was part of the team. On the other hand management had to do the very same thing. They had to trust the workforce to make on-the-spot decisions and share ownership of the work and improvement efforts. No longer could management be referred to as *them* and employees as *us*. Both parties were molded into one productive team, bound together and committed to get the job done.

The team building workshops gave everyone a safe atmosphere to air their fears, angers, and concerns about the project and their jobs. Each team had the opportunity to tell their managers what they really needed from them, and managers told to the employees what they needed in order to manage the operation. This worked so well that teams started inviting their customers to the workshops to find out their needs, too. People completing workshops took back to the work areas a new understanding of the demonstration project objectives . Excitement could be felt as a completely new environment evolved, one that a year before had seemed impossible.

Trust and bonding between workers, and between workers and managers, started to take place. Trust grew, communication began to flourish, and employees learned to be at ease talking to their internal managers who became members of the team, and to external managers who were now identified as customers.

GUIDELINES FOR TEAMS

The sun beat down on the cab of the truck increasing the temperature inside at the same rate the driver's temper rose. Time lost, material sitting on the loading dock, going nowhere. An aircraft and pilot held up, waiting for delivery of material. An idea started to form...scheduled service...don't drop trailers...would anyone be interested?

The mechanic's patience evaporated in the humidity, waiting for the parts to get the A-10 into the air. Flight time approached at a steady pace, impatience drifted into anxiety. An idea began to form...what if all deliveries were made to a single location at scheduled times...would transportation listen?

Customers and suppliers invited to transportation's team meeting. Create a shuttle service...$350,000.00 in transport and waiting time saved...no cost to implement, delivery time improved by 56%...customer satisfaction 89% on latest survey. A work team, with their customers and suppliers, improves a process.

Enthusiasm was contagious and spread throughout the workforce. The teams continued to meet regularly, learning to interact as a team by working through their initial commitments. As these first

commitments were met and team cohesiveness developed, the teams started to look for way to improve their processes. Applying process improvement method did not come naturally. More training was developed and taught in-house by experts in Total Quality Management (TQM) and Statistical Process Control (SPC) to give the teams an understanding of process analysis and control.

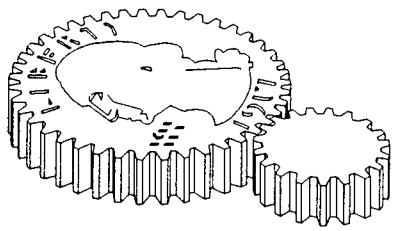
A labor-management team developed guidelines for teams, identifying the roles of managers, team leaders, supervisors, and team members. The guides also outlined specific parameters for teams to move efforts away from triviality and into process improvements.

Individuals who had shown a natural ability to facilitate groups were selected and given responsibility to assist their coworkers by leading team building follow-on sessions. They helped the teams focus on solving problems which resulted in one of three things:

1) improve the work place
2) improve the process
3) improve quality service to the customer

PRODUCTIVITY GAINSHARING

A true cultural change evolved as management started to listen to suggestions and act on proposals for change. Managers found there was now more time to focus on actually managing their process instead of fire-fighting problems and watching people. Quality took on the highest priority as teams identified, and started talking to, their customers. New levels of customer satisfaction were being reached in functions never before acknowledged as customers. It became evident that quality starts to happen when communication barriers are broken and employees and managers work as a team. Process improvements were made, rework eliminated, waste removed, and systems streamlined. Total productivity savings amounted to $5.5 million. Half was returned to the Air Force, and half was shared by all civilian employees. Each person in the project earned $1725.00 in gainshares and $319.00 in a special act award. Additionally, $7.6 million were saved through cost avoidance.



None of this developed in a matter of a few days, weeks or months. This was a five year effort. The teams had to learn to work together, supporting each other's successes and helping to correct errors. This new focus on the *team*, instead of the *individual*, was difficult to make and the challenge of participative management was frightening. The workforce learned that making decisions meant accepting responsibility for the results without having a manager, or someone else, to blame.

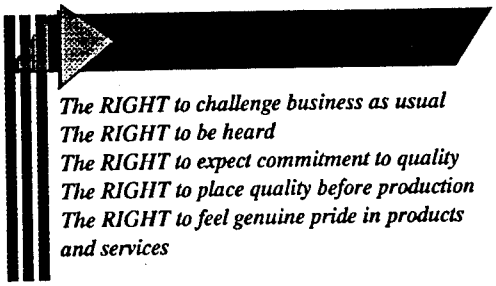
The elimination of individual performance appraisals supported the focus on teams. The project ended before improvement to this intervention could be tested. The goal was to measure each process, gain statistical control of the process, then improve and exceed customer expectations. Customer satisfaction and control of the process would become the measurement of the work team's performance. The teams would identify their Most Valuable Players (MVP) as well as the poor performers. Productivity gainsharing

would be based on how well the teams performed and maintained an exceptional level of customer satisfaction. Working without individual performance appraisals enhanced the effectiveness of team work as individuals stopped competing with each other and started working together to serve their customers.

TOTAL CUSTOMER SERVICE

A line worker on the A-10 final line looks at yet another aircraft being readied for final work before flight test. Another A-10 with a quarter inch gap between the flap stabilizer and the outer skin, a gap that should not be there. It causes no problems with the safety or air worthiness of the craft, so it has been consistently overlooked. He shakes his head wondering, why allow a million dollar aircraft to leave with a problem that could be fixed? An idea begins to form...submit a Quality Bill of Rights Challenge...could it work?

The Bill of Rights challenge arrived at the commanding General's desk. After careful consideration he signs his approval, validating that the commitment for quality is not just a saying but a new way of life. The line shuts down while the worker gathered his team and with help from aircraft engineers and sheet metal workers fixed the process and eliminated the quarter inch gap. In two short weeks the line re-opens with an improved process which produces a consistent, error-free product.



Another realization that affected teamwork was the discovery that every process has a customer, and that the customer-contact employee is the most important person in the process. The division which had been responsible for end-of-process quality inspection was disbanded in 1989. The responsibility for quality and customer service was passed directly to the teams. Each team had to inspect their own product and work directly with their customers. Many teams learned they were not providing quality services and products, and that their customers had a very low opinion of supply distribution.

Process ownership and responsibility created a new self-confidence and pride. No longer would teams allow old sayings to go unchallenged. Anyone heard saying *"we've always done it this way,"* or *"just do it, don't think about it"* were taken to task immediately for perpetuating outdated ideas. The old ways of doing business had worked in the past because employees had never taken the time to see how their job affected the next person or section. They did their part of the process and passed the work on without knowing its eventual impact. Now, the teams realized they needed to find out what problems the next person--their customer--was having, and find a way to resolve those problems.

The teams started inviting their customers to their weekly meetings, which took a lot of customers by surprise. The customers were

delighted to talk about what they needed and suggest ways to make services and products better. If there was a problem in a specific area, the people affected were invited to a meeting where the problem was explored and suggestions requested. One very surprising consideration came out over and over -- workers on the floor know how to fix the problems. In the old environment workers didn't care about anything beyond the narrow confines of their job. If there were problems, it was left to management to correct. Process ownership changed this perception when poor work and poor relationships directly reflected on the team.

FREEDOM TO FAIL

The whine of the F-16 generator rewinding sang into every corner of the shop. High tech efficiency stopped at the rewind shop's door, the rewinding is done by hand. Six hours pass as the F-16 jet fighter waits, a silent reminder of time and money slipping away. A quiet man begins to have an idea...design a new tool...would anyone listen?

Silence in the room felt as cold as ice, unvoiced opinions filled the air finding no place to land. The team leader took a deep breath and tried again, "Does anyone have any ideas to speed up the rewinding process?" A light shift in position alerted the others as the quiet man spoke softly, "I've made a tool that will work." Excitement grew as the idea was discussed...they were finally hearing each other.

The tool needed very few modifications. Within a week it was ready to use....rewind time cut from six hours to twenty minutes per generator...97% failure rate on final test dropped to less than 1%. Before, the supervisor was reluctant to sign off on the 3% of generators that passed final testing. Now, he feels proud to sign for anything coming out of his shop. This is team work...this is quality.

Process improvement became a way of life. Major processes have been flow diagrammed, analyzed, and streamlined. Process changes were tested, and if the first solution failed, the drawing board was brought back out. While the teams continued to work on the processes, mistakes and failures were allowed without repercussions. Experience was gained with every mistake.

It became evident within the first year of the project that team building and the project were not suited for everyone. Some supervisors were either unwilling or unable to make the changes demanded by the new environment. Several supervisors requested to be taken out of supervision, or to be transferred to areas outside the project. Each request was treated with respect and, if management agreed, the request was granted.

Some employees could not accept the responsibility of ownership and asked for transfers. Team work was now part of the job, and anyone who could not make the commitment was encouraged to find other employment. A labor and management board was created to deal with each employee request. The board reviewed each case and assisted the individual in finding work outside the project.

LABOR & MANAGEMENT PARTNERSHIP

There continued to be one major area of discontent which had to be dealt with early in the project. Middle managers did not clearly understand their role in the team process. Policy was driven down from the top, but in too many cases it was driven around the middle managers. This allowed fear to creep into the process and erode team bonds. The directorate training staff developed a six year education program to teach managers the history of TQM, how to establish goals, target specific areas for improvement, and manage human resources in the new system. The middle manager's role developed into organizational trouble shooting. The managers act as a corporate board, where they plan and implement improvements. They guide the actions of the teams, while networking with other managers and customers.

One of the greatest achievements to come out of the project was the close relationship that developed between the labor unions and management. Distribution formed a full working partnership with organized labor, giving them an equal voice in the creation of policies and design of the project. Management created the environment and labor unions ensured that everyone involved was treated fairly. Each time they sat down to work out problems it was always with the aim for both sides to win, with the employees gaining the benefit.

DIMINISHING RESOURCES

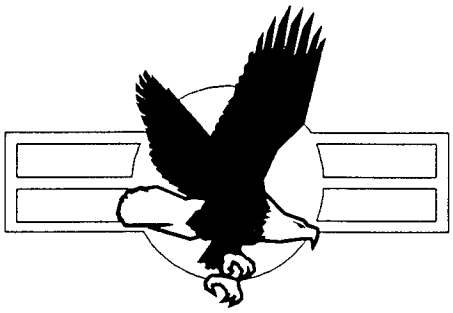
The chair creaked in pain, covering the soft moan barely escaping the lips of the supply clerk. Another inventory package returned, the yellow sticky paper attached said do it again, change this word and that word. She had promised the customer their assets would be released, now all the work would have to be repeated. An idea began to form...change signature level...would the review team listen?

A disgruntled manager retires, creating an opening, giving the deputy director the chance to test a theory. What if the position is filled on a rotating basis by the lead inventory team? An idea takes reality...challenge the team to improve the inventory process...would they be willing?

The team accepts their director's challenge and creates a central review team with the authority to sign completed work. No cost to implement...management position eliminated. Inventory processing timeliness increases from 85% to 95%...rework drops from 32% to 19.6%. The work team, empowered by top management, exceeds expectations and creates a system responsive to customer's needs.

Several teams were given the opportunity to decide between eliminating or filling positions made vacant due to transfer, promotion, or retirement. The teams were challenged to improve their work processes, and pull together and share the extra work load instead of hiring new employees. A few teams were allowed to test the process

further by becoming self-directed teams, working without a first line supervisor. These teams maintained, and in some cases exceeded, previous levels of production and quality. Civilian manpower within the project dropped from 1845 positions to 1311 when the project ended. Civilian personnel classification actions were also reduced as manpower changes were made using the new system. Personnel actions generated under the project were processed in 832 hours compared to 2850 hours before project was implementation.



1993 PACER SHARE ENDS

Pacer Share officially ended on February 18, 1993. The fourth year evaluation report stated that "*the project has provided a step in the right direction*" (FOURTH YEAR EVALUATION REPORT, NRPDC, page viii). The project proved that government employees can take charge and be proud of what they do and how they work. It proved that, like private industry, changes can be made and processes improved.

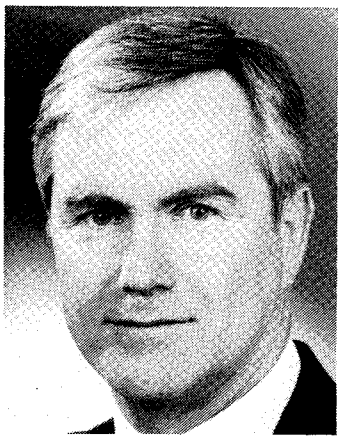
The old meaning to the phrase *good enough for government work* has been reestablished. Pride in doing an excellent job can never be taken away. Although the project has ended, the lessons learned will continue to be shared and expanded upon. Project Pacer Share proved that if employees are trusted and empowered great things can, and will, happen.

Top level managers saw that the line employees can make rational and viable decisions. The workforce can take charge of their jobs and improve them without losing productivity. Employee grievances dropped from 54 yearly to only six during the project. Unfair labor practices were reduced from six to only one. The project demonstrated that management and labor can work together as partners. It also showed that the federal human resource management process can be changed successfully.

SUMMARY

The Pacer Share project enabled a government unit to try a new way of doing business. This unit demonstrated that the federal government can function as a customer focused organization. The project created an environment which built a high performance team-based organization, focused on giving the customer what they need, when they need it, and leaving them delighted with the product or service the first time, every time.

ELEMENTS OF TQM IN AIR FORCE INSTRUCTION



Dr. Tom Griffin

ELEMENTS OF TQM IN AIR FORCE INSTRUCTION

Tom F. Griffin, III, Ph.D.

ABSTRACT

It is well documented that education has been slow to adopt the philosophy of Total Quality Management (TQM). This is in part due to the difficulty of translating the terminology of industry into language and concepts applicable to, and understood by, educators. Educators are unaccustomed to thinking of themselves as having customers and are likely to reject the idea that students', as customers, know what content they should receive. A translation of the terminology of the quality movement to education is presented. Air Force instruction, as taught by the Academic Instructor School, is analyzed to identify parallels with the philosophy of TQM.

INTRODUCTION

Improving the quality of education is a goal whose merits are without challenge in an industrial society. Institutions of higher education are in financial distress in the U.S. and their situation parallels the trend toward downsizing in industry and government. "Costs are increasing while funding decreases. . ." Enrollment is decreasing due to changing demographics, the rise of excellent foreign institutions and the move by many corporations to educate their own managers (Bemowski, 1991). This should provide adequate reason for attempting to analyze education using the TQM paradigm. In addition, this paper will examine the U.S. Air Force, Academic Instructor School to determine the aspects of the program that are examples and the aspects that are non-examples of TQM applied in education.

Total Quality Management (TQM) is a philosophy of management that may run counter to the conventional wisdom concerning quality improvement. Traditional American management theory has been characterized as motivation of employees by fear (principally of losing their jobs), by requiring them to meet quotas, and by attempting to maximize their next merit increases" (Carder, 1991). TQM offers an alternative to management by objectives (MBO) as well as the promise of improving quality while reducing, not increasing, cost. TQM is a philosophy built on:

1. Investing in the skills of the people who do the work in the system,
2. Trusting the "knowledge of the system" of the people who work in the system to
3. Scientifically and cooperatively make improvements to the system for the
5. Longterm benefit of the internal and external customers of the system as well as
6. Employees, owners and other stakeholders of the system.

TQM has become a well-developed field with a methodology successfully applied in many business situations. In order to apply the principles of TQM to education it is necessary to translate the components of the educational process (students, teachers, classes, curriculum, etc.) into the native language and concepts of TQM (e.g., customer, supplier, product, quality, etc.). In other words, one must first answer the following questions. Who are the customers of education? What is the product? Who are the suppliers? What is quality in education?

THE CONCEPT OF QUALITY IN EDUCATION

Quality is defined from the perspective of the customer in the TQM philosophy. The nature of the customer of education is more complex than for most products. Customers of education could be the individual students or the institutions of society in which the student applies his knowledge. The individual student may pay some or all of the cost of education in order to obtain financial and non-financial benefits from education. Thus, the student could be the customer of education. Likewise, society subsidizes education and benefits from having well-educated, productive individuals who play various societal roles: employee, owner, director, member, supporter, elected official, citizen, head of household, consumer, etc. In this sense, society pays for and benefits from education and could be thought of as a customer.

It is clear that students are customers of educational institutions when they make purchases from the bookstore, housing office and cafeteria. The application of the TQM philosophy to these areas is essentially the same as in industry. In addition, students are the customers, or beneficiaries, of service activities such as registration, admissions, financial aid, parking, security, library and computer center. They should be thought of as customers of these services even though they may not pay specific charges for these services. Again, the application of TQM to these areas is as straightforward as in any other service organization.

Although they are important, administrative services merely support the essential process that takes place at educational institutions--learning. Learning is the fundamental activity educational institutions exist to provide. Good teaching may cause learning to take place, but ultimately it is the learning that is the goal of the organization. Teaching is but a means to an end. If it were not for learning, educational institutions would not exist.

When we consider the learning process we must conclude that the goal of the process is to produce people educated in a particular area of knowledge. The selection of course content by educational institutions should be guided by the needs of those institutions that employ or otherwise utilize the knowledge or skills of the individuals who learn the course content. Thus, the customer of a course of study (i.e., the learning in a particular field) is the institution for whom the student utilizes the content of the course. The customer for a business school, for example, is the employer who hires the graduates of the business school.

Quality in business education, as in any other field, must be evaluated from the customer's perspective. Quality business education is defined in terms of the extent to which graduates of a business program can effectively address the problems and opportunities of

interest to their employers. Just as quality is designed, not inspected, into products, quality is designed into education. Quality must be designed into education by planning the content of the course of instruction. If the plan for a curriculum does not include the correct content, the customer will not judge the education to be of high quality no matter how well teachers teach or students learn.

Determining the appropriate course content to satisfy customer requirements is a necessary, but not sufficient condition for achieving quality in education. Quality education must include consideration of the extent to which the curriculum content is learned by students. An excellent design produces low quality if students do not master the content. Methods of instruction that encourage high levels of learning and retention produce higher quality graduates and are, of course, preferred methods.

In the context of the conceptualization presented above, learning is the production process used to create quality graduates, from a curriculum designed to meet the needs of employers and implemented with the goal of maximizing learning and retention. In this scenario students are the workers who perform the production operation, learning. Faculty are the first line supervisors in the production system.

Within the education factory, are many internal customers. Each course or unit of instruction that the student takes may be thought of as an internal customer of the product of previous courses. Each course that builds on the knowledge students receive in previous courses is a stakeholder in the quality of the education provided in those previous courses. Unfortunately many institutions do a very poor job of coordinating the content of related courses. In a recent survey with respect to the "quality" content of non-quality courses, 100% of the schools surveyed reported that such content was determined by the individual instructors (Dorsky, 1992). In business schools, and most other schools, "professors are autonomous, setting up their courses the way they want." (Kaplan, 1991). When students reach a unit of instruction without mastering prerequisite material, re-work becomes necessary. Re-work is inefficient and costly. It wastes the time of the instructor and the students who have already mastered the prerequisite material. Further, it puts in jeopardy the attainment of course objectives.

Just as quality in education requires educational objectives designed to meet the needs of customers and methods of instruction that enhance learning and retention, quality improvement relies on objective, valid measures of achievement. Measurement of results is fundamental to quality improvement.

Too often some students do not successfully complete a course of study. They represent the scrap of the system. Just as much time and money is invested in their education as in the education of those who are successful. However, the expense of educating the scrap of the system may be inconsequential compared with other costs. Perhaps the most terrible cost of educational scrap is the price society pays when an individual's opportunities for further learning are diminished as a result of unsuccessful experiences in education. Lost human potential should be a serious concern for an information-based society that relies extensively on a highly educated workforce. Further, the prolonged effects on the individual

of failure in education may lead to diminished interest in learning, diminished self-esteem, emotional and psychological disorders and ultimately to antisocial behavior (Bloom, 1971). One need only consider the educational composition of those in our prisons to gage the enormity of this cost. Scrap is no less serious in education than in industry.

The reasons for educational scrap are many. Perhaps the most important reason is that many educators expect to produce scrap. As a result, many educators use systems and methods that guarantee they will produce scrap. Eventually, students learn to act in conformance with the expectations of educators. For example, the expectation of scrap is enough to legitimize the use of grading systems that allow only a few students to earn high grades and ensure that some students will do poorly or fail. "Grading on a curve," or norm referenced grading, is an example.

The use of norm referenced grading places emphasis on how well students learned relative to each other rather than how well they learned relative to course objectives. Thus, measures of the effectiveness of alternative methods of instruction become less important than class standing. The result is that less effective methods or methods that require less effort will inevitably come into use. This may explain the heavy reliance on the use of large lecture classes in many educational institutions, even though it is acknowledged by all that methods with greater student involvement produce more learning and greater retention.

Competitive grading systems reduce student opportunities to work cooperatively, even in situations where educators are trying to produce environments encouraging student involvement and cooperation. The use of team projects is an attempt to increase student involvement and teach cooperation. However, giving a student team a limited number of points to distribute among themselves for their individual grades on a team project is totally contrary to the original objective.

One of the most powerful means of inspiring learning is for teachers to model the behaviors they wish their students to learn. Teachers, like managers, must "walk their talk." To do otherwise is to diminish the value of the course content in the eyes of the students. Teachers cannot merely say they want to produce high quality and eliminate scrap, they must act accordingly.

OVERVIEW OF THE AIS PROGRAM

This overview is written from the perspective of a non-Air Force student in the program during January and February of 1993 at Maxwell Air Force Base, Alabama. It represents the student's understanding of the program based on his experience and based on conversations with AIS staff before, during and after the completion of the program.

The explicit curriculum (i.e., the visible, documented curriculum) of the AIS is a four week program of instruction in educational theories and applications taken by personnel who teach in the Air Force. Students in the program, although primarily from the Air Force, may come from all branches of the service as well as civilians from the Department of Defense

and other agencies. The AIS allows a limited number of local civilians from government and educational institutions to participate in the program if space is available.

Students making up a class in the AIS are organized into seminar groups of six to eight students with one seminar instructor. Most of the instruction and time is spent with the student's seminar group. Each hour of the day is scheduled and all seminar groups are on the same schedule. Some lectures are given to the entire class in a large lecture auditorium with audio-visual support. Students may make use of the Air University Library and usually make extensive use of the facilities and helpful staff of the AIS Audio-Visual Center.

Students teach three graded lessons on topics of their own choosing and must pass at least two. In addition, students are given a comprehensive final examination which they must pass in order to successfully complete the course.

The student's first two lessons are given using the informal lecture and guided discussion method. Preparation for the first two graded lessons is done within the seminar group. Preparation involves practice presentations with feedback from the seminar instructor and other students. Grading of the first two lessons is done by an instructor from a different seminar group. The student teaches the first two lessons to a scatter group composed of students from other seminar groups. Scatter groups usually contain no students from the presenter's own seminar. The student with some input from the seminar instructor chooses the format of the final lesson which is given to his seminar group and graded by his seminar instructor. The student's own seminar instructor plays no role in grading the student until the final lesson is taught.

ANALYSIS OF THE AIS PROGRAM

Quality is designed into the AIS using the Instructional Systems Design (ISD) model. The ISD process focuses on course design that meets the needs of customers. It represents a continuous process of course improvement. Step 1 of the process is to analyze system requirements, or determine the needs of the customer. Step 2 involves determining the educational requirements for meeting the customer's needs. ISD provides for accountability by specifying educational objectives and by specifying the measures, step 3, of the objectives prior to planning and conducting instruction, step 4. Unless the objectives and the measures of the objectives are specified before the instruction takes place, accountability cannot be demonstrated. Accountability requires that a teacher specify educational goals and measures of achievement prior to conducting instruction. ISD provides a basis for measuring and demonstrating the quality of learning (step 5). ISD is not only used by AIS staff, but is taught to the students in the AIS.

The expectation of success, no scrap, is introduced early in the AIS program. Students are told that AIS has never had a student regress. They create the expectation of success among students by telling them that AIS will give them everything they need in order to successfully pass the course. The explanation of the grading of the course emphasizes how students will succeed in the program.

Use of criterion referenced grading reinforces the expectation of success because students know that they can all pass. Criterion referenced grading supports the ISD process by providing quantitative benchmarks that can be used to test alternative methods of instruction. Fear of grading is minimized because only two grades exist: pass and fail. The AIS program teaches and uses the concept of mastery learning (Bloom, 1963, 1968). Student's expect to pass and need not worry about being categorized with different passing grades.

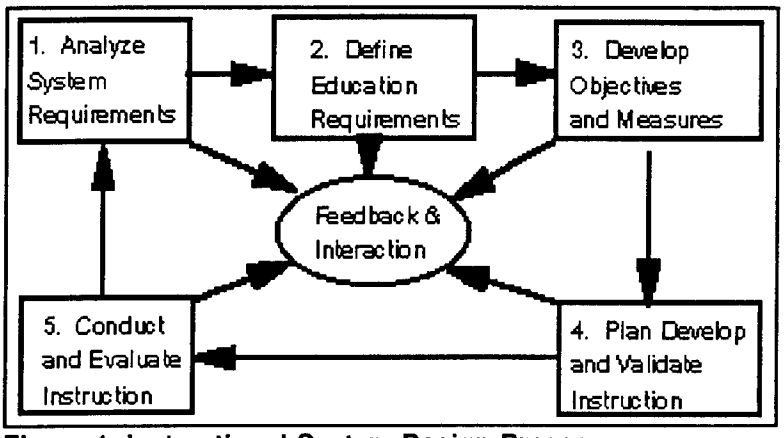


Figure 1--Instructional System Design Process

Emphasis on small group instruction with active participation of students in seminar groups creates a high level of personal involvement for most students. The high level of contact with instructors supports the students' belief that AIS really does care about every student being successful. The role of seminar instructor as helper is supported by having other seminar instructors grade the student's first two lessons (Knowles, 1984). The only role the student's seminar instructor plays in the first two lessons is to assist in the development of lessons and provide constructive feedback (i.e., formative evaluation) after practices before his own seminar group.

Teamwork and cooperation are taught at AIS. Teamwork is essential for students to succeed in the guided discussion exercise because most of the talking during this lesson is done by the students who discuss the questions asked by the student leading the discussion. Everyone is placed in the position of having to rely totally on his "scatter" group in order to pass this exercise. Cooperation and teamwork are not just words at AIS--they are fundamental to success in the program and after the program. In addition, the feedback given after each practice lesson is directed toward improving the performance of the members of the seminar group. Each person gives and receives feedback. If you expect to receive constructive feedback you must cooperate by giving constructive feedback.

Instructors in the AIS program model the behavior they expect from their graduates. They teach exactly like they want their students to teach. There is a perfect correlation between the methods AIS uses to create successful learning outcomes for it's students and the methods AIS expects it's graduates to use in creating successful learning outcomes throughout the U.S. Air Force.

SUMMARY

In the AIS program, the point was made that excellent courses of instruction could certainly exist without having been created by the ISD process. Introducing the ISD process

to such a program may introduce only minimal changes to the course of instruction. Thus, ISD may only serve to document that the instruction is excellent.

The analogy to TQM is that many educational principles consistent with TQM have been around for a long time and applied in the AIS. If TQM is used to analyze an educational process of high quality it may produce few improvements. TQM may only document the high quality of the process, not change it. AIS is a program of high quality that did not have it's origins in the teachings of Deming (1981) or Juran (1991). Applying the TQM philosophy to AIS merely documents the high quality of this program. Although AIS did not have it's origins in TQM, it is the benchmark for those attempting to apply TQM in education.

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COGNITIVE LINKAGES BETWEEN ADULT LEARNING MOTIVES AND SELF-CONCEPT: DIRECTIONS FOR CONTINUOUS IMPROVEMENT AND THE LEARNING ORGANIZATION OF ARGYRIS AND MEZIROW

Dr. Margaret Miller-Vaughn

COGNITIVE LINKAGES BETWEEN ADULT LEARNING MOTIVES AND SELF CONCEPT: DIRECTIONS FOR CONTINUOUS IMPROVEMENT AND THE LEARNING ORGANIZATION OF ARGYRIS AND MEZIROW

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Abstract. Recent empirical and theoretic work on Total Quality Management and Continuous Quality Improvement concludes with consistently unresolved issues. The US needs to find which new kinds of leader/manager characteristics should be emphasized, for desired directions. Details are found in self-concept theory, combining the work of Argyris, Mezirow, and others (on the "learning organization") with a new cognitive model of the self from Lerner and Ford. The author's own observations among professionals who pursue advanced learning confirms a detailed set of characteristics, a portrait of the Learner Self. These include: search for general knowledge, habitual use of deep processing, habits of introspection, inner-directedness, and carrying around mental models. The characteristics are compared to leadership theory from Kotter and managerial-task theory from Mintzberg. The portrait answers four itemized pressures the US faces, in revising national policy for global and resource-conservationist enterprise.

COGNITIVE LINKAGES BETWEEN ADULT LEARNING MOTIVES AND SELF CONCEPT: DIRECTIONS FOR CONTINUOUS IMPROVEMENT AND THE LEARNING ORGANIZATION OF ARGYRIS AND MEZIROW

Introduction

In just the past few years, we have seen a number of efforts to measure effectiveness from TQM or CQI innovations (total quality management and continuous quality improvement), as these are implemented in American organizations. One study by Jarrell and Easton took empirical measures of 39 Fortune-500 firms very recently . In the final analyses, these inquiries always conclude with issues of leader ability to acknowledge value [Spivey], managerial readiness [Buckmaster], generative learning [McGill], active role-taking by executives [Jarrell and Easton], or "commitment by top leader" [Hammer]. These mean we need to find some new kinds of leadership activity within traditional and nontraditional leader roles.

In Japan, and perhaps other countries, the habit of joint consultation (information-sharing) is definitely distinguished from negotiating or bargaining [Noriake, Shimada]. It is a learning habit occurring once a month, at least, when formalized.

Apparently, the new leader activity is not easily added to old activity [Argyris]. It is taken that many approaches artificially divide the individual away from the new grouped tasks [Kotter and Heskett] and couch the "Ideal of Continuous Improvement" as a too-vague, quasi-philosophy of work [Buckmaster, Morton].

Reports show that there are weak outcomes, even in the best cases. To increase their transformability, organizations must either develop or acquire certain aspects of learner ability, i.e. capacity to add new activity and to do it at both top and bottom of their work organizations [Kilmann 1986, Mezirow]. The question is: How can a "self" be altered through experience, including interventions, to improve a group's TQM/CQI effectiveness?

My paper does not have as its objective to persuade its audience to accept or to reject these other authors' prescriptions. Neither does it argue about the leadership issues. Instead, it takes the new leader activities and roles as "givens," as

correctly proved to be necessary, and it searches for:

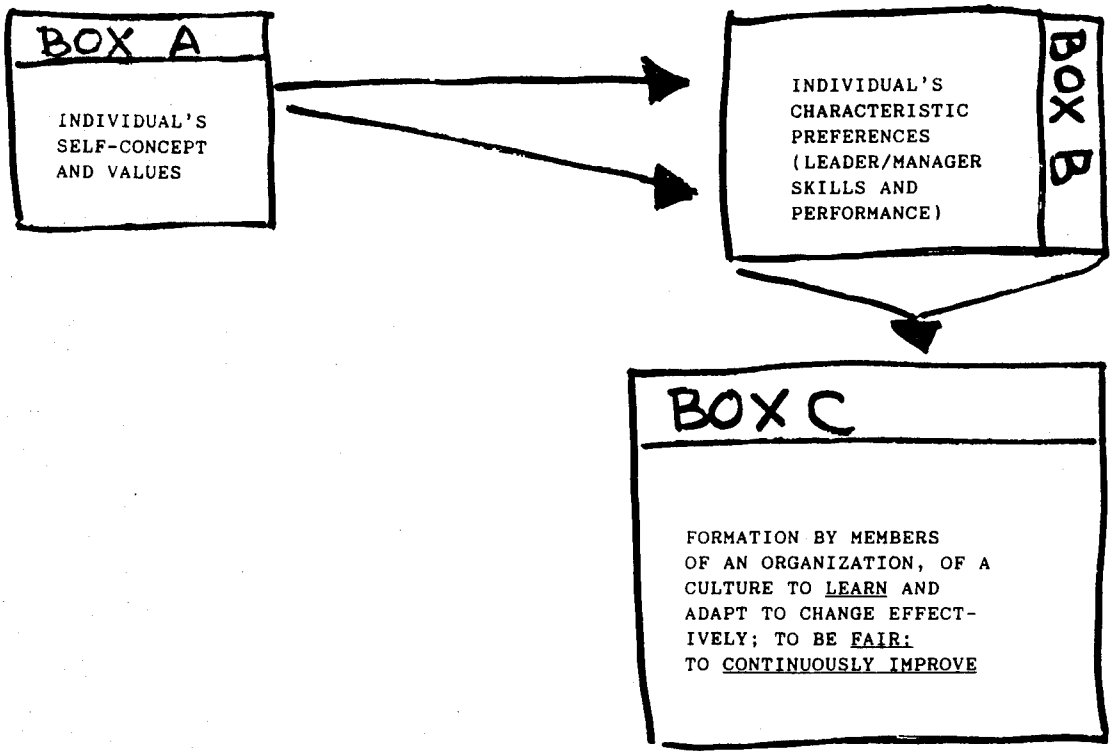
> just what conditions enable people to have leadership-with learner-ability qualities...(conditions that are taken to reside within the self-concept)?

These conditions are the ones organizations may either develop or acquire (select), as they succeed in building up and rewarding new activities among managers and executives targeting Malcolm Baldrige or similar criteria.

Basic Propositions

A model here shows the basic propositions and gives direction to the argument with which the question is answered: how can a self be altered through experience to improve a group's effectiveness? Immediately one sees the linkage between individual and group effectiveness in desired directions:

Fig. 1. The Three-Box Model.



A point of interest to remember with this model is that some individuals have a self-concept that includes "self as lifelong learner," and this correlates with "self as one who tries new things, who investigates and experiments with ideas" [Vaughan, Mezirow].

Conventional treatments of "self" have set the stage, but they are insufficient. Those often cited have not explained why achievement may be low while some of these measures (such as "strong self-image") are high, a failed connection cited recently [Hattie]. Some of the more common treatments have held that self is known through:

ego ideal [Levinson]
self efficacy [Merton]
role congruence [Kahn]
ego and superego [Freud]
reflexivity [Mead]
introspection [Mintzberg]
lifecycle and "worthiness" (self-worth) [Bühler]
inner- vs. other-directedness [Festinger]

These concepts lead to useful summative conclusions:

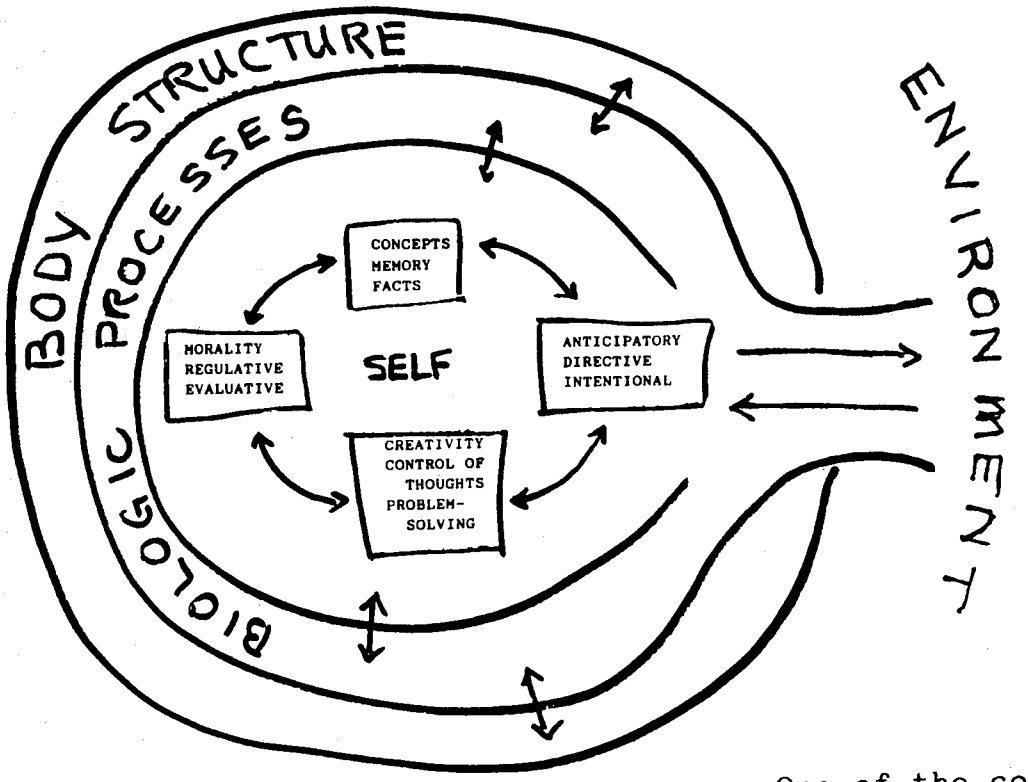
> we "play to" a society as audience; "the other" is a mirror
>
> our immediate role-senders are needed (more or less), and heeded (more or less)
>
> we have strong or weak preferences on the means used to examine and express the Self; these may be recognized, conscious; one can "know one's Self"

The first two of these indicate how Self is constructed in everyday life, and the third indicates that a leader's or manager's Self may not be fixed.

The Lerner/Ford Model

The most recent theory of Self appears to encompass some of the earlier concepts, but with a more useful configuration to indicate which environments of "Self" may be more intuitively cognitive, as well as logical [Lerner and Ford]. This configuration led to my interest in designating some characteristics of a "learner self."

Fig. 2. The Self. (adapted from Lerner and Ford)



Influence directions are marked by arrows. One of the cognitive components, the "Thought/Problem-Solving" component, gives most promise as the specifically-developed part of the self-concept associated with lifelong learning habits.

Those who specialize in aspects of learning theory where, as in the Myers-Briggs preference indicators, the learning style preferred is the focus to be studied and compared, have found that the more committed learner is one who habitually turns to "deep processing" and "getting behind the data" [Vaughan]. These two expressions mean careful and experimental study, or "rethinking," or "reengineering," a term associated with Hammer. They attach especially to the first three of six leader and manager habits, so widely reported in management literature

[Mintzberg, Kotter 1990] to mark the successful transformational person:

introspection
inner-directedness
habit of carrying around workable "mental models"
reflexivity
integrity
drive

Surveys among advanced learners who are practitioners in managerial and administrative professions, is conclusive. Among them several preferred motives for continuous improvement emerge. They (1) seek specific mastery (the mastery Self), (2) seek general knowledge (the learner Self), (3) seek to promote one's career (the earner Self). Those who are also clearly committed to Continuous Improvement ideals show strong preference for the second search type, the Learner Self [Vaughan].

The Learner-Self Portrait

Therefore, I propose that the learner self does correlate with the achievements we want to find in leaders and managers of the learning organization, and that these are the same which are intended in the principles of Continuous Improvement [Hammer, Jarrell, Noriake]. Furthermore, we find they are the same as those which drive selected aspects of excellence in advanced management research reports, and in particular those which are at the same time creative and rigorous.

The search for general knowledge, habitual use of deep processing, and the habits of introspection, inner-directedness, and carrying around workable "mental models," constitute a portrait of the successful Learner Self filling leader and manager roles in a Continuous Improvement program.

Such a portrait may be put to an integrative test with one new promising general management concept, as we begin to measure the Learner Self more widely through empirical field work. That concept is The Learning Organization, a type of organization where its culture and structure, both, are characterized by commitment from its leaders and its managers to establish and continue to refine mechanisms (personal and formal) for studying themselves on a continuous basis; such culture and structure provides momentum "beyond the quick fix" [Argyris, Kilmann 1984, McGill].

It turns out The Learning Organization has one main goal: to break down defense mechanisms people use, as they resist seeking or accepting new paradigms for consideration under the general rubric of Model O-II [Argyris]. The Argyris Model means a habit or system of self-study to maintain a steady evaluative view of "theories-in-use" (read: the traditional way we operate) at the same time new untested theories, or "mental models of how we might improve," are considered and taken on as experiments. One of the interesting features of this is the difficulty among some leaders and managers to share information and to delegate decision-making to <u>many levels</u> in the organization, as a staff-development function [Kanter, Kotter 1990]. We are finding that the new types of professionals being trained need more of an experimental mindset, and they need to be recognized well when they come to work with it [Reich, Kanter, Spivey].

It is not known which set of factors, "hygiene" or "motivational," will best ensure the characteristics,

search for general knowledge
deep processing
introspection
inner-directedness
habit of carrying around workable "mental models"

Some CQI literature advocates relaxation of extrinsic motivators, to shift rewards to task meaningfulness (a cluster of measures), long studied by the original theories on job redesign [Hackman]. So far, proponents have relied on instruction and facilitative methods to nudge the organization into this commitment [Kotter and Heskett, Kilmann 1986, Argyris, Mintzberg, Mezirow] rather than pay, advocated by Hammer. It would certainly be easier, as in all such cases, to select managers and leaders who already bear that commitment for the most reliable establishment of the Learning Organization. For this reason, advanced education programs (MBA and PhD) for management professionals now include coursework and exercises, as well as research projects, that focus on this type of commitment. So there will be increased amounts of empirical field work along these lines, very soon.

It does seem abundantly clear that the Learner Self is one vital aspect of self-concept we can identify, select or develop, and then include with purpose plus reward, doing this for leader and manager roles in organizations where sustained TQM and CQI innovations are considered a major investment.

We are Under Pressure

These observations conclude by noting that in all types of American organizations and institutions, we face several pressures that make it mandatory to answer our question:

> how we can uncover and perhaps re-form a manager/leader Self, enabling it by conditions of learner ability?

The pressures include these four:

1. We enter an era of resource conservationism without precedent; our infrastructures are degrading, requiring prudence and improvement in labor-force preparation among our youth [Bellah]

2. We enter an era of rapid growth in competition for markets with global dimensions; inside our own organizations we must develop better systems of trust and commitment [Reich]

3. American industry has shown reluctance to invest in medium-to long-term payoffs, such as retraining in public schools or retraining in organizational development skills, while in other nations the proportion so devoted is increasing [Thurow]

4. The expense of a program to implement organizational transformation is made only part-way; momentum is lost and improvements are allowed to regress; improvement is not continuous [Hammer]

A common thread exists here, and it is to discover a way to shift attentiveness, from forms and systems to individual development, raising up the stock throughout our workforce and institutions (present and future) of a particular set of skills we know we need in greater supply. The task will not be successful if not entered into by all holding and seeking leadership roles, from top to bottom. There are many things our institutions must stop doing, and many we must start. One must conclude that we have to move more surely into institutional interdependence and individual lifelong learning habits, meaning increased cooperative learning shared between public and private enterprise. Generalizations are not enough. This paper is a contribution to some of the details that need to be known.

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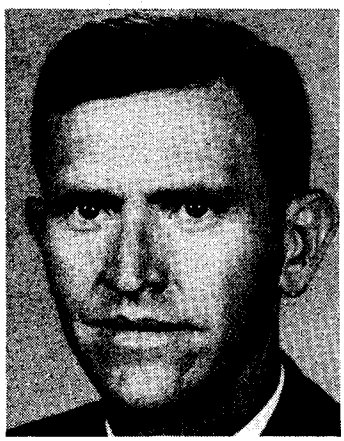
REFLECTIVE NOTES TOWARD A CONCEPTUAL PHILOSOPHY FOR THE INTEGRATION OF TOTAL QUALITY MANAGEMENT PRINCIPLES OF EMPOWERMENT INTO AIR FORCE EDUCATION AND TRAINING



Maj David Gray

Reflective Notes Toward a Conceptual Philosophy for the Integration of Total Quality Management Principles of Empowerment into Air Force Education and Training

ABSTRACT

This paper provides some reflective notes toward a conceptual philosophy for the integration of Total Quality Management principles of empowerment into Air Force education and training. The principles, application, and implications of empowerment as well as the challenges of providing quality instructional processes and products are identified. This paper also addresses various aspects of instruction, including the instructor, student, instruction and technology. Additionally, instructional approaches for the introduction of human engineering factors and new technologies into instructional design, development and delivery are addressed. Finally, descriptive and prescriptive methodologies for the incorporation of learning principles into academics are presented, as well as, the current and future vision of instructional requirements.

APPROACH

The instructional objectives for the presentation entitled, "Reflective Notes Toward a Conceptual Philosophy for the Integration of Total Quality Management Principles of Empowerment into Air Force Education and Training," include the following:

1. Identify the principles of empowerment as formulated by Deming (1986).

2. Discuss the requirements and challenges of providing quality instructional processes and products.

3. Highlight aspects of instruction relative to the instructor, students, instruction and technology.

4. Conceptualize instructional approaches for the introduction of human engineering factors and new technologies into instructional design, development and delivery.

5. Address descriptive and prescriptive methodologies for the incorporation of learning principles into academics.

6. Expand the current and future vision of instructional possibilities.

The overall objective of this presentation is to examine an approach for the integration of Total Quality Management principles of empowerment into Air Force education and training. This paper addresses concerns and questions and proposes an approach that is intended to entertain methods to improve the overall ways of instruction within the Air Force.

EMPOWERMENT

Empowerment is a pillar within Total Quality Management as formulated by Deming (1986). The Quality Air Force Glossary (1993) identifies this idea as the "act of placing accountability, authority, and responsibility for processes and products at the lowest possible level." In other words and in simpler terms, empowerment equates to the allowance by the organization for its people to function in order to accomplish the stated objectives and goals of the organization. This allowance endows the individuals with the wherewithal and latitude to pursue those activities which afford the organization the ability to provide the best service and quality of products and processes.

This notion of empowerment is readily apparent in Deming's (1988) point number 6 "Institute training on the job" and number 13 "Institute a vigorous program of education and self-improvement for everyone." Bryham (1988) provides an example of this concept of empowerment in his delightfully detailed and entertaining book.

The focus of this discussion is limited to the instructional-related aspects of empowerment or those activities which occur so that the individuals can be empowered to accomplish their roles. This relates specifically to the inter-related aspects of instruction, which is the mainstay for empowerment. Moreover, this discussion focuses on functions and activities generating the development of the instructor, students, instruction and technology.

AIR FORCE REQUIREMENTS

The Department of Defense, one of the world's largest educational enterprises, has the imperative responsibility to maintain the highest quality of instruction. And, of course, the Air Force shares part of this responsibility, which is indispensable to the critical tasking of national defense and security. This burden demands the highest quality of informed and trained personnel, and is assisted and exacerbated by the phenomenal informational and technical explosion.

CULTURAL TRANSFORMATION

For any organization, including the Air Force, the integration of empowerment into the individual and collective fabric of the organization must occur for the principles of quality to influence the functions of that group. As Deming (1988) has identified, the inculcation of these ideas into a group must include "a new transformation of management" and "new religion." These ideas must become ingrained into the psyche of the individuals within the organization. "Point Two: Adopt the New Philosophy" (Deming, 1988) is the essence of what must occur if these actions are to become a reality. Covey's (1990) notion of a "Paradigm Shift" is similar, in substance, to this transformation, which is absolutely essential for individuals and the organization to experience if the quality phenomenon is to occur.

BASIC PREMISES

Any discussion on instruction must begin with several basic premises. First, the objective of instruction is learning, not teaching! In any instructional endeavor, the purpose should be and is for the learner or student to learn. The teaching is the means or vehicle for the learning (the ends or objective).

Second, as one person teaches another to fish, the pupil not only catches the fish but learns about the process of fishing as well. Similarly, as the teacher teaches a student about a particular subject, the student learns about that subject and the process of learning as well. Reason would suggest that the more skilled and adept students are relative to the process of learning, the more likely they are able to learn. What can and should instructors do so students are able to capitalize on various learning styles? What learning strategies are appropriate?

Additionally, as the technology avalanche continues, the necessity of continual review and reexamination of all of the components of the instructional process is paramount. This also includes the employment of the appropriate instructional technology and the determination of the future role of the instructor as this technology emerges into academics.

INSTRUCTOR

The instructor is a critical node in the process of providing any type of instruction. Of course, instructors must be subject matter experts and thoroughly familiar with the subject content. This typically is not the problem for military or civilian institutions. The mastery of the instructional skills is, however, generally not as strong as the grasp of the content and this is the point. Faculty Development courses must be first-rate. Several questions require attention. What is the status of teacher education programs in the Air Force? How do they stack up with civilian entities? Do Air Force instructors receive the appropriate information on instructional development, educational psychology, evaluation principles, and instructional technology? How can the faculty development courses for technical training and professional military education capitalize on and enhance each another? Additionally, what is the role of the instructor as new instructional technology advances into the curriculum? What instruction is required for the instructors to become technologically attuned and qualified?

STUDENT

The student is another component of the instructional process and several relevant factors are worthy of consideration. First, since each student has an individual learning style, what things can be done to assist students to identify and understand their own individual style? What can be done to assist students (with their individual learning style), as they approach various types of educational settings? How can students determine the appropriate learning strategies matching their learning style?

As technology advances, requirements increase, operations diversify, and demands intensify and as manpower and funding diminish, the necessary proficiency, knowledge, skills and attitudes of students and consequently levels of learning must be reexamined. Should students be able to perform and conduct analysis, synthesis and evaluation - the higher levels of learning? If so, are the academics adequate to provide the instruction and stimulation necessary to generate student competency at the higher levels of learning?

Are the students able to make the mental leap from the lower levels of learning to the higher levels? What is the appropriate instructional approach and methodology to assist students make this leap in the classroom and in preparation for the actual workplace?

INSTRUCTION

As the demands increase for better prepared and informed people, the actual academics and instruction of Air Force faculty development courses demand scrutiny. For example, perhaps new approaches to the development, delivery and evaluation of instruction can be explored. Other factors for consideration might include the latest developments in the area of curriculum, instruction, cognitive science, human learning factors, and evaluation. Developing forums and mechanisms for the incorporation of these new concepts, of course, would be beneficial.

Other issues and questions worthy of study include the objectives and methodology of the faculty development courses. For instance, are the objectives for these courses on target and how should the objectives be determined? What methodologies are most consistent with the objectives of the instruction? How can the most appropriate instructional methods be utilized to reach the established objectives?

In sum, just as instruction is the vehicle for achieving the objective of empowerment, so too is empowerment the vehicle for achieving the objective of the realization of the principles of quality. Consequently, as goes the instruction resulting in empowerment, so goes empowerment resulting in the actualization of quality. High performing individuals, groups and systems result from high performing instruction.

TECHNOLOGY

The final consideration deals with the technology that can and should be brought to bear as instruction is provided. The phenomenal growth of instructional technology has provided opportunities for the application of these absolutely magnificent advancements. However, several relative issues require attention.

First, the wide range of instructional technologies require consideration. This spectrum of the various types of instructional medium includes such things as simulators, interactive courseware, multi-media classrooms, distance learning, and intelligent tutors. Is the current state of application of

instructional technology appropriate? As technology advances, what can be done to insure that Air Force education and training stay abreast of these developments?

Standardization of systems is a cost saving measure and alleviates compatibility problems. What is the best vehicle for insuring the crossflow of information regarding authoring, development, and delivery systems, as well as software, hardware and related services?

Finally, the application of the instructional technology is an important consideration. Although various types of instructional technology exist, the appropriate application is critical. On one hand, these technologies should be employed to the fullest extent possible - so long as the application is reasonable and sensible. On the other hand, how is the best way to insure that these advanced technologies are inappropriately applied so that they don't become just "electronic page-turners?"

CONCLUSION

The results of this study, although not strictly statistical nor quantitative, provide a qualitative examination of the topic of instruction with projections and postulations. The questions and points of the discussion are intended to provide a critical examination of instruction in the Air Force - not in a negative sense, but in a question-generating and thought-provoking manner. The intended results of this presentation will provide a point of departure for further research and future discussions regarding the comprehensive improvement of the instruction within the Air Force. And this is the point of this paper! What is and should be the fundamental and inclusive goal of instruction within the Air Force? What is the best avenue and the best vehicle for the attainment of these objectives? The intention of these points and questions is to identify ways and areas for improvements.

In sum, the objective of this paper is to raise questions, generate ideation, induce discussion, and stimulate thought for the purpose of improving instruction in the Air Force.

A well-defined problem is a critical component of and the first step toward a well-defined answer. These questions are the first step toward solutions to these issues relative to instruction in the Air Force.

As Weaver (1986) has explained, ideas have consequences. The ideas, philosophy and direction outlined and set forth for Air Force instruction will undoubtedly set in motion specific consequences and results. Our task is to insure that the vector is on target, or, in other words, our "ladder is leaning against the right wall!"

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KAI AND TEAMBUILDING: A TOOL TO PREDICT INTERACTION AND POTENTIAL CONFLICT

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KAI AND TEAM BUILDING: A TOOL TO PREDICT INTERACTION AND POTENTIAL CONFLICT

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Have you gotten the best product from your team? Do your teams falter, slow to a crawl and stop - mired in an interactive morass of quibble until a forceful personality takes them to one decision, maybe the best decision as that person see it? Do you want to improve the effectiveness of your teams? Would it be helpful to be able to predict interaction between team members or two individuals? Have you ever wondered why Joe has such outstanding ideas but is never able to carry them out on time or in the way that he described he would? Have you ever wondered why Mary slowly and precisely compiles data for reports but never gets them done because she is constantly redoing them to make them better? Why is it that no matter what the situation, Joan and Jack immediately clash and are unable to discuss a topic or work together on a project?

The purpose of this paper is to introduce a tool utilized by the 445 Airlift Wing (Associate), Norton AFB/March AFB that addresses the above situations. The tool was used to augment the interactive skills and team building modules of the USAFR TQM cascade training curriculum.

The tool assisted the training cascade planner to assess potential cascade interaction and small group potential for conflict as well as appropriately assign facilitators to the small groups. It greatly increased awareness of group dynamics and interpersonal communication among the 684 Wing personnel who participated in TQ cascade training from November 1991-July 1993.

Data from twenty-nine (29) Total Quality Management/Problem Solving Process (TQM/PSP) cascades and ninety-six (96) small groups within the cascades was analyzed and descriptions of cascade/small group interaction and findings will be presented in this paper. Representative data summary charts will be delineated to further clarify data. The 445AW had conducted forty-eight (48) TQM cascades during the stated time period but, the KAI was administered and addressed only during the PSP training cascades. Thus, the studies reports only on data from those 29 cascades.

"THE TOOL"....

A tool exists to assist you, a leader, facilitator, committee/team chair person or team member, in addressing the above situations. The Kirton Adaptation-Innovation Inventory (KAI) is an instrument that describes how, the manner of, and the preferred mode of an individual's thinking or decision making style. It identifies a person's preferred style of working and tackling problems. Within organizations, individuals, managers and workers need be valued for differing styles of decision-making, communication and work style.

Studies are being conducted , using the KAI, to delineate how problem solving styles contribute to enhance cooperation or precipitate clash in interpersonal interaction, group decision making, or team functioning (McHale, 1986).

The score(s) on the KAI can be utilized "to assess the thinking style of an individual as well as be used to assess how the individual might interact with another person or with a team of individuals. The KAI was designed for use with adults and specifically with adults with life and work experience" (Kirton, 1991, p20).

Specifically, the KAI is statically correlated to the "sensing-intuition" and "judgement-perception" classifications of the Meyers-Briggs Type Indicator (Meyers, I.B., 1962 and Kirton, 1990, p28). This measurement instrument is a personality inventory utilized by the USAF to enhance team building curriculum and to attempt to improve communication interaction, relationships or team building. The KAI has an advantage over the Meyers-Briggs instrument because it can be administered, completed and scored within 30 minutes and be immediately available

for teaching/discussion. The KAI focuses only upon thinking/decision making style versus numerous scales and personality characteristics that are complicated and difficult to remember and to apply. Numerous studies have demonstrated that differing and/or conflicting thinking and decision making styles are what get teams and individuals into interactive and productivity trouble.

KIRTON ADAPTATION - INNOVATION INVENTORY
KAI: EVOLUTION AND VALUE

The KAI "evolved from a study of behavior of managers in organizations and the way that ideas were initiated, considered, developed and implemented with resultant changes. Since problem solving is needed by any organization to survive, Dr. Kirton became interested in the decision-making process and the dynamics of risk taking behavior versus adaptive behavior oriented towards maintaining the status quo. He profiled two "preferred" styles of cognitive decision making; adaptive and innovative. His studies documented that "preferred" cognitive style is established at an early age in life and remains stable over time" (Kirton, 1991, p5).

Dr. Kirton documented that preferred decision making behavior is predictable and manifests itself in social, work, and interpersonal situations. Characteristics of behavior of preferred cognitive/thinking style can provide valuable insight for individuals as to understanding how they interact with others, how they work on a team with others, as well as, how conflict may be inevitable when interacting with/working with another individual whose cognitive style is naturally/"preferably" different from his/her own. His and other related research has shown that when there is a work relationship, an individual can make accurate assessments of the cognitive style/KAI score(s) through observation of interactive behavior (Kirton, 1990; McHale and Flegg, 1986).

The value of this prediction through behavior assessment is that it attempts to bring quantitative analysis to what has always been "fuzzy or gut felt" analysis by leaders. Utilizing the KAI, an individual or a leader can anticipate a situation in which there is potential for conflict and can avoid the conflict, plan how to utilize the conflict, as well as, assist individuals and teams in understanding why there are communication misunderstandings. It becomes an invaluable process to assist individuals in not evaluating decisions/decision making as "right" or "wrong" but, evaluating in terms of differences in perceiving/working secondary to differing thinking style. A leader or manager can use this process as a way of establishing a basis and tolerance of individual differences to enable all team members to contribute to the effectiveness of endeavor and to potentiate the cohesion potential of teams, departments, or organizations.

Studies have shown that despite the fact that cognitive style is formed at early age, man has the capacity to learn, detach, and/or alter behavior to fit circumstances, situations, or valued behavior as defined by organizations, leaders/management or peers. "Individuals may accommodate their behavior to the prevailing cognitive climate of a group, department, or organization but, with intense stress, will resort to their "preferred" way of decision making behavior, expose themselves, interact "out of sorts" to observers and then resume behavior compatible to the prevailing/valued expectations" (Kirton, 1991, p91).

There exist "two differing sets of attributes of an individual; one set of attributes/behaviors are natural to and "preferred" by an individual and one set has to be learned and exercised to become a part of the individual's coping behavior" (Kirton, 1991, p6). This concept is similar to the concept of "private self versus "public self" described in numerous psychological theories and publications.

The basis for the study presented in this paper was formed around Dr. Kirton's book "Adaptors and Innovators-Styles of Creativity and Problem Solving" (1990). He discusses and analyses studies/data pertaining to the effectiveness of team selection based upon the recognition of advantages and limitations of differing thinking/decision making styles. He defines characteristics/behaviors of "Adaptors" and "Innovators" in his "KAI Feedback Summary" handout by comparing their perceptions and behaviors pertaining to five foci: "(1) perceived behavior of each other, (2) problem defining, (3) solution generating, (4) policy formation, (5) in organizations, and (6) in collaboration" (Kirton, 1992). "Bridgers" exhibit a third style of thinking/decision making which encompasses both adaptive and innovative thinking characteristics/behaviors.

KAI: BEHAVIOR CLASSIFICATIONS : ADAPTORS", "BRIDGERS", AND "INNOVATORS"

"ADAPTORS" - are generally described as: efficient, precise, methodical, prudent, disciplined, dependable, predictable, inflexible, structured, cautious, safe, intolerant of ambiguity, loyal, tactful, reserved, self-judging/critical, sensitive to criticism, looking "within the box" for new ideas, "do things better", preferring and enjoying detailed work, don't make waves/avoid conflict, like rules and order,not liking or coping well with change, going about a job and getting it done, producers of neat/organized products, preferring product/task oriented work, meeting deadlines, caring deeply about people, and being very sensitive to people and their reactions. " A habitual "Adaptor" when confronting a problem will generally accept recognized theories,policies, customary viewpoints or paradigms. They are often viewed as successful because they agree with their bosses. Adaptive solutions reflect generally agreed upon paradigms and become readily accepted because they are familiar and therefore easily understood and grasped" (Kirton, 1990, p69)..

"BRIDGERS" - are generally described as: very people oriented, outgoing and gregarious, able to see views of both "Adaptors" and "Innovators", are often the "bridge" between conflicting polarized individuals, possess a good sense of humor, evoke fun and laughter within social groups, are sometimes known as "party people", are known for their social skills, have outstanding "people skills", are often sought out for counseling, opinions or advice, are able to relate to and understand "Adaptor" and "Innovator" insights and are usually able to reconcile conflict/discordant communication. They have a "preferred" style of problem solving that is either high adaptive or low innovative in nature. "They act as intermediaries between the very differing cognitive styles of the "Adaptors" and "Innovators" - and are useful as mentors or facilitators" (Kirton, 1992, p 35). Kirton also describes "Bridgers" as being "a natural bridge between the core orientation of a group and scorers located further away from the group on the KAI continuum" (Kirton, 1991, p73).

"INNOVATORS" - are generally described as: "liking to do things differently", thinking fast, tangential thinkers, looking "outside the box" for problem solutions, idea people - evoking and changing ideas/flow of ideas constantly and quickly, impatient, always in a hurry/or behind, exciting, impractical, dealing well with crisis and chaos..and who will create it because it is familiar, preferring the unknown or constantly changing situations, undisciplined and chaotic to others, intense in emotions and reactions, energizing to groups, enthusiastic, prolific brainstormers for new ideas, enjoying risk taking, rude, abrupt in speech and behavior, having tempers and using them, having abrasive personalities, creating dissonance, increasing tension in a work group, having bitter/alienating arguments, unable to work very long with other "Innovators" in a group, insensitive to reactions of others, appearing aloof or preoccupied, tuning out others, having difficulty with rules and work/organizational demands, labeled as "flaky", intrinsically shy/reserved yet appear/outgoing to others, increase a group's tension, and imaginative but often failing to meet deadlines. "The habitual "Innovator" detaches a problem from "accepted thought", and at the same time, reconstructs a problem and its paradigm while in search of a solution" (Kirton, 1992, p69). This reconstructive process threatens "Adaptors" or adaptive systems and leaders because it is unfamiliar and appears unsound or risky. Therefore, the "Innovators" ideas are frequently rejected before being seriously considered.

KAI: QUESTIONNAIRE CHARACTERISTICS

The KAI contains 32 questions. Each question provides the respondent with the opportunity to answer on a graduated spectrum from "is the item/behavior "very easy" or "very hard" to perform consistently over a long period of time. The respondent needs to base his/her response over a pattern of behavior not just reflective of a recent period of time. The KAI Certification Course qualifies a person to administer, score and interpret the inventories.

The KAI score places a person on a continuum of scoring which identifies the individual as having one of three "preferred" thinking/decision making styles: adaptive/"Adaptor"; bridging/"Bridger"; or, innovative/"Innovator". Scores range from 32-160 points. Sixty-seven (67%) of people are located in the score range of 80-112 points on the KAI continuum (Kirton, 1992, p1):

"Adaptor" = 32-79; "Low Adaptors"/strongly adaptive thinkers score below 65 points.

"Bridger" = 80-111; Encompasses the "High Adaptor" score range 80-95 points and the "Low Innovator" score range 96-112 points.

"Innovator" = 112-160; "Very high Innovators"/strongly innovative thinkers score above 120 points.

****

RANGE OF KAI SCORES

32 48 64 80 96 112 128 144 160

.....

A D A P T O R S I N N O V A T O R S

{----------}

67%

of people are in this range

(Kirton 1992, 1985, p1)

****

Dr. Kirton states that "very high or very low scores are not laudatory nor pejorative and are very useful for understanding behavior in a variety of settings" (Kirton, 1990, p5).

Identification of one's tendency to be adaptive, bridging or innovative can assist in identification of what style of thinking will trigger conflict or irreconcilable differences. Consideration of KAI scores can enhance team composition and efficacy dependent upon team tasking. It must always be remembered that "Adaptors" and "Innovators" have differing attributes which, depending upon the situation can be viewed as either advantageous, disadvantageous, or interchangeable.

KAI SCORES: USE AND APPLICATION

The KAI was administered to 684 Reservists and civilian employees of the 445 Airlift Wing (Associate), Norton AFB prior to the first day of a TQ training cascade. The trainees were primarily Wing Command Staff, Squadron Commanders/Unit Chiefs or Executive Staff of Squadrons/Units. These trainees represented Level I and Level II of the 445AW TQ Cascade Training Plan. Cascade KAI scores and KAI scores of the small groups within the cascade were plotted on KAI Score Summary Reporting Form.

The KAI Score Summary Reporting Form was assessed by the TQ cascade coordinator who was usually an experienced/"seasoned" facilitator. Potential interactive dynamics and the potential for conflict was projected for the cascade and small groups. Appropriately experienced facilitators were assigned to the small groups. Notes were written after the cascade on the summary forms as to actual cascade interaction, group dynamics and behavior indicative of the four stages of group development: forming, storming, norming and performing.

Decision was made to conduct a descriptive, exploratory study of the relationship of KAI scores to trainee and cascade interactive dynamics. Data was later analyzed for this paper. The working hypothesis for this study was that:

(1) identification of KAI scores of trainees could be utilized to anticipate/predict the interaction of a TQ training cascade and of small groups within the cascade and,

(2) a macro/micro (cascade/small group) numerical predictor could be identified to predict individuals or groups that might experience intensive or irreconcilable conflict.

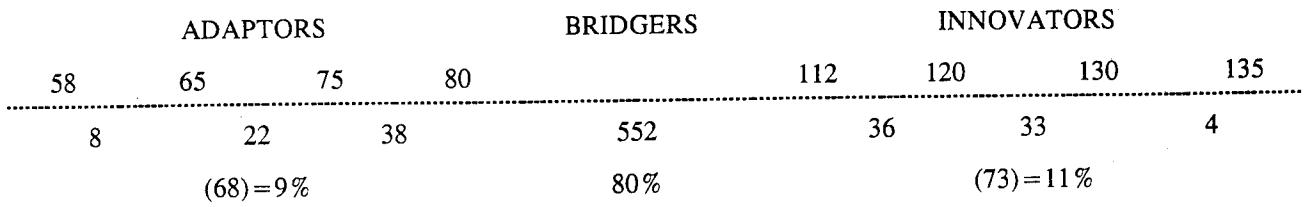
The purpose of administering the KAI inventory was two-fold: (1) to predict cascade interaction and potential conflict and, (2) to teach awareness and tolerance of individual strengths and differences in thinking/decision making styles. The process and method of using the KAI as an awareness teaching tool will be covered later in this paper after "Findings-Results-Trends".

FINDINGS - RESULTS - TRENDS

PREDICTION OF CASCADE AND SMALL GROUP INTERACTION AND CONFLICT

The 684 trainees of the 445AW exhibited a broad base of KAI scores on the KAI continuum ranging from 58 - 135 points. There was a balanced distribution of " Adaptors" (9%) and "Innovators" (11 %) with a large mid-grouping of "Bridgers" (80%) as illustrated by the following chart:

445AW KAI SCORES DISTRIBUTION
(N = 684)



The broad spread and balance of KAI scores was reflective of the Wing's Command and Squadron/Unit leadership. Hopefully, there exists a leadership climate that will accommodate and tolerate expression of dissenting ideas and individuals who have different styles of cognitive thinking/decision making. The spectrum of scores indicated that there was potential talent, if tapped and utilized effectively, to compose productive and positively interactive teams. The organization appeared to be very "people oriented" and within that context, potentially able to value both adaptive and innovative behavior, thinking and work preference.

The degree of congeniality or disruptiveness of a particular training cascades would experience was predictable by assessing the results of KAI scores. The interactive climate of the small groups within a cascade was also predictive.

Identification of potential conflict was possible by examining five (5) KAI score related foci:

(1) range of KAI scores within a cascade. Here the process was to identify very high and very low scores on the KAI continuum. These trainees predictably have the potential of causing cascade, small group, and/or small group member conflict.

(2) range of KAI scores within the small groups; identifying very high and very low scores to predict conflict.

(3) distance of the mean scores of the small groups from the mean score of the cascade; the greater the distance, the greater the potential for conflict.

(4) the difference between mean scores of each small group from the mean scores of the other small groups; the greater the distance, the greater the potential for conflict.

(5) the individual score difference of each small group member from the scores of other group members and the mean of the small group; the greater the distance, the greater the potential for conflict.

The KAI point spread was the single most important indicator of potential conflict within any cascade and/or small group. Based upon KAI scores, and the criterion of potential and actual conflict, the 445AW was able to group all cascades into one of three classifications: (1) very easy cascades, (2) challenging/some conflict cascades, and (3) difficult/conflict ridden cascades.

The predictive KAI point spread for cascade or small group conflict was 45 points or above. The combination that elicited extreme conflict was a cascade point spread above 45 points compounded by an increasing cascade KAI score mean, an increasing group mean score difference between groups plus the number of "High innovators" with or without " Low Adaptors". More than one "High Innovator" within a small group predictably caused conflict. If there were more than two, then the small group appeared to have great difficulty or were unable to resolve their conflict by the end of the training.

Kirton's research (1992) demonstrated that a difference of only 5 points between the averages of two groups is noticeable (and statistically significant) and that a bigger gap could cause difficult communication and work productivity problems (Kirton, 1992, p4). The 445AW study reinforced that finding. Increasing differences between the mean scores of the small groups did increase conflict behavior but the scores were variable and a specific predictive numerical value was not identified/documentable. This is an area for future research; relationship of Cascade and small group mean scores to prediction of interaction and conflict and identification of a numerical predictor.

In cascade training, the groups experienced long training days and very short periods of time to accomplish assigned group work assignments. These conditions elicited intense emotions, intense group competition and group dynamics/communication pressures. Frequently, innate/ "preferred" cognitive/decision-making styles replaced "learned" styles and resultant behavior discordant.

EASY / SMOOTH TRAINING CASCADES: (APPENDIX I)

After plotting KAI scores on a KAI continuum, observation of score groupings quickly predicted that cascades or small groups with less than a 45 KAI point spread would be "easy" training sessions.

Typical of this "easy" training cascade were scores visually grouped around a "core" of "Bridgers" with no extreme scorers Thusly, on the KAI summary report form the cascade "looked" balanced. Even though these were "easy" cascades, some divergence was noted where some individuals scored far enough from the mean to be potential conflict generators.

In two cascades, Beta and Chi (Appendix I), there were individuals in small groups who scored far enough from the group mean to be usefully different in their cognitive/decision making style and their resultant working style preference. However, they did not cause group dissention or conflict. These group members were either near enough to the group mean to overcome communication or acceptance problems within the group or they were absorbed into/accommodated to the group consensus orientation or, could have been overwhelmed by numbers of group members.

The smaller the point spread, the more potentially compatible the work/learning environment and the greater cohesive and supportive the interaction.

These groups had little difficulty "forming" and were characterized by reaching the "norming/performing" stages of group development fairly quickly during cascade training. As the 445AW became more familiar with the predictability of the KAI scores upon cascade/small group interaction, less experienced or less "seasoned" facilitators were able to be assigned to these small groups because of the predicted lack of potential conflict. A "seasoned" facilitator frequently supervised beginning facilitators facilitating these groups.

CHALLENGING CASCADES/SOME CONFLICT CASCADES: (APPENDIX II)

Training cascades with KAI scores ranging from 50 - 62 points demonstrated the effect of differing thinking/decision making styles. As cascades and the small groups within them increased their KAI point spread, interactive/ communication differences and work productivity began to be noticeable and stressed. Simultaneously, the cascade and small group KAI score means began to increase.

The potential for conflict was apparent after plotting the cascade KAI scores on a KAI continuum. The scores still grouped around a "core" of "Bridgers" but the cascade KAI score mean increased towards the direction of innovative thinking as more than one "innovator", and sometimes several, appeared as cascade trainees.

"Deviant behavior" (as defined by group consensus orientation as "Bridgers") was exhibited in the small groups by either "Low Adaptors" or "High Innovators" secondary to their cognitive and work style preferences. This behavior began to exert pressure upon the group causing communication and work/productivity problems, increased group tension and put strain upon the "good will"/good behavior of the group. Frequently this behavior was surprising to group members themselves because the team "usually worked well together without communication problems". Individual group members were frequently appalled by their unusual display of anger and resultant conflict behavior. Stress elicited their "preferred" style of decision making/behavior versus "learned" or repressed behavior and caused conflict within the group.

These small groups were characterized by their difficulty in the "forming" and "storming" stages of group development precipitated by differences in thinking/decision making and work preference styles.

Conflict and communication difficulties were demonstrated within a small group composed of more than 50% "Low Adaptors/Adaptors" and with the remaining group members being "Bridgers" (Appendix II, Epsilon, Group #1). The group difficulty was secondary to a low work energy level and the group progress was bogged down by preciseness, literal translation of tasks and directions, preference for details and limited conceptual thinking. The "Bridgers" did not have enough energy to move the group and became frustrated as the small group struggled to complete assigned tasks on time. The more intense the group pressure, the more the group focused upon detailing information and lost view of the "large picture" of assigned tasks...and the more intense the conflict.

The ability of the groups to move beyond "storming" and begin "norming" was directly dependent upon the number of "Bridgers" present to balance the extreme scores of "Low Adaptors" and/or "Innovators". There was still more or less a balance between "Adaptors and "Innovators". Though these groups "came together" by the end of training, there was rarely behavioral evidence of "performing". The groups would just begin to show characteristics of performing" but then experienced strife or conflict and regressed.

DIFFICULT/CONFLICT-RIDDEN CASCADES: (APPENDIX III)

Training cascades with KAI scores of 65 points or above were characterized by conflict. There were two exception groups with KAI point spreads of 49 points (Lambda, Appendix III) and 59 points (Mu, Appendix III) that experienced intense conflict. However, the KAI point spread alone was not responsible for the conflict. Twenty-five percent(25%) of the trainees in both groups were "High Innovators".

The most overt characteristic of these strife ridden groups was the number of "High Innovators" present in a cascade or small group. The intensity of their energy, personalities, fast thinking, assertiveness/aggression, as well as their tendency to be rude and openly aggressive among themselves, disintegrated their group's interaction.

More than one "High Innovator" (score 120+) in a small group was interactive "dynamite"..especially if there was also a "Low Adaptor" in the group. The difficulty in communication arose when the "High Innovator" did successfully accommodate into the group; his/her thinking or decision making style clashed because of oppositional ways of decision making and working. Conflict sometimes occurred because the "High Innovator" simply did not perceive cues of escalating conflict or chose to ignore them to "get his/her way".

The data documented that more than one "High Innovator" in a group could divide or overwhelm a group and then conflict escalates to the degree that one "High Innovator" leads, another/or others follow, while another "High Innovator" might blow up or gets out of the way when the group ignores or rejects his/her ideas and isolates him/her from continued group interaction/decision making.

Data from small group analysis reinforced that small groups seemed able to accommodate one "High Innovator" as long as there were "Bridgers" to intercede with any conflict between the "High Innovator" and "Adaptors" in the group. The communication between two extreme scorers was totally blocked and irreconcilable with a KAI point spread of over 40 points. It was seriously impaired at 20 points. This finding reinforced interaction data documented throughout Kirton's and KAI related studies (Kirton, 1987; 1990; 1992). Groups with more than one "High Innovator" were predictably conflict ridden.

Not only did the groups have difficulty "forming", and coming to consensus on decision making, but at times could not resolve conflict enough to move beyond the "storming" stage of group development. Since these groups frequently were not able to resolve their conflict to reach the "norming" stage of group development, group members tolerated each other just enough to get assigned tasks completed.

Often, their strife would not allow completion of the assigned task and the group "felt" failure. The good point of these feelings was that the group would begin to see that they were not working as a team and would finally seek assistance from outside help; this was frequently offered by the assigned group facilitator whom the group had ignored, dismissed or rejected stating that the facilitator interfered with their work progress..totally ignoring the impact of their group dynamics/interaction upon productivity.

Usually these groups could be characterized as 'task oriented" versus "interaction oriented". Facilitator focus would be primarily upon interactive skills versus tasks to be accomplished. Not infrequently, these groups demanded counseling intervention by a skilled, "seasoned" supervising facilitator/trainer. Only the most seasoned and skilled facilitators were assigned to the groups projected to experience intense and extreme conflict as predicted by KAI scores.

While these groups were the most difficult to work with, they were also the most rewarding for the facilitator to work with when the group would finally develop some insight and sensitivity as well as tolerance to group interaction and thinking style differences. As these groups began to utilize the differences to complement and accomplish assigned tasks, they became very bonded and effective after training was completed. These groups were an excellent example of the need for "individuals to acquire insight and generate tolerance into other's different cognitive styles to pave the way to better collaboration in groups" (kirton, 1991, p68). These groups also possessed the greatest potential of any of the groups to move towards "out of the box" thinking and were almost synergistic in coming up with results or newer ways of doing things. This group had the potential for defining futuristic pathways to solving problems. Every organization must have, value, develop, tolerate and utilize the difficult "High Innovators" if it is to grow or not become stymied.

The following chart summarizes data analysis of a representative sampling of the three classifications of the twenty-nine (29) TQ/PSP training cascades conducted by the 445AW and discussed in this paper:

KAI THINKING STYLES : CASCADE INTERACTION ANALYSIS SUMMARY

CASCADE	ADAPTORS (LO) (HI) ↓65 75+	BRIDGERS 80 - 111	INNOVATORS (LO) (HI) 112-119 120+	KAI SCORE RANGE	KAI PT SPREAD	CASCADE KAI SCORE MEAN	KAI MEAN DIFF B/N GRPS	CASCADE DESCRIPTION STAGE OF GROUP DEVELOP-MENT
ALPHA	--- 2 ---	14	--- ---	71 - 97	26	91	4	NORMING
BETA	--- 1 (2)	13	--- ---	73 - 103	30	91	9	NORMING PERFORMING
CHI	--- 1 (1)	17	1 ---	73 - 116	43	85	7	NORMING PERFORMING
DELTA	--- 2 ---	17	1 ---	70 - 117	47	76	25	NORMING SOME STORMING
EPLISON	(4) 2 (1)	15	2 ---	58 - 112	54	85	7	FORMING STORMING SOME NORMING
GAMMA	--- 2 3	17	1 (1)	69 - 131	65	92	17	FORMING STORMING SOME NORMING
IOTA	--- 1 (2)	13	3 (4)	67 - 132	65	97	17	FORMING STORMING
KAPPA	(1) 1 (2)	13	--- (5)	64 - 135	71	97	16	FORMING STORMING
*LAMBDA	--- 1 (1)	11	2 (3)	72 - 122	*49	100	8	FORMING SOME STORMING NORMING
*MU	--- 1 (1)	12	2 (3)	69 - 128	*59	93	5	FORMING STORMING

***EXCEPTIONS TO CONFLICT CATAGORIES BASED ON KAI SCORES (65+ = DIFFICULT CONFLICT RIDDEN CASCADE)**

TEACHING AWARENESS AND TOLERANCE: THINKING/DECISION MAKING STYLE DIFFERENCES

In addition to the required cascade training prework materials, the trainees received a supplementary journal article entitled "A Tale of Two Dinosaurs" (Lareau, 1991) to orient them to "old ways of thinking" or the concept of paradigms and "new ways of thinking", interactive skills as well as empowerment dynamics. This article paved the way for introduction to TQM curriculum focusing upon interactive skills, concepts of paradigms, group dynamics, team building and receipt of a KAI Inventory for completion and return prior to cascade training.

During the cascades, a stuffed dinosaur was utilized to visually teach and demonstrate awareness of "old thinking", old paradigms, and dysfunctional communication skills such as "shutting out/putting down" verbalizations and non-verbal behavior. As any of these behaviors were exhibited, the offender received the dinosaur and kept it in their possession until another trainee, facilitator or cascade faculty member earned the opportunity to care for "Paradigm"; the name given to the dinosaur.

The dinosaur could be thrown across the room at the offending trainee/ new recipient during group interaction.. This added humor to tense situations and deflected or diffused conflict within cascades or small groups. "Paradigm" (the stuffed dinosaur) is still used and seen at staff or TQ PAT/project meetings. The dinosaur has become a symbol of the TQ quality improvement process, Wing cascade training and the evolving cultural change toward quality and empowerment within the Wing.

After the KAI has been completed by the trainee and prior to return of his/her KAI scores, the optimal teaching process is to:

(1) introduce the goals and purpose of the questionnaire to the large cascade or training group during the interactive skills and/or team building modules of the TQM training curriculum.

(2) divide the large group into subgroups of 5-10 participants based upon groupings of same style of thinking/decision making KAI scores (Low Adaptors/Adaptors/High Adaptors; Adaptive Oriented Bridgers/Innovative Oriented Bridgers; Low Innovators/High Innovators).

(3) allow the small groups 15-20 minutes to interact and make a listing, on easel chart paper, of their strengths and difficulties when working within groups as a team member; what they do well or like about themselves and what gets them into trouble or what they do not like about themselves (the composite group characteristics will reflect individual ones). Instructions should not be definitive/structured. This will allow each group to organize the assignment data in their specific manner dependent upon cognitive and work style. "Adaptors" will usually carefully and neatly list the attributes in two columns whereas the "Innovators" will scramble words and scratching all over the paper in their haste to get thought down as they quickly brainstorm them. The resultant visualization of the differing groups is usually dramatic.

(4) Upon return to the classroom, have a person from each subgroup describe the group lists to the large group. They will identify and reflect most attributes described by KAI studies and publications.

(5) identify for the group how the polar/extreme "Adaptors" and "Innovators" view each other and how to accommodate and utilize differing thinking styles to build effective teams and enhance interaction and work productivity.

(6) Only at this point of the session are the participant's KAI scores distributed so that they will be accessible for discussion of characteristics of specific KAI scores; strengths and weaknesses.

Throughout the presentation emphasis must be placed upon the value of all team members; how individuals with differing traits complement each other. Deliberate effort must be placed upon avoidance of one thinking style being viewed better than another (re-"Innovators" being better than "Adaptors"/ higher scorers being better than lower scorers) since our culture places status upon the label/term "innovative/innovator" versus "adaptive/adaptor".

Discuss the paradigm that the "Innovator" is viewed as a leader and the "Adaptor" as a follower and that the "Innovator" appears is more highly valued and creative whereas the "Adaptor" is viewed as the opposite. These paradigms must be changed for successful and effective interpretation and usage of the KAI for team building. Concerted effort needs to be placed to avoid labeling and use of labels. This will reinforce acting out negative behavior by the "High Innovators" and give them an excuse not to accommodate their behavior to the group . It will also make some "Adaptors" feel "less than or shamed" at being labeled adaptive because of thinking style.

The author of this paper, would prefer to replace the term "Low Adaptor" with "Strongly Adaptive" and the term "High Innovator" with "Strongly Innovative" to reinforce that both styles of thinking have equally strong characterized thinking". Perhaps this would lessen the stigma of culturally labeled perceptions. Hopefully, by teaching awareness of differing thinking/decision making styles and how to recognize and deal with them, the perception that conflict is "bad" will be changed and with it the realization that conflict can be useful and productive at times and when managed effectively.

SUMMARY - CONCLUSIONS

The 445AW, Norton AFB/March AFB, has successfully utilized the KAI during TQ cascade training involving over 684 trainees to augment and enhance the interactive skills and team building modules of the USAFR TQM training curriculum.

Awareness of differing thinking or decision making styles has elicited resultant tolerance of differing communication and work preference styles. When conflict occurs, there is less tendency to judge "right or wrong" and to "communicate defensively" and more tendency to acknowledge thinking style/ decision making style differences as a potential source of conflict. There is realization that conflict can be predicted and that a "Bridger" may be necessary for anticipated conflict between individuals with opposing decision making or work preference styles. This had very positive impact upon morale, communication and work productivity of Wing personnel.

Data analysis from 48 training cascades did confirm that identification of KAI scores of cascade and cascade small group trainees could be utilized to anticipate and predict the interaction of a TQM training cascade and of small groups within the cascade.

The data also determined a predictor numerical KAI score of 45 points or above as the predictor of potential conflict within a training cascade or cascade small group. Appropriate facilitator assignment was made for cascade small groups based upon KAI point spread assessment of potential for group conflict.

Applicability of findings from the study of TQ training cascades has potential application to enhance team building and assignment of individuals to PAT teams or any task/project oriented team not per chance or, by "how it has always been done" or, by who volunteers or usually gets the work done but, by purposeful assessment of what the task demands, what type of team composition is needed to get the best results, and by choosing team members that will most effectively complement each other in thinking/decision making and work preference styles. Dr. Kirton summarized this tasking when he stated that "the challenge is to create the right team balance and foster tolerance amongst team members who may have very different cognitive styles....and pave the way for better team collaboration" (Kirton, 1991, p68).

The Commander or leader will no longer need to make project or any group assignments from his "gut knowledge" but from a knowledge base. Conflict will no longer have to be judgmental and personalized. Perhaps, awareness and tolerance of differing thinking and decision making styles can potential the greatest actualization of talent within the United States Air Force and Air Force Reserves.

Data analysis was limited in predictability indicators but provided a framework for future, continued study of team building and team conflict prediction using the KAI.

In summary, the KAI data results quantified subjective knowledge possessed by successful leaders and verified the usefulness of the KAI to predict individual, group or team interaction and conflict.

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* KAI inventories, certification/training courses, information etc. can be obtained by contacting two sources:

(1) KAI Center, Management Development Institute Eckerd College
4200 - 54th Avenue South
St. Petersburg, Florida 33711
800-753-0444 FAX: 813-864-8996

(2) D. Michael Kirton, Ph.D.
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Tel/Fax: (UK) (O1) 44 442 871200

APPENDIX I
EASY/SMOOTH RUNNING CASCADES

ALPHA CASCADE
KAI SCORE RANGE: 71-97 POINTS
KAI POINT SPREAD: 26 POINTS
CASCADE KAI SCORE MEAN: 91 POINTS
GROUP MEAN SCORE DIFFERENCE: 4 POINTS

	ADAPTORS			BRIDGERS			INNOVATORS		
	50+	60+	70+	80+	90+	100+	112+	120+	130+
N = 16			71	80	90				
			73	82	91				
				82	92				
				82	96				
				87	96				
				87	97				
				88					
				88					
	******	******	******	******	******	******	******	******	******
GROUP #1 (80-97) 17 pts mean = 88				80 82 87	96 97				
GROUP #2 (82-91) 9 pts mean = 84				82 87 88	90 91				
GROUP #3 (71-96) 25 pts mean = 84			71 73	82 88	92 96				

*CASCADE CONSENSUS PROFILE : HIGH ADAPTORS & BRIDGERS

BETA CASCADE
KAI SCORE RANGE: 73-103 POINTS
KAI POINT SPREAD: 30 POINTS
CASCADE KAI SCORE MEAN: 91 POINTS
GROUP MEAN SCORE DIFFERENCE: 9 POINTS

	ADAPTORS			BRIDGERS			INNOVATORS		
	50+	60+	70+	80+	90+	100+	112+	120+	130+
N = 16			73	84	90	100			
			75	89	91	103			
			79		91				
					92				
					92				
					92				
					95				
					95				
					97				
	******	******	******	******	******	******	******	******	******
GROUP #1 (91-100) 9 pts mean = 94					91 92 95 97	100			
GROUP #2 (73-103) 30 pts mean = 85			73 75 79	89	92	103			
GROUP #3 (84-95) 11 pts mean = 90				84	90 91 92 95				

*CASCADE CONSENSUS PROFILE: HIGH ADAPTORS & BRIDGERS

CHI CASCADE
KAI SCORE RANGE: 73-116 POINTS
KAI POINT SPREAD: 43 POINTS
CASCADE KAI SCORE MEAN: 85 POINTS
GROUP MEAN SCORE DIFFERENCE: 7 POINTS

	ADAPTORS			BRIDGERS			INNOVATORS		
	50+	60+	70+	80+	90+	100+	112+	120+	130+
N = 20			73	80	92	100	116		
			77	81	92	101			
				84	93	102			
				86	95	103			
					95	104			
					99	107			
					99				
	******	******	******	******	******	******	******	******	******
GROUP #1 (84-107) 21 pts mean = 93				84 86	92 93 95 99	107			
GROUP #2 (73-104) 31 pts mean = 93			73 77		95 99	102 103 104			
GROUP #3 (80-116) 36 pts mean = 86				80 81	92	100 101	116		

*CASCADE CONSENSUS PROFILE : HIGH ADAPTORS & BRIDGERS

APPENDIX II
CHALLENGING/SOME CONFLICT CASCADES

DELTA CASCADE
KAI SCORE RANGE: 70-117 POINTS
KAI POINT SPREAD: 47 POINTS
CASCADE KAI SCORE MEAN: 76 POINTS
GROUP MEAN SCORE DIFFERENCE: 25 POINTS

	ADAPTORS			BRIDGERS			INNOVATORS		
	50+	60+	70+	80+	90+	100+	112+	120+	130+
N = 20			70	81	91	100	117		
			72	81	92	101			
				84	93	104			
				87	96	104			
				88	97	107			
				88		111			
	******	******	******	******	******	******	******	******	******
GROUP #1 (80-104) 16 pts mean = 78				88 88	91 92 97	104			
GROUP #2 (84-117) 33 pts mean = 103				84		100 101 104 107	111 117		
GROUP #3 (70-96) 26 pts mean = 97			70 72	81 81 87	93 96				

*CASCADE CONSENSUS PROFILE : BRIDGERS & BALANCED ADAPTORS/INNOVATORS

EPSILON CASCADE
KAI SCORE RANGE: 58-112 POINTS
KAI POINT SPREAD: 54 POINTS
CASCADE KAI SCORE MEAN: 85 POINTS
GROUP MEAN SCORE DIFFERENCE: 7 POINTS

	ADAPTORS			BRIDGERS			INNOVATORS		
	50+	60+	70+	80+	90+	100+	112+	120+	130+
N = 24	58	64	79	80	91	101	112		
	58	64		81	93		112		
		68		84	94				
		68		85	95				
				87	96				
				87	97				
				89	98				
	******	******	******	******	******	******	******	******	******
GROUP #1 (58-101) 43 pts mean = 77	58 58	64 68	79		93 96	101			
GROUP #2 (64-98) 34 pts mean = 87		64		81 84 87	91 95 97 98				
GROUP #3 (68-112) 44 pts mean = 84		68		80 85 87 89	94		112 112		

*CASCADE CONSENSUS PROFILE : HIGH ADAPTORS & BRIDGERS

APPENDIX III
DIFFICULT/CONFLICT RIDDEN CASCADES

GAMMA CASCADE
KAI SCORE RANGE: 69-131 POINTS
KAI POINT SPREAD: 65 POINTS
CASCADE KAI SCORE MEAN: 92 POINTS
GROUP MEAN SCORE DIFFERENCE: 17 POINTS

	ADAPTORS			BRIDGERS			INNOVATORS		
	50+	60+	70+	80+	90+	100+	112+	120+	130+
N = 24		69	74	82	92	103	113		131
			76	83	93	105			
			77		93	106			
			78		95	106			
					96	107			
					98	107			
					99	108			
						111			
	******	******	******	******	******	******	******	******	******
GROUP #1 (82-131) 49 pts mean = 104				82	95	106 107			131
GROUP #2 (76-108) 32 pts mean = 94			76	83	93 98	107 108			
GROUP #3 (78-113) 35 pts mean = 97			78		92 93 96 99	103 105	113		
GROUP #4 (69-111) 42 pts mean = 87		69	74 77			106 111			

*CASCADE CONSENSUS PROFILE : BRIDGERS BALANCED WITH ADAPTORS & INNOVATORS

IOTA CASCADE
KAI SCORE RANGE: 67-132 POINTS
KAI POINT SPREAD: 65 POINTS
CASCADE KAI SCORE MEAN: 97 POINTS
GROUP MEAN SCORE DIFFERENCE: 17 POINTS

	ADAPTORS			BRIDGERS			INNOVATORS		
	50+	60+	70+	80+	90+	100+	112+	120+	130+
N = 23		67	77	85	90	100	112	121	132
			78	85	92	102	114	126	
					93	102	117	127	
					95	103			
					98	105			
						107			
	******	******	******	******	******	******	******	******	******
GROUP #1 (85-127) 42 pts mean = 103				85	92 93	102 105	114	127	
GROUP #2 (67-132) 65 pts mean = 105		67		85	90 95 98	100 102 107			132
GROUP #3 (77-121) 44 pts mean = 105			77 78			103	112 117	121 126	

*CASCADE CONSENSUS PROFILE : BRIDGERS DOMINATED BY INNOVATORS

KAPPA CASCADE
KAI SCORE RANGE: 64-135 POINTS
KAI POINT SPREAD: 71 POINTS
CASCADE KAI SCORE MEAN: 97 POINTS
GROUP MEAN SCORE DIFFERENCE: 16 POINTS

	ADAPTORS			BRIDGERS			INNOVATORS		
	50+	60+	70+	80+	90+	100+	112+	120+	130+
N = 22		64	75	81	91	101		120	133
		69	76	85	92	102		123	135
				87	93	105		127	
				88	95				
				88	98				
	******	******	******	******	******	******	******	******	******
GROUP #1 (86-133) 48 pts mean = 102				85 87	91 98	101		127	133
GROUP #2 (69-135) 66 pts mean = 101		69		88	93 95	105		123	135
GROUP #3 (64-120) 56 pts mean = 87		64	75 76	81 88	92	102	120		

*CASCADE CONSENSUS PROFILE : BRIDGERS DOMINATED BY HIGH INNOVATORS

LAMBDA CASCADE

KAI SCORE RANGE: 73-122 POINTS
KAI POINT SPREAD: 49 POINTS
CASCADE KAI SCORE MEAN: 100 POINTS
GROUP MEAN SCORE DIFFERENCE: 8 POINTS

	ADAPTORS			BRIDGERS			INNOVATORS		
	50+	60+	70+	80+	90+	100+	112+	120+	130+
N = 18			73	82	95	106	113	120	
			79	85	95	106	118	122	
				89	96	107		122	
					99				
					99				
GROUP #1 (73-122) 49 pts mean = 99			73	85	95	107	113	122	
GROUP #2 (79-120) 41 pts mean = 97			79	82	95 99	106		120	
GROUP #3 (89-122) 33 pts mean = 105				89	96 99	106	118	122	

*CASCADE CONSENSUS PROFILE : BRIDGERS & INNOVATORS

MU CASCADE
KAI SCORE RANGE: 69-128 POINTS
KAI POINT SPREAD: 59 POINTS
CASCADE KAI SCORE MEAN: 93 POINTS
GROUP MEAN SCORE DIFFERENCE: 5 POINTS

	ADAPTORS			BRIDGERS			INNOVATORS		
	50+	60+	70+	80+	90+	100+	112+	120+	130+
N = 19		69	78	80	90	101	112	123	
				80	91	102	116	123	
				84	97	108		128	
				88	98	111			
	******	******	******	******	******	******	******	******	******
GROUP #1 (80-116) 36 pts mean = 100				80 84	97	108	112 116		
GROUP #2 (69-128) 59 pts mean = 101		69		88	98	102	123 128		
GROUP #3 (78-123) 45 pts mean = 96			78	80	90 91	101 111	123		

*CASCADE CONSENSUS PROFILE : BRIDGERS DOMINATED BY INNOVATORS

A SYNERGISTIC APPROACH TO THE HERSEY & BLANCHARD SITUATIONAL LEADERSHIP MODEL AND KASET INTERNATIONAL LEVELS OF IMPROVEMENT MODEL

TSgt Julia Palladini, Ph.D.

A Synergistic Approach to the Hersey & Blanchard Situational Leadership Model and Kaset International Levels of Improvement Model

by

Dr. Julia I. Palladini

Air Mobility Command has published Quality Air Force (QAF) training materials for Awareness, Teams and Tools, and Facilitator courses. None of these courses include any information on Situational Leadership. Empowerment is mentioned in the Awareness course, but the model and elaborative description is in the additional reading section of the student book. The students are not required to read information as part of their course work!

Because Situational leadership and empowerment are key elements of QAF, their principles must be taught to personnel at all levels of management and their subordinates. This paper briefly introduces or reintroduces the Hersey and Blanchard Situational Leadership Model and the Kaset International Level of Empowerment Model. It then presents an integrated model showing the relationship between those two models.

The Hersey Blanchard Situational Leadership model consists of three variables: follower maturity, task, and relationship behavior.

Follower maturity is also known as readiness or development level and is defined as the extent to which the subordinate has the ability and willingness to accomplish a specific task.

"Task behavior is defined as: the extent to which the leader engages in spelling out the duties and responsibilities of an individual or group. The behaviors include telling people what to do, and how to do it, when to do it, where to do it, and who's to do it" (Hersey, 1984, p. 31).

Relationship behavior is defined as: the extent to which the

leader engages in two-way or multi-way communication if there is more than one person. The behaviors include listening, encouraging, facilitating, providing clarification, and giving socioemotional support (Hersey, 1984, p. 32).

These variables, when combined, ideally should produce the type of leader behavior for the quadrant that contains the intersection of all three variables. Each quadrant is labeled with the leader behavior that will most likely be effective for the situation. See Diagrams 1 & 2.

In basically crisis-oriented organizations such as the military or fire department, there is considerable evidence that the most appropriate style would be the high task and low relationship, since under combat, fire, or emergency conditions success often depends on immediate response to orders. Time demands do not permit talking things over or explaining decisions. But once the crisis is over, other styles might become appropriate (Hersey & Blanchard, 1988, p. 119).

By definition "situational approaches require the leader to behave in a flexible manner, to be able to diagnose the leadership style appropriate to the situation, and to be able to apply the appropriate style" (Hersey & Blanchard, 1988, p. 106).

One thing that frequently happens in the military is instead of using appropriate leader behavior matched with follower readiness, performance, and demonstrated ability, privileges are based upon chronological age, rank, or gender.

Once personnel have been trained on the use of situational leadership, they still need one more thing before they can make

quality reality. This one thing is "permission to do their jobs correctly" (Crosby, 1986, p. 230). Permission to do things correctly results in getting line-stopping problems identified, corrected and eliminated. Gaining permission to do things right can be a lifelong frustration unless the leader thinks it is important, too (Crosby, 1986). Any action by the leader that thwarts the quality efforts of subordinates will be amplified and echoed in the attitudes and initiatives of those subordinates. "Many quality efforts plunge to a quick death because of holes in implementation. They fail to first build an empowered organization, and they don't provide the skills, individuals, and teams needed to make quality work" (Development Dimensions International, DDI, 1992).

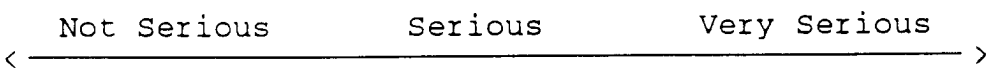
To succeed in quality efforts, the workers in the organization must be given permission to do their jobs correctly; they must be empowered. "According to author John Adams, empowerment is 'the creation of an environment in which individuals are encouraged to develop toward their full creative potential'" (Morse, 1992, p. 4).

To aid supervisors at all levels in empowering their workers, an empowerment model from Kaset International is included in the student handbook used in the Air Mobility Command Awareness course. The model illustrates five levels of empowerment based on the capabilities of the person and the seriousness of consequences (for the task or lack thereof).

Figure 1

Empowerment Model (Matrix)

Person	Not Serious	Serious	Very Serious
Very Capable	Level 1 Totally Empowered	Level 2 Post-Approval	Level 3 Guidelines
Capable	Level 2 Post-Approval	Level 3 Guidelines	Level 4 Pre-Approval
Not Capable	Level 3 Guidelines	Level 4 Pre-Approval	Level 5 Not Empowered



Level 1: Totally Empowered: "Take Charge--handle it on your own."

Level 2: Post-approval: "Go ahead and handle it on your own--inform me of action taken later on."

Level 3: Guidelines: "Help the customer, but follow guidance."

Level 4: Pre-Approval: "Come check with me before doing this or that."

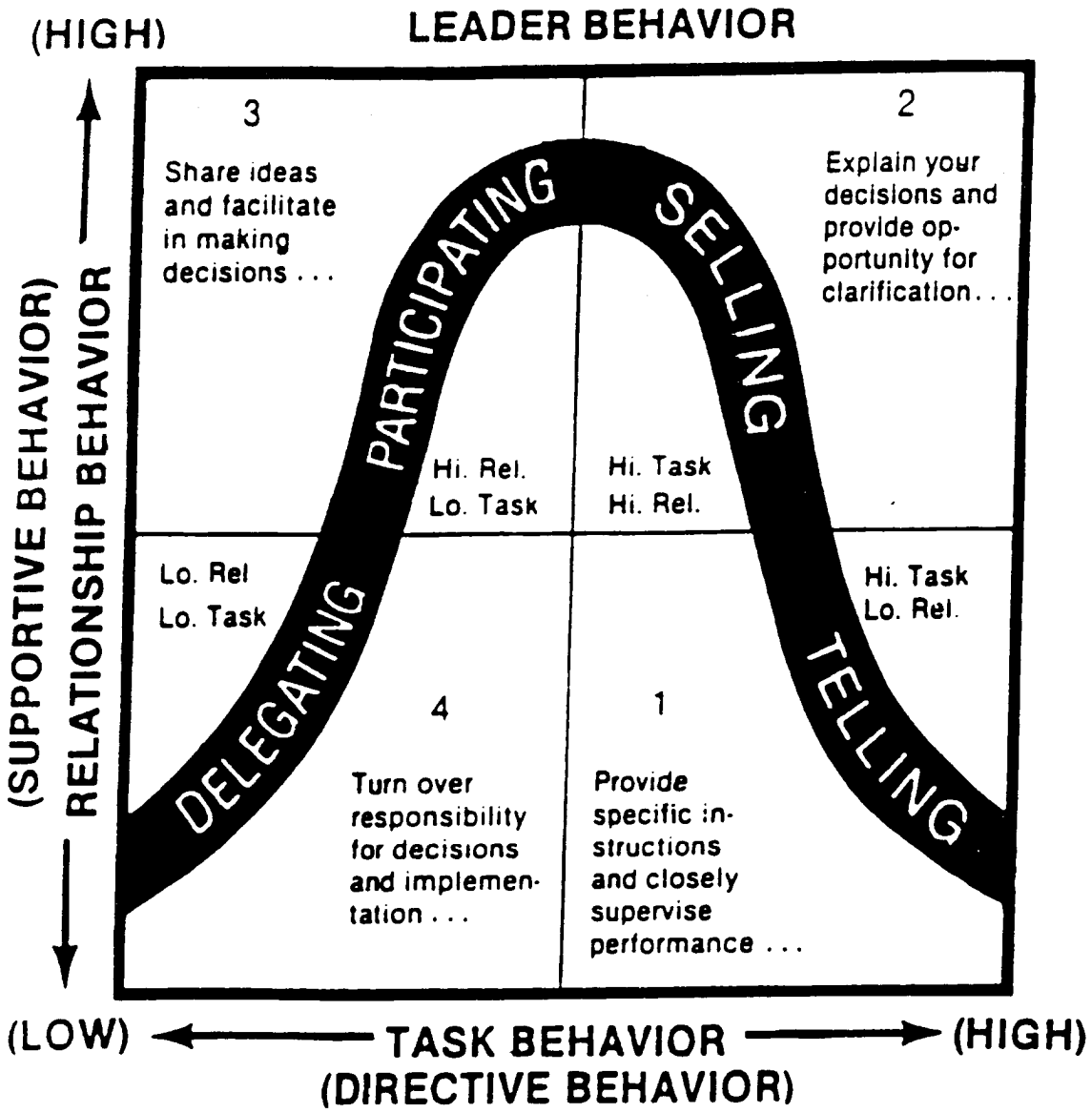
Level 5: Not Empowered: "You aren't allowed to handle this situation. Decisions in those matters are reserved exclusively with me or top-level management" [Air Mobility Command (AMC), 1992, pp. A-16 - A-171].

Additionally, Morse (1992) goes on to state that "two simple steps will create an environment where every person is not ordered, bossed, or directed, but is encouraged, nurtured, and stimulated to develop new ideas: empower yourself and your co-workers" (p. 4).

Diagrams 3 & 4 present an integrated model comprised of the

Hersey and Blanchard Situational Leadership model and the Kaset International Levels of Empowerment model. This model shows what types of leader behaviors empower subordinates and the degree or level of empowerment produced. This model and a discussion of it's meaning should be added to the Quality Awareness course and any other Quality course for supervisors and leaders.

Diagram 1



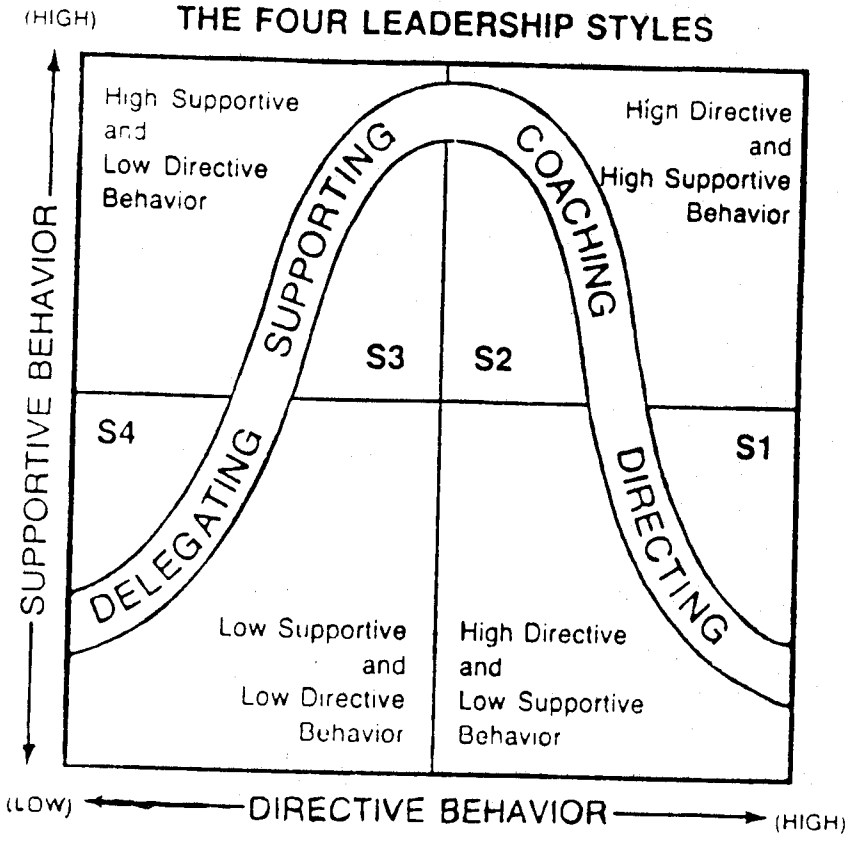
FOLLOWER CONFIDENCE

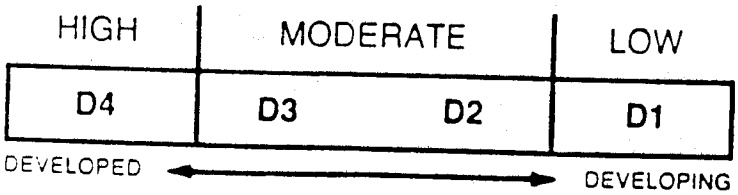
R4	R3	R2	R1
Confident	Insecure	Confident	Insecure
FOLLOWER DIRECTED		LEADER DIRECTED	

Situational Leadership Model (Hersey, 1984, p. 69)

Diagram 2

SITUATIONAL LEADERSHIP II

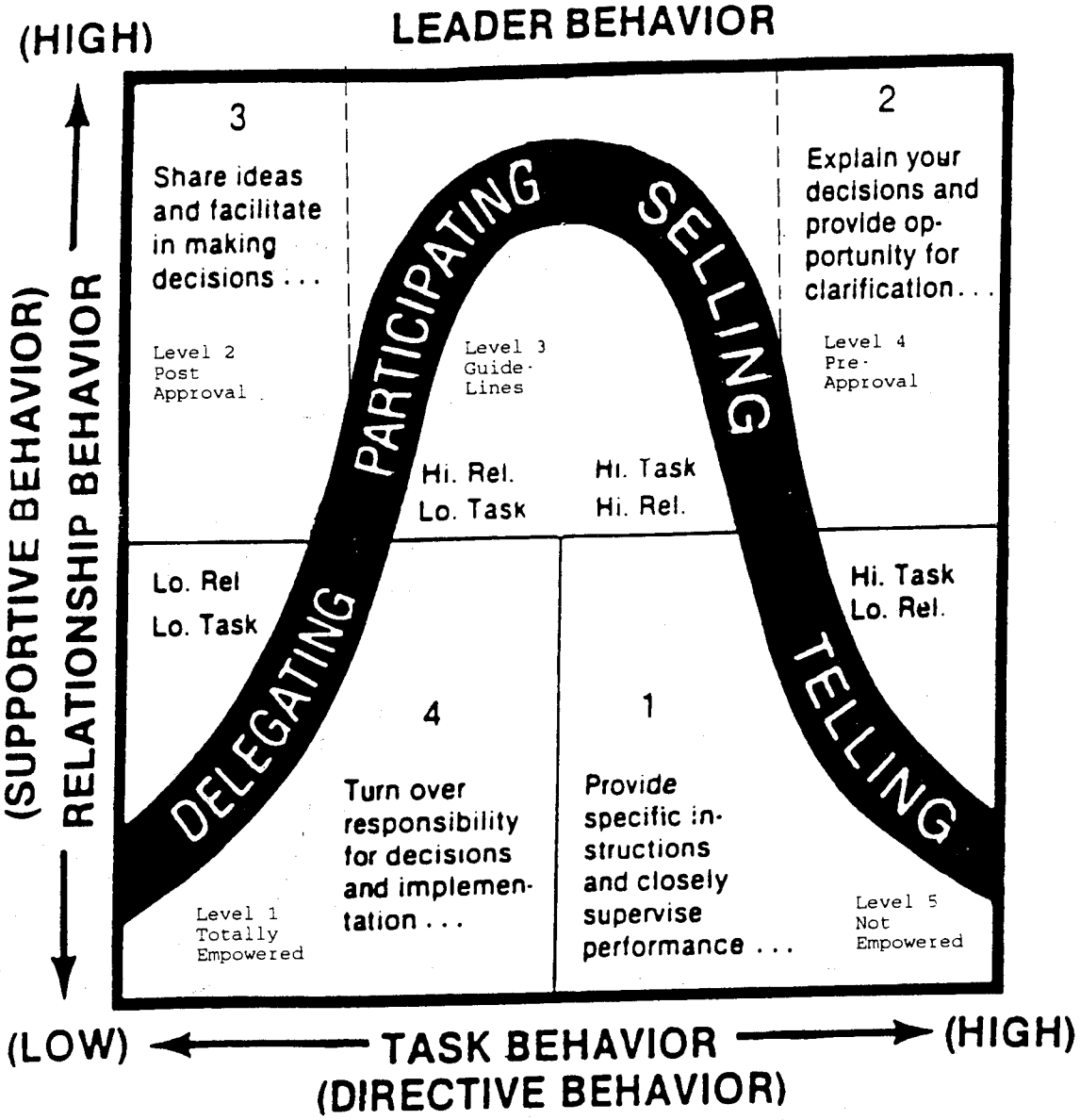




DEVELOPMENT LEVEL OF FOLLOWER(S)

Situational Leadership Model II (Blanchard, et al., 1985, p. 68)

Diagram 3

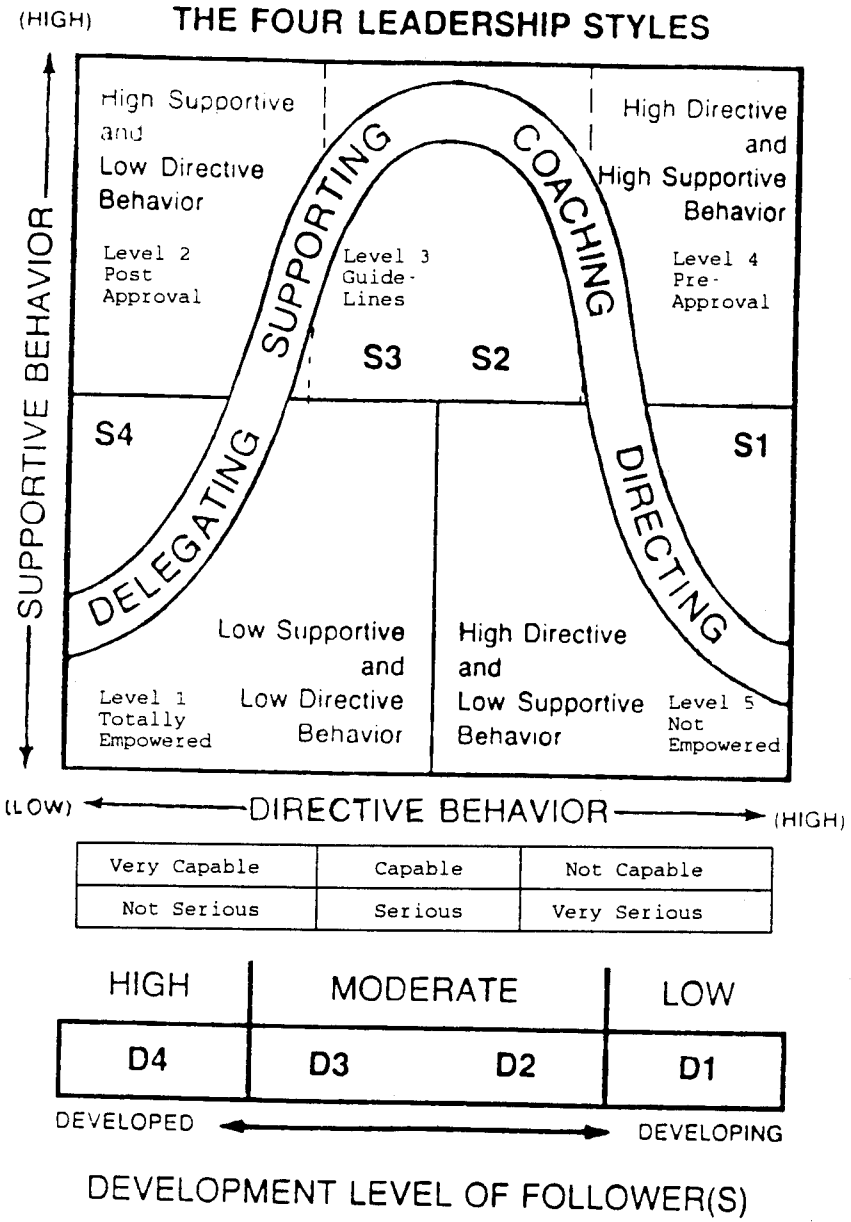


FOLLOWER CONFIDENCE

R4	R3	R2	R1
Confident	Insecure	Confident	Insecure
FOLLOWER DIRECTED		LEADER DIRECTED	
Very Capable	Capable	Not Capable	
Not Serious	Serious	Very Serious	

Diagram 4

SITUATIONAL LEADERSHIP II



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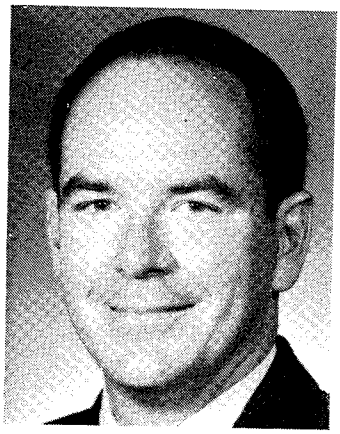
THE BENEFITS TO AIR FORCE TOTAL QUALITY MANAGEMENT BY MERGING SITUATIONAL II LEADERSHIP AND THE MYERS-BRIGGS TYPE INDICATOR IN LEADERSHIP TRAINING



Maj Mark Phillips

The Benefits to Air Force Total Quality Management by Merging Situational II Leadership and the Myers-Briggs Type Indicator in Leadership Training

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Introduction

I teach a block of instruction on Total Quality Management (TQM) to 240 government executives, 0-4 and above, GM-13 and above, and to about 300, mid-level government managers, 0-3 and above, GS-9 and above, each year. This is a part of my teaching load as an Assistant Professor at the Air Force Institute of Technology at Wright-Patterson AFB. I've noticed more and more a feeling of uneasiness in the room when TQM comes up as a subject. A few have good TQM stories, but many have horror stories, or possibly worse, believe TQM is a buzz-word or slogan and that it's usefulness as a management philosophy is coming to an end.

I'm also certified to teach the Myers-Briggs Type Indicator (MBTI). In the simplest of explanations, the MBTI is a text that teases out personality types through 126 questions. I started to notice that there was a high correlation between those individuals with certain personality types and those individuals who have the negative view of TQM. I've begun research to determine with statistical significance this correlation, but for now this paper will discuss personality type, flexibility in leadership and those personality types that dislike change.

What is MBTI?

Before I write any further about MBTI, let me come clean. I am an ISTJ.

I'm an "I" for introvert. That means that I need private time and space and am energized by inner resources and internal experiences. I feel pushed inward by external claims and intrusions, e.g., I get exhausted and stressed by working in groups and constantly talking. I am often reserved, quiet, hard to know. If I were an "E," I would need and be energized by talking and working with groups of people. I would get tired and lonely when off working alone. I would be friendly, talkative, easy to know.

My "S" stands for a preference toward sensing. I want facts and practical matters. I like starting at the beginning of a project, taking one step at a time. I want set procedures and established routines. I have little "N" preference, which stands for intuition. People with an "N" preference live toward the future and prefer imagining possibilities. They like change and variety, like opportunities for being inventive and might start working on a project by jumping in anywhere, or leaping over steps.

When I make decisions, I'm inclined to base them on principles and logic. This is because I'm a "T" which gives me a preference toward truth and justice, impersonally deciding on people and matters based on objective principles. If I had a "F" or feeling preference, I would base decisions on personal convictions and decide more with the heart. I would be concerned about how my decisions affect relationships, harmony and I'd be better at understanding people.

As a "J" I want structure, a schedule and prefer little variation in the schedule. I prefer an organized lifestyle, with definite order and control. I like establishing closure and enjoy being decisive. If I were a "P" or one preferring a perceptive lifestyle, I'd be more flexible, going with the flow. I'd prefer experiencing life as it happens and feel comfortable maintaining openness instead of establishing closure.

When you combine together the four preferences

Extraversion (E) or Introversion (I)

Sensing (S) or iNtuition (N)

Thinking (T) or Feeling (F)

Judgment (J) or Perception (P)

you get a distinct preference type. This understanding of one's own type and the type preferences of others you work with can enhance teambuilding, working relationships, and certainly improve communications. MBTI certainly doesn't explain all the uniqueness found in individuals, but understanding these four key preferences can help a great deal in understanding each other. By the way, MBTI does not measure IQ, psychiatric disturbances, emotions, trauma, stress, ability to learn, maturity, affluence or intelligence. It is simply a friendly and constructive way of name-calling.

MBTI Type in U.S. Population and Organizations

Table 1 shows that there is a spread of personalities in our population. While our population is quite well spread among the spectrum of types, personality types gravitate toward one profession over others. What we naturally prefer in our lives basically translates to the work we wish to perform. The organizations that value and appreciate our personality tend to reinforce and reward us for our preferences. These organizations in turn also start taking on the personalities of the dominant type found in that organization.

For military personnel the dominant type is ISTJ and ESTJ, with over 30% of our military population preferring these types. (see Table 2). These STJ organizations take on the same characteristics that a person with an STJ type would have. The organization and the military personnel reinforce the desirability of the STJ preferences in both the organization and personnel. The below description by Barr (1989) sounds a great deal like military organizations I have come to know, even though the authors were not describing the military. They were simply describing a typical STJ organization.

CAPT Databank Total Population

N = 232557

SENSING THINKING	SENSING FEELING	INTUITION FEELING	INTUITION THINKING
ISTJ N=21755 %= 9.35	**ISFJ** N=21581 %= 9.28	**INFJ** N= 9990 %= 4.30	**INTJ** N= 9868 %= 4.24
ISTP N= 7419 %= 3.19	**ISFP** N=11266 %= 4.84	**INFP** N=17684 %= 7.60	**INTP** N= 9223 %= 3.97
ESTP N= 7154 %= 3.08	**ESFP** N=12718 %= 5.47	**ENFP** N=24472 %= 10.52	**ENTP** N=10100 %= 4.34
ESTJ N=21298 %= 9.16	**ESFJ** N=22668 %= 9.75	**ENFJ** N=13711 %= 5.90	**ENTJ** N=11650 %= 5.01

JUDGMENT — INTROVERSION — PERCEPTION — PERCEPTION — EXTRAVERSION — JUDGMENT

Note: ■ = 1% of sample

8631500

	N	%
E	123771	53.22
I	108786	46.78
S	125859	54.12
N	106698	45.88
T	98467	42.34
F	134090	57.66
J	132521	56.98
P	100036	43.02
IJ	63194	27.17
IP	45592	19.60
EP	54444	23.41
EJ	69327	29.81
ST	57626	24.78
SF	68233	29.34
NF	65857	28.32
NT	40841	17.56
SJ	87302	37.54
SP	38557	16.58
NP	61479	26.44
NJ	45219	19.44
TJ	64571	27.77
TP	33896	14.58
FP	66140	28.44
FJ	67950	29.22
IN	46765	20.11
EN	59933	25.77
IS	62021	26.67
ES	63838	27.45
ET	50202	21.59
EF	73569	31.63
IF	60521	26.02
IT	48265	20.75
S dom	63208	27.18
N dom	54430	23.41
T dom	49590	21.32
F dom	65329	28.09

This table is one of a series of tables from the CAPT-MBTI Data Bank of MBTI records submitted to CAPT for computer scoring between 1971 and December 1982. This was the entire databank population from which the 59,784 records with usable occupational codes were drawn. This databank has 51% Form F cases from 1971 to 1978, 35% Form F cases from 1978 to 1983 and 14% Form G cases from 1978 to 1982. Analysis of an earlier databank subset showed Form F and G databanks were comprised of 56% females and 44% males; education level completed: 6% some grade school, 30% high school diploma, 25% some college, 18% bachelor degrees, 11% masters degrees, 3% doctoral or post doctoral work, and 6% unknown. Age group percentages were: 11% under 18, 29% 18 to 20, 12% 21 to 24, 10% 25 to 29, 16% 30 to 39, 10% 40 to 49, 5% 50 to 59, 2% 60 plus, and 5% unknown.

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MILITARY PERSONNEL

N = 264

SENSING THINKING	SENSING FEELING	INTUITION FEELING	INTUITION THINKING
ISTJ N= 37 %= 14.02	**ISFJ** N= 25 %= 9.47	**INFJ** N= 9 %= 3.41	**INTJ** N= 8 %= 3.03
ISTP N= 20 %= 7.58	**ISFP** N= 4 %= 1.52	**INFP** N= 16 %= 6.06	**INTP** N= 4 %= 1.52
ESTP N= 8 %= 3.03	**ESFP** N= 12 %= 4.55	**ENFP** N= 23 %= 8.71	**ENTP** N= 14 %= 5.30
ESTJ N= 47 %= 17.80	**ESFJ** N= 17 %= 6.44	**ENFJ** N= 7 %= 2.65	**ENTJ** N= 13 %= 4.92

JUDGMENT — INTROVERSION — PERCEPTION

PERCEPTION — EXTRAVERSION — JUDGMENT

Note: ■ = 1% of sample

8629447

	N	%
E	141	53.41
I	123	46.59
S	170	64.39
N	94	35.61
T	151	57.20
F	113	42.80
J	163	61.74
P	101	38.26
IJ	79	29.92
IP	44	16.67
EP	57	21.59
EJ	84	31.82
ST	112	42.42
SF	58	21.97
NF	55	20.83
NT	39	14.77
SJ	126	47.73
SP	44	16.67
NP	57	21.59
NJ	37	14.02
TJ	105	39.77
TP	46	17.42
FP	55	20.83
FJ	58	21.97
IN	37	14.02
EN	57	21.59
IS	86	32.58
ES	84	31.82
ET	82	31.06
EF	59	22.35
IF	54	20.45
IT	69	26.14
S dom	82	31.06
N dom	54	20.45
T dom	84	31.82
F dom	44	16.67

This table is one of a series of tables from the CAPT-MBTI Data Bank of MBTI records submitted to CAPT for computer scoring between 1971 and June, 1984. This sample was drawn from 59,784 records with usable occupational codes from the total data bank of 232,557. This data bank has 51% Form F cases from 1971 to March, 1978, 35% Form F cases from 1978 to June, 1984 and 14% Form G cases from 1978 to December, 1982. An analysis of Form F and G data banks showed the data banks were comprised of 56% females and 44% males; education level completed: 6% some grade school, 30% high school diploma, 25% some college, 18% bachelor degrees, 11% masters degrees, 3% doctoral or post doctoral work, and 6% unknown. Age group percentages were: 11% under 18, 29% 18 to 20, 12% 21 to 24, 10% 25 to 29, 16% 30 to 39, 10% 40 to 49, 5% 50 to 59, 2% 60 plus, and 5% unknown.

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STJ Organizations
(Sensor, Thinker, Judger)

The theme of the STJ organization is hierarchy. Titles mean something. Authority, title, and status delineate the structure around which other dynamics move. Principal beliefs of a hierarchical organization are:

Respect your boss.
Observe the chain of command.
Follow standard operating procedures.
Control decisions and interactions by policy and procedure.
Pay your dues before you move up the hierarchy.
Take only carefully calculated risks within the structure.
Make your contributions clearly measurable in a competitive area.

An STJ organization is traditionalist. It has strong values of conservatism and stability. The STJ individuals are like the STJ organization. They like to get things done steadily and on schedule. Are particularly strong with detail and careful in managing it. Have things at the right place at the right time. Can be counted on to honor commitments and follow through. Work well within organizational structure.

What Environment are the Military People and Organizations Facing?

Our military environment today is one of fast-moving change. Just to name a few of those changes: change in the communist threat, base closures, early retirement boards, the gay issue, proposed pay freeze, stationary bicycles, and the new Air Force uniform. "Confused and off-balance" is how CMSgt Ronald Culver, Senior Enlisted Adviser at the Lackland Training Center in San Antonio, described the mood of the people in which he comes in contact. I believe this Chief said it well.

A few years ago I started asking new students what was their life's greatest challenge. I asked the question primarily as an ice-breaker. The student-typical responses were "raising my teenage children" or "surviving this course"; there was laughter and fun in the responses. Today I'm still asking the same question, but now the responses are "I need to make it five more years to retirement," or "Will my job be there when I return from this course," or "Will I be selected on the next RIF." There is still some laughter from the students, but it is more a polite, nervous understanding of from where the individual is coming.

Affects of Change on STJs

We all know that much of the change is for the good. I won't get into the reasons for the change. What I do want to discuss is the affects this change has on STJ's. First, for the organization. Barr (1989) stated that STJ organizations are traditionalists, with strong values of conservatism and stabilization. "With change and unpredictability, we have to question the survivability of the STJ organization if productivity and cost effectiveness is the measure." The potential pitfalls of STJ organizations (Hirsh, 1990) is that they may overlook the long-range implications in favor of day-to-day operations. They may neglect interpersonal niceties or may not consider the human element in decision making. They may become rigid in their ways and be thought of as inflexible. They may expect others to conform to standard operating procedures and thus not encourage innovation.

I don't know if the Hirsh description of pitfalls of STJ organizations apply to the military. We are certainly encouraging an innovative management philosophy in TQM, encouraging innovativeness in our people with TQM. The acceptance of this innovation principle at the lower levels might not be as easily adopted. It could be argued that we are more concerned with day-to-day operations and probably argued that we are more concerned with logic and justice than people factors.

What affect does all this change have on people with STJ personalities? Typical weaknesses of the STJ manager (Barr, 1989) are impatience, resistance to change, and negativity. "A manager with STJ preferences is usually reluctant to change priorities. Once the plan is organized, the manager is usually irritated at changes in the plan--particularly changes that someone else imposes. The STJ manager is usually impatient when projects or tasks get delayed." "STJ managers tend to look at the people causing the problem rather than looking to see if the work process itself is causing dysfunctional flow of work." Barr's most interesting statement on this subject is as follows:

> **We are not saying that STJ managers are obsolete. We are saying that each set of preferences has its set of negative possibilities. Anyone who gets stuck in a set of preferences without thorough development of alternative skills will find her/himself in dysfunctional managerial form. The danger of a managerial style being reinforced by the same organizational structure is the false encouragement to the manager to be satisfied with his/her style. Being stuck in STJ preferences will not be enough for the challenge.**

As I wrote earlier, the largest personality type in the military is STJ. We are also in an STJ organization which continues to reward individuals who have preferences similar to the organization's preferences. Since STJ is not a preference that wants change, variety and innovation, it is natural that we will feel great discomfort with such a vast amount of change around us.

Situational Leadership II and Flexibility

Let's briefly look at one of the staples of leadership training in the military. The way one is trained can help tell how one will handle change. Situational Leadership II (SLII) developed by Dr. Ken Blanchard is taught at Reserve Officers Training Corps, Officers Training School and continues to be reinforced at Air Force leadership training while on active duty. In a nutshell, SLII states that, to be an effective leader, one must provide to the subordinates what the subordinate is lacking in terms of directive behavior or supportive behavior. In other words, depending on the developmental level of a subordinate in working a task, the supervisor either gives more direction (what to do, how to do it, identify the goal) or gives more support (listen to the subordinate's problem, communicate feelings, aid in team building). The different combinations of supportive and directive behavior are shown in Table 3. The snake-like line running between the various quadrants gives descriptive phrases of the management style needed.

How does a manager decide what is needed by the subordinate in terms of leadership (supportive, directive or some combination thereof)? The leader needs to diagnose the developmental level of the subordinate into one of four developmental levels shown in Table 4. The lowest developmental level is D1, which is for a person with high commitment toward the task, but low competence. The picture I have in my mind is a Ph.D. in English who wants to save money changing the oil on his car, but has never changed oil before. The person has the desire and commitment to do the work, but doesn't have the knowledge or competence. Table 5 shows what leadership style should interface with the various developmental levels. For D1, the correct match would be style S1, directive behavior. The individual needs to be told what to do (directive behavior), not why it's important (supportive behavior). The Ph.D. in English trying to change oil is a good example from another perspective; it's important to remember that developmental level is task specific. The Ph.D. might be normally considered a highly developed person, but on the particular task of changing the oil, he is at the lowest developmental level.

One of the most important aspects of SLII to remember is that an individual's developmental level also changes constantly over time. For instance, a secretary who is both committed to the work of typing and very good at typing would be at the D4 developmental level. The appropriate leadership style would be delegating. She or he needs low supportive and directive behavior from the supervisor. Let's say the office gets a new computer. This secretary might drop instantly in developmental level. For instance he or she might now be low in competence in using the computer and low in confidence. This moves the secretary to D2 requiring a change in leadership style to S2--coaching, being high in directive behavior and high in support to the secretary.

In sum, with SLII, a supervisor needs to be good at diagnosis of subordinate's developmental level, but also flexible in adjusting his or her own leadership style to best match the subordinate's needs. If the supervisor is both good at diagnosis and good at being flexible, then they are well on the way to the third step in the Ken Blanchard leadership model, "contracting for leadership style." This step involves working

THE FOUR LEADERSHIP STYLES

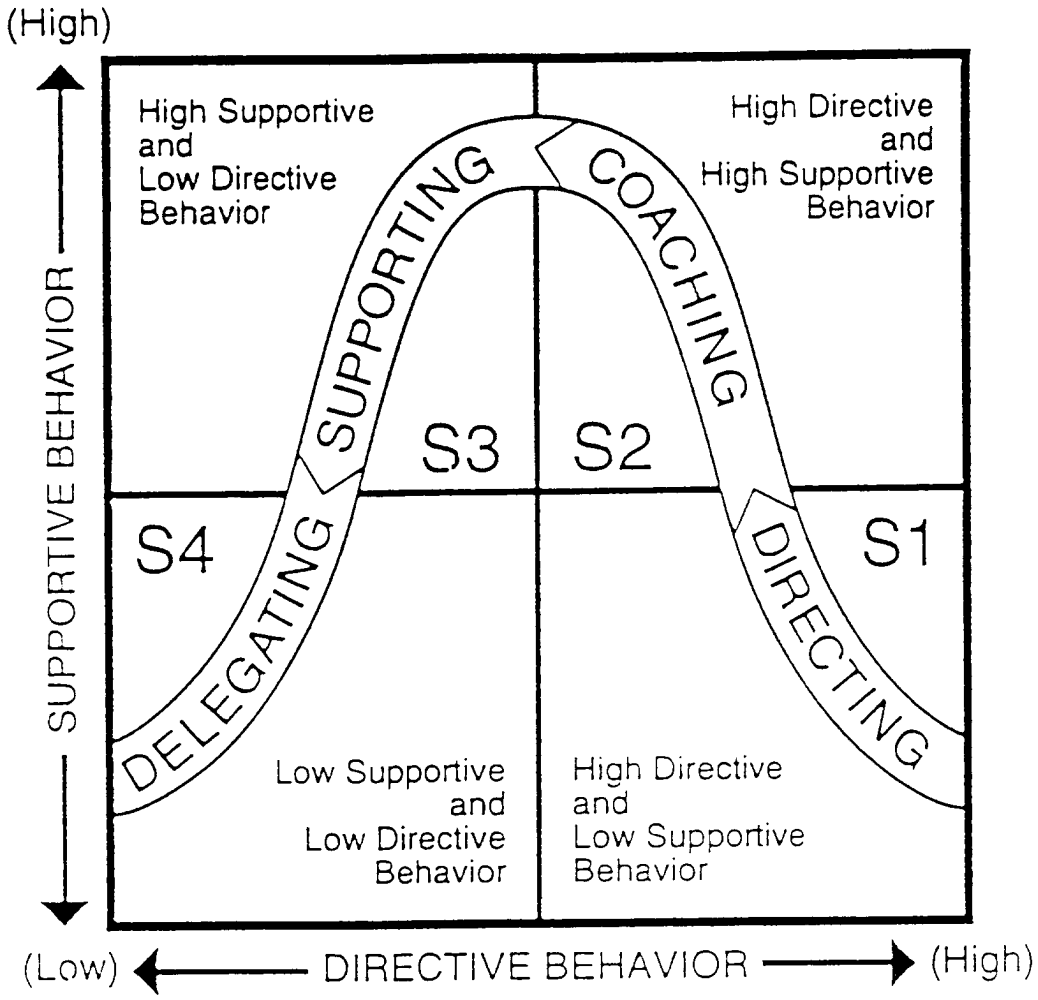

TABLE 3

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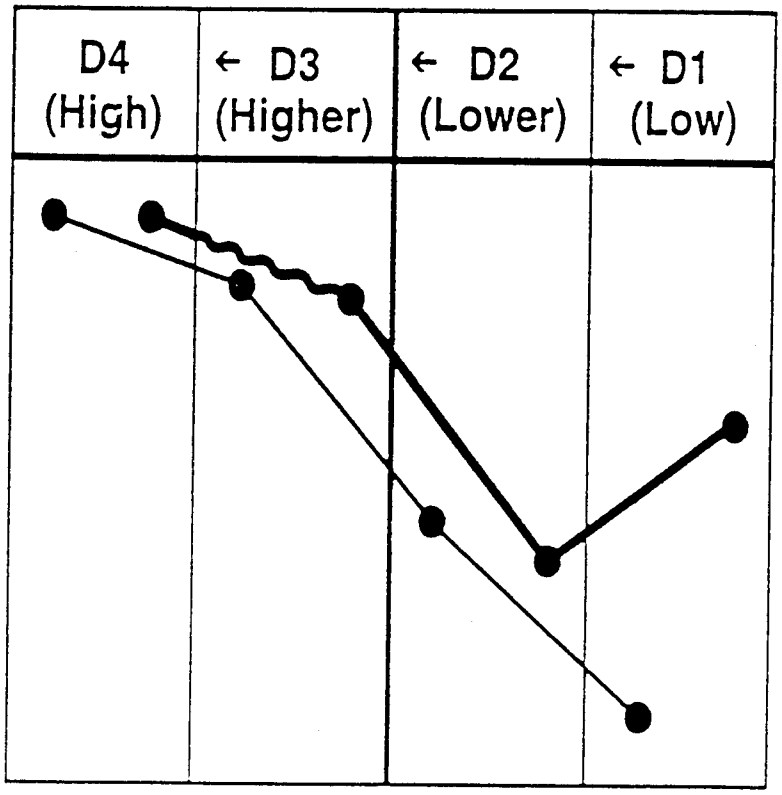
THE FOUR PERFORMER LEVELS



——— Competence = Knows how and transfers skills

▬▬▬ Commitment = Is confident and motivated

TABLE 4

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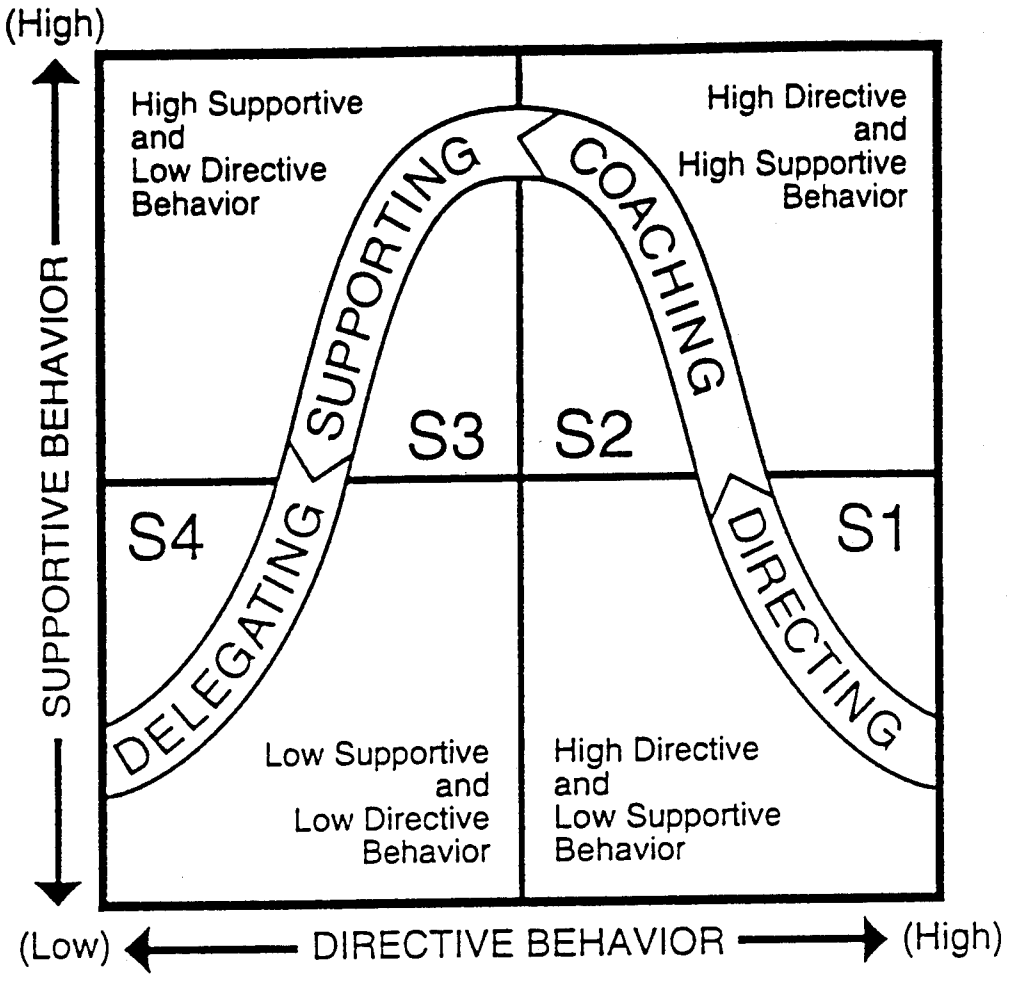
THE FOUR LEADERSHIP STYLES AND DEVELOPMENT LEVEL



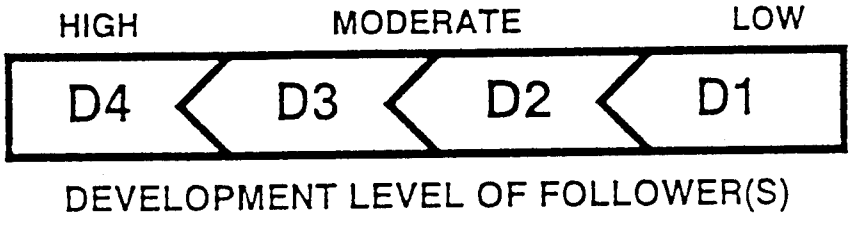


TABLE 5

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with the individual to make sure he or she is getting the type of support or direction from the supervisor to make the individual the most productive.

How does Situational Leadership II and MBTI Tie Together?

Most of the literature on the subject of leadership and management in the past decade has had a similar focus, that people and management's ability to work with individuals with different personalities is key to productivity. Successful leadership will need to be skilled at managing employee strengths, help employees with their weaknesses, motivate the diverse members of the workforce and maintain a harmonious and productive work team.

This paper has described the value in understanding MBTI to help the supervisor understand him/herself, and also in understanding the subordinates. SLII demonstrates that a supervisor can be most effective in dealing with the various and constantly changing needs of subordinates by being flexible. Some very recent work by Blanchard Training and Development (1992) helps show that our personality type creates in us blind spots, or least preferred leadership styles. Table 6 shows that, for instance, SJ personalities prefer S1 leadership styles. In other words, SJ's have no problem with being highly directive and low in support. This is what we do best. However we, SJ's, least prefer an S3. This is a style of high support, low directive behavior.

For each of the personality types there are leadership styles that are most preferred and those that are least preferred. This paper won't discuss all the possibilities for blind spots on both the subordinate and supervisor roles. In the next section, I will, however, describe the potential problems for SJ managers, since they are the most dominant type in the military and also have a military organization that reinforces this type.

Potential Blind Spots for an STJ Military Manager

Already discussed in this paper is the fact that STJ managers like structure and stability in the organization. In fact STJ's like structure and stability in most facets of their lives. What STJ's are finding, however, is great variety and change in their work world. Considering this environment, what should the leader do? What can the military leader do to be the most productive, make his/her organization the most productive, and get his/her people to the D4 level described in the SLII model? The answer is not easy. The leader needs to understand one's own personality, what the potential blind spots are, and also work hard at understanding the subordinate's own potential blind spots.

Table 7 shows the potential blind spots for an SJ manager dealing with subordinates with different personality preferences. What STJ's must focus on is that the change and variety are not only here to stay, but will continue to accelerate in the future. Although not the most comfortable feeling, by understanding our own personality and developing an understanding of our people and their unique needs, we should be able to best match our leadership to what the subordinates need during these uncertain times.

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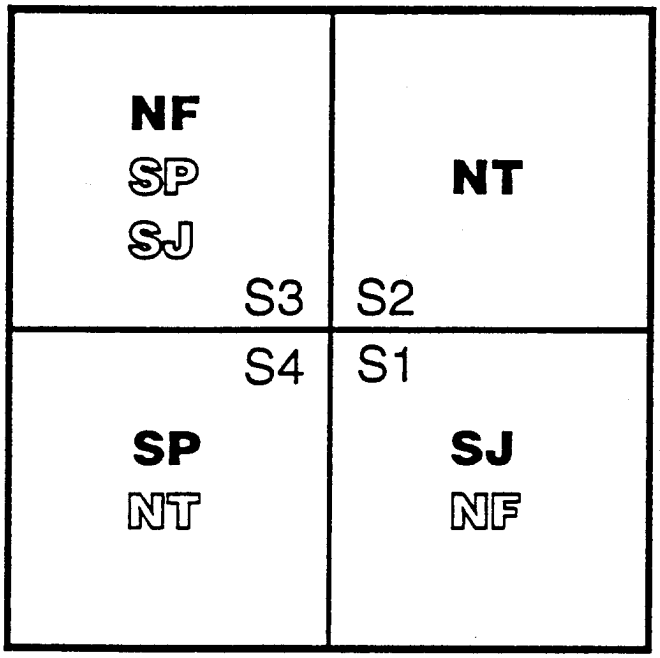
BLIND SPOTS: MOST/LEAST PREFERRED LEADERSHIP STYLES, BY TEMPERAMENT*



■ Most preferred/"natural" style for each temperament

□ Least preferred/"natural" style for each temperament

TABLE 6

*Based on data from over 2,000 managers. Face validity only.

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POTENTIAL SLII® BLIND SPOTS FOR SJ MANAGER

Preferred Styles: S1 and S4
Least Preferred Styles: S3 and S2

	S4	S3	S2	S1
SP employee	May perceive SP's problem-solving techniques as not well organized; may not delegate appropriately	May use inadequate supportive behaviors; may tend to praise things that SP does not value in himself or herself	In supportive mode, may neglect to support SP's crisis orientation and quick thinking	May try to force SP into schedules, routines, completion of paperwork
SJ employee	May have trouble delegating due to the need to monitor details	May want to give too much direction in details and so on	May be difficult to provide high support; will want to focus on what's wrong	Both employee and manager may want high direction–attention to details; may agree on form of direction; both may fail to see the big picture
NT employee	May have trouble understanding NT's future-oriented abstractions; may not understand why NT wants new tasks	May support/praise NT's past job history instead of NT's future contributions	May give wrong kind of support, such as praise for detail work and task completion	May focus too much on history and task at hand
NF employee	May have difficulty delegating due to perception that NF is disorganized and unpredictable	May provide high support that is impersonal and task oriented	May provide high direction, without high support	May focus too much on details; may not give enough support
	S4	S3	S2	S1

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TABLE 7

Being Receptive to the Change Can Work

I have had some executives in my class with strong STJ personalities and who also love TQM and tout it's virtues. These executives seem to fully believe in the fact that they, as supervisors, can't do it all. They believe the subordinates have to be empowered to develop changes and have the confidence that the changes are going to get the support of upper management. To have subordinates who are truly empowered, the subordinate needs to be in the D4 level of development in working tasks. In other words, supervisors want subordinates who are committed to the work and also competent in performing the work. Again, it's important to remember that people don't just come to the workplace at D4; they typically need to be developed, moved over time through the development levels. That means a supervisor must be able to flexibly apply the right amount of support and directive behavior when the subordinate needs it to develop the person to a D4 level.

On 13 Aug 93, I was reading the Wright-Patterson base newspaper *Skywriter.* An article entitled "Process Improvement Proves Itself" was not about MBTI or Situational Leadership II, but I saw aspects of both in the article. I've never met the author, Colonel Michael H. Bednarz, but I'd like to share some of his article and mention some of the similarities I saw between his article and this paper.

> As one of the more senior members of Aeronautical Systems Center staff ("senior," in this context, means old), I have had an opportunity to compare the changes that have occurred here since my first assignment to Wright-Patterson in 1968. Back then, in comparison to now, there was plenty of money, little programmatic oversight and control and no real incentive to change. Things were working just fine the way they were, thank you.
>
> No so today! The budgets are dropping. Our personnel force declining . Oversight is at an all-time high. Workload seems to be increasing. And change is everywhere.
>
> That was then...
>
> How in the world are we expected to cope with all of this at the same time? On top of that, our senior leaders keep forcing this ridiculous thing called "Total Quality Management" down our throats at a time when we are too busy absorbing changes to take on something more. We just don't have time to waste looking at our processes with all the alligators nipping at our toes....besides if I did take time to measure something or look at my processes, management would ignore my ideas anyway. What a waste this TQM stuff has become.
>
> This is now...

> I was flat wrong. Quality management should be the philosophy of good leadership. Quality management really embodies two main features to be effective.
>
> The first is employee empowerment. It is absolutely essential that each member of an organization believes he can make a difference through continuous improvement. We have been trying to do this for years, long before the quality management label arrived.
>
> The second feature is what differentiates quality management from any previous "buzz word" program. This is the training of our people in the tools necessary to make changes. These tools include process analysis and measurement techniques necessary to do process improvements.
>
> It is the leadership's responsibility to assure these features are implemented. It is everyone's responsibility to use these features to make a positive difference.

Again, I've never met Col Bednarz and I certainly have no idea what his MBTI type is. He sure sounds through like a leader who has STJ preferences. He said he was happy when we were in a world of little change. People had a mission, little oversight and there were the money and people to do the job. STJ's like stability and structure and little change. When all change started to happen, he became uncomfortable and then, when they added something called TQM, he really became uncomfortable with this ridiculous philosophy.

He has now seen the light. I don't know if Col Bednarz has heard of Situational Leadership II, but what he wrote basically stated that leadership's role is to make people competent and committed to do their jobs. This is exactly trying to make people D4. To get the people to the point that management can delegate. Management doesn't need to provide high support or high directive behavior. The people have all they need; they're empowered.

Conclusion

We want competent and committed people. People capable and committed to do the work, capable and committed to work under a TQM philosophy, capable and committed to understand the improving of our processes. We also want management to realize that they must create the empowering environment; they need to lead people into a developmental level so that they can delegate and the people can operate, with little support or direction, to accomplish the mission.

SLII describes well the type of behavior management must take to bring people to a higher developmental level. To tailor SLII to the uniqueness of people we are to work with, an understanding of MBTI is needed. MBTI allows us to understand not only our own preferences and blind spots, but also those of our subordinates and co-workers.

Supervisors efforts to increase subordinates' development levels will be enhanced by this "better understanding" of self and others.

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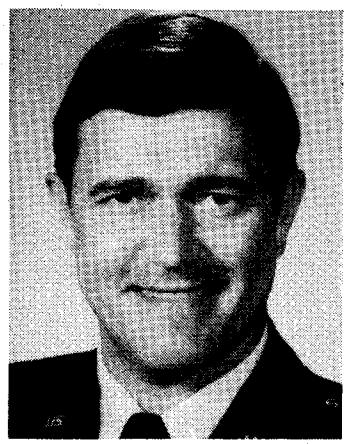
IN THE TRADITION OF VON STEUBEN: INSPECTION AS A TOTAL QUALITY TOOL



Lt Col Charles Court

IN THE TRADITION OF VON STEUBEN: INSPECTION AS A TOTAL QUALITY TOOL

BY
CHARLES M. COURT, LT COL, USAF

ABSTRACT

One of Deming's fourteen points for quality calls for the elimination of inspection to assure a quality product. Continuous improvement also calls for tools to let an organization monitor itself. Under Total Quality, then, why do we need external inspectors like the Inspector General?

Just as organizations change and evolve under Total Quality, the Inspector General function is changing away from the paradigm of compliance through inspection. The new emphasis is to foster progress through teaching and coaching. This new tradition is really a revival of the tradition started by Baron von Steuben, the Inspector General during the American Revolution.

INTRODUCTION

Most students of history and of management would not immediately relate Baron von Steuben, of the American Revolution, to today's Total Quality Management (TQM) initiative. Steuben lived from 1730 to 1794. He spoke with a thick German accent, laced with profanity, when he spoke English at all. He was famed for his temper. Because of prior experience and military aptitude, Steuben rose to become the second Inspector General (IG) of the United States Army, yet General Washington considered him unsuitable for command. (12:501) Nevertheless, Steuben is a renowned hero of the American Revolution because he applied his knowledge of war to train the new Army of the United States into a fighting force that could win in the field.

So what does Baron von Steuben have to do with TQM? The Baron is a fine example of quality management when compared to his predecessor, General Conway, the first Inspector General. This paper will use these two Revolutionary War Inspectors General, Conway and Steuben, to compare and contrast their different approaches to service during the Revolution. This discussion will then use these two examples to identify key benefits when leaders apply the inspector general function as a change agent. A critical comparison of opportunities and problems leads to predictions of how Total Quality may evolve in the Air Force. Finally, this paper will discuss the recent experiences and successes of the Air Force Materiel Command Inspector General team. This team has developed new tools to use the IG function to facilitate Total Quality Management.

HISTORY AND LEGEND

Many Americans no longer learn details of personalities and issues from the revolution against England. This loss is unfortunate because the events of over two-hundred years ago can give lessons today. For example, the first two Inspectors General of the Army of the United States served under different circumstances that reflected different leadership philosophies.

GENERAL CONWAY AND CONWAY'S CABAL

The first Inspector General of the United States Army was General Conway, an Irish-born Frenchman with military experience in Europe. Despite General Washington's objections, Congress appointed Conway with the authority to report directly to the civilian Board of War, rather than through the commander in chief. Essentially, Congress authorized Conway to go over General Washington's head directly to Washington's civilian supervisors. (7:112)

When he visited Washington's headquarters at Valley Forge, Washington and his staff tended to treat Conway with ill will. Apparently, Conway had corresponded with Horatio Gates, the victorious American general in the Battle of Saratoga. In his correspondence, Conway suggested that Gates would be a better commander in chief than Washington. This intercepted correspondence is the source of the "Conway Cabal"; Washington's staff became convinced that Conway was conspiring against their leader. After a short tenure, Conway departed voluntarily. This opened the inspector general job for a superior candidate.

BARON VON STEUBEN

Steuben is occasionally called von Steuben in deference to, and in confusion over, his full title: Baron von Steuben, which translates to *Baron of Steuben* in English. When Steuben came to the United States to serve in the Revolution, Washington first applied Steuben's knowledge and ability as a military drill instructor. Barely speaking English at first, Steuben the drillmaster worked through interpreters to train a cadre of drill instructors. The new American instructors taught basic battle maneuvers to the rest of Washington's army at Valley Forge. After Conway's departure, Steuben became the second Inspector General of the United States Army.

Rather than report to the Board of War, however, Washington prevailed so that Inspector General Steuben reported directly to the commander-in-chief, General Washington. As the Commander's trusted agent, Steuben remained Washington's expert "eyes and ears" on military questions in the field. This tradition of the teacher becoming the inspector is an approach that inspectors general should continue to consider.

THE TWO GENERALS CONTRASTED

Before discussing TQM, a direct comparison of General Conway and General Steuben illustrates how two conflicting paradigms developed. Conway was not an agent of the commander, but of the commander's boss, the Board of War. Conway operated with an agenda that apparently did not support the commander in the field. The final condemnation is that Conway came to be seen as a conspirator, a situation that reinforces the perception that the inspector general is not a friend -- the inspector is not to be trusted.

Conversely, Steuben worked directly for Washington as the commander's agent. Steuben's prior success as drillmaster had earned him the trust of the entire American Army. This professional respect carried over so that Steuben remained an effective trusted agent. As the Inspector General, Steuben continued to instruct, so that the army would keep improving. This perception of inspector as teacher has grown into a paradigm that is especially significant under today's total quality reforms.

TOTAL QUALITY MANAGEMENT TODAY

Total Quality Management remains an amalgam of the philosophies of many management "gurus." (3) The quality advocate with the most visibility and notoriety remains W. Edwards Deming. (1:5) To express his central management philosophies, Deming composed fourteen points of management. Conway's appointment and circumstances of service violated many of those points. Steuben can serve as an example of how following philosophies similar to some of Deming's fourteen points contributed to the American success almost two hundred years before anyone had ever heard of Total Quality Management.

DEMING'S FIRST POINT: CREATE CONSTANCY OF PURPOSE

Washington was in a poor position to improve his war efforts while Conway appeared to be a conspiritive, disuniting force. Similar problems exist today: How does a leader build a new structure while he is busy protecting himself from personal and professional enemies from within his own camp? The Steuben paradigm, with the inspector reporting only to the commander and with the inspector himself committed to teaching and improving the system, is completely in line with Deming's first point.

DEMING'S FIFTH POINT: IMPROVE CONSTANTLY

As with the first point, Conway was a divisive element, causing problems rather that solving them. Steuben was an experienced expert of war, battle, and maneuver. He was a superior person to provide information. By receiving direct reports, Commander-in-Chief Washington was in the best possible position with the best information to improve the army's abilities.

DEMING'S SIXTH POINT: TRAIN AND RETRAIN

Obviously, this point demands that a Total Quality organization have excellent teachers. Recall that Steuben first made his reputation in the American Army by training more drill instructors. As Inspector General, he was still willing to get down from his horse to instruct the fighting men in firearms and in maneuver. In contrast, there is little record of Conway either seeing battle or being around the field headquarters.

DEMING'S SEVENTH POINT: INSTITUTE LEADERSHIP

The fledgling American Army had faced incredible odds. The British Army was recognized as the best in the world. The American currency was worthless. Congress could agree on almost nothing. Supplies were constantly scarce. The desperation of the attack on Trenton and of the winters at Valley Forge remain American military legends. The leadership of George Washington held everything together until victory.

Throughout the revolution, Washington and his staff struggled to keep the army together and to help the army do its job better. Steuben was part of the solution because he knew the Army's job and he kept Washington informed of problems and opportunities. Contrast this situation with Conway's reputation of apparently undermining the commander in the field. Again, the examples of the two inspectors general show how the Steuben paradigm supports the leadership function.

DEMING'S EIGHTH POINT: DRIVE OUT FEAR

The specter of General Conway trying to get General Washington replaced is an excellent example of how a leader can face forces which encourage paranoia. Such forces could impose paranoia upon an entire organization. Just as Washington had no faith in Conway or in his agenda, the army staff could not afford to trust the inspector. Washington's dislike for Conway came out when Washington wrote,

> General Conway's merit, then, as an Officer, and his importance in this Army, exists more in his own imagination, than in reality ... I would ask, why the Youngest Brigadier in the service (for I believe he is so) should be put over the heads of all the Eldest? (sic) (11:388)

The troops may have feared Steuben as the drillmaster; the relationships between general officers and field troops always remain distant. However, the commanders of the combat units respected Steuben's contributions to building the army and instituting discipline. The subordinate commanders knew that they could frankly discuss their problems with the inspector general and that Steuben would either offer solutions or take the problem to the appropriate level for solution. Opportunities for productive exchanges set a tradition of problem solving with recognized experts. This also leads to the next pertinent point.

DEMING'S TWELFTH POINT: REMOVE BARRIERS TO PRIDE AND WORKMANSHIP

Deming himself discusses problems with workers and he often finds that they never really get trained to do their jobs. (10:81) An inspector who is a qualified expert and teacher, as was Inspector General Steuben, would be a superior person to remove the barrier of inferior training. An inspector general who actively undermines unit leadership would himself be a barrier that would undermine pride and success.

DEMING'S THIRTEENTH POINT: INSTITUTE EDUCATION AND RETRAINING

This point seems to echo point six, above: Train and Retrain. Education is different from training, and this point really speaks to the need to let people constantly improve themselves. (10:84) This point becomes extremely important to illustrate how leaders must be teachers and teachers are among the most important leaders. The example of the drillmaster becoming the inspector reinforces the concept that teaching, contributing, and leading become intertwined.

DEMING'S FOURTEENTH POINT: TAKE ACTION TO ACCOMPLISH THE TRANSFORMATION

What situation gave Washington the best opportunities to turn an undisciplined mob into an army that beat the best in the world? Innovation, knowledge, expertise, and tenacity all came together to let the Americans win. Baron von Steuben was part of the solution because he applied his abilities in support of his commander and the overall goals of the revolution.

This truncated list and analysis of Deming's points must now go back to a point that has caused much confusion.

DEMING'S THIRD POINT: CEASE DEPENDENCE ON MASS INSPECTION

While military units have been especially aware of the advantages of total quality for some time, inspections remain part of the military way of life. A very old rule illustrates the basic conflict: "No combat-ready unit has ever passed inspection. No inspection-ready unit has ever passed combat." This then leads to the question: Do we still need inspectors general if units have adopted Total Quality?

A literal approach to Deming's third point appears to sound the death knell for inspectors general. Inspections at the end of a process to ensure overall quality are counterproductive and obsolete. (1:148) Inspections focused solely on final products cannot force quality into military units or service units any better than into any manufacturing operation. The new philosophy demands quality at the beginning of each process and throughout each process.

MANAGEMENT THEORY AND THE VALUE OF THE INSPECTOR GENERAL

The Steuben paradigm, "The Tradition of Von Steuben," offers value within a total quality operation. The advantages of the Steuben example go beyond the pertinent items in Deming's fourteen points. Steuben's successes illustrate how his paradigm for inspectors general can continue as an essential part of total quality progress.

ESSENTIAL ELEMENTS OF TOTAL QUALITY

Several elements must come together for an organization to initiate a successful Total Quality approach. Leadership and management, two confusing terms in themselves, must combine their support for the new quality philosophy. All elements of a changing organization must remove obstacles to quality. Appropriate change agents and a formal system to change values must work together.

Leadership and Management Support

Top leadership must initiate the change for an organization to become a quality organization. (6:56) The integrity of the leadership must also be unquestioned. (5:107) Good management itself calls for an ability to extract information from an organization and an ability to monitor operations. (8:53,67) Furthermore, any performance feedback, on either management or organizational performance, must be non-threatening, lest critical information be obscured by defensiveness. (9:166)

The Steuben example answers all of these points. An agent of top management, such as an inspector general, who operates with integrity and in a non-threatening manner can communicate support for change through actions and words. Knowledgeable trusted agents would be in superior positions to expedite information when that information is of special interest to top decision-makers. Additional sets of "eyes and ears" can provide a critical ability for leaders to monitor input, processes, metrics, and results in order to provide a balanced view of continuing operations. Inspectors acting as teachers can communicate the quality vision supported by top management.

Remove Obstacles

Perhaps the greatest condemnation of inspectors general today is that units often see inspectors and the inspection system itself as obstacles to progress. This misinterpretation of the IG role is a direct result of attempts to inspect quality into units as an end product, just as Deming condemns in his third point. Granted, any unit trying to do a job does not need a snooping tattle-tale, a Conway, under foot. When inspectors today ask why units interpret and apply certain rules badly, a common reply is that the IG told people to do things a certain way during a previous visit. Units rarely question whether counter-productive or obsolete approaches make sense now, or ever made sense.

This interpretation of the IG as part of the problem overlooks opportunities that Washington and Steuben exploited. A clear, straight, knowledgeable, auxiliary information channel is an outstanding avenue to locate obstacles and position the commander, not the IG, to remove those obstacles. Recall that the top leadership must initiate the changes. The examples of the differences between Conway and Steuben illustrate the clear difference between the two separate paradigms. The Conway paradigm, reporting to a superior level of supervision, risks letting the IG become an authority able to direct change. This approach usurps the commander. The Steuben paradigm empowers the commander and appropriate subordinates in the chain of command with the expert information they need to achieve positive change.

Appropriate Change Agents

The Steuben paradigm then opens opportunities for inspectors to function as effective change agents. Recall that inspectors general work directly for the commander, but are not normally in the operational chain of command; subordinate commanders do not work for the IG, they report to their commander. As an independent arm of top leadership, inspectors can combine their position outside the chain of command with a commitment to inform leaders of progress and subordinate units of the need to change. Inspectors as teachers would be in excellent positions to inform all units of new ideas, innovations, approaches, and reforms. Commanders and subordinate leaders would remain best able to apply those lessons under an overall plan.

Formal Systems to Change Values

To accomplish a change in organizational culture, toward a Total Quality organization, top leaders must ultimately establish formal systems to support evolution toward the new values. (6:56) Here, the Steuben paradigm allows the inspectors to become one of the formal systems. IG inspectors can see their roles as teachers and consultants. Leaders within the operational chain can see inspectors as additional information channels and disseminators of expert advice. Rather than being headquarters agents with the power to disrupt organizations and confuse procedures, the IG can be part of the solution.

EVOLUTION OF THE INSPECTOR GENERAL AND OF TOTAL QUALITY

A current symptom of the old layered organizational structure is a multiplicity of inspectors general and other oversight agencies. Right now the military has Department of Defense (DOD) IGs, service IGs, command IGs, and local unit IGs. Some of these inspectors investigate complaints, others instruct and teach in order to facilitate change, and others inspect end products and report their findings to higher levels.

As Total Quality removes layers of oversight and encourages flatter organizations, IG teams will also shrink. Leaders must decide which IG roles add the most value. Deming's first point, "Create constancy of purpose," becomes the overriding consideration. Should future IGs continue to inspect and report in what this paper describes as a Conway paradigm, or should inspectors move to roles as teachers, facilitators, and consultants as in a Steuben paradigm? The answer to this question has a profound effect on the future of TQ in the Air Force. Just what level of commitment do top leaders want to communicate?

Senior Air Force leaders have defined Total Quality as:

> A leadership commitment and operating style that inspired trust, teamwork, and continuous improvement everywhere in the Air Force. (2)

Which approach, Conway's inspect and report or Steuben's teach and facilitate, holds the most promise to promote TQ? Which paradigm offers the best promise of inspiring trust and teamwork?

This choice is not a false dilemma. The theories behind Total Quality must combine with operational realities. Smaller, more efficient and effective units at all levels must operate in an environment of trust, innovation, and clarity of purpose. Inspection units can act to facilitate constant improvement by informing operational units of new products and new approaches. IGs can propose new ideas with the same spirit of teamwork Washington and Steuben applied over two hundred years ago.

AFMC IG SUCCESS STORIES

In support of total quality, the Air Force Materiel Command (AFMC) IG has developed a new type of review, a Total Quality Review (TQR). When a unit commander or director invites the IG team to do a TQR, the unit that made the request first uses the Secretary of the Air Force Quality Criteria to develop a self-assessment of its own quality program. The Secretary of the Air Force criteria is based on the Baldrige criteria for quality developed by the United States Department of Commerce.

The unit also sends the IG a list of unit customers. The IG uses the self-assessment to develop a list of unit strengths, areas for improvement, and field issues which are issues the IG team will examine further. The IG team contacts the unit customers for their impression of service and product quality. Then the team goes to the unit and interviews at least 30 per cent of the personnel. Field issues determine interview topics. The overall goal is to determine the unit's quality maturity against the Air Force criteria.

At the end of the interviews, generally at the end of a one-week visit, the unit commander receives an IG briefing and a short written report, a "field memo." The reports describe what the IG team observed and what the unit needs to do next to continue its drive for quality. Although the criteria gives number scores for the level of quality maturity, the IG team does not use those scores and does not try to give any number grades. In order to remain non-threatening and to reduce defensive reactions, the field memo and final briefing make observations and suggestions that the unit commander can use at his/her own discretion. The commander receives the only copy of the field memo released outside the IG office. The only people at the final briefing are IG team members, the commander, and anyone else the commander invites.

The Total Quality Review format supports the letter and the spirit of TQM in several ways. It lets the unit being reviewed and the IG team work together to improve Total Quality. It

lets IG inspectors function as consultants as they learn from many units' quality programs. It supports unit commanders by putting all pertinent information solely in their hands. By being both voluntary and non-threatening, units can regard a TQR visit as a real aid to their progress and not a rite of passage imposed by an inspection system.

Since November 1990 the AFMC/IG team has conducted 24 Total Quality Reviews throughout the Materiel Command. The lessons learned have allowed the IG team to expand their knowledge of TQ and their application of TQ principles to other areas. For example, the AFMC/IG now focuses more intently on support for those commanders and directors in the best positions to affect TQ progress.

Products such as a Commander's Policy Review (CPR) now check to see how the commanding general's policies are being implemented so that all units can improve. The CPR report disseminates the most successful approaches as best practices, to be copied throughout the command. The IG does not single out other units if a commander's policy is not especially applicable to their situation. The commander receives realistic feedback on how units apply his policies so that command processes can improve.

CONCLUSION

IGs are simply not going to go away because of Total Quality. By moving away from defect catching and toward process improvement, inspectors become valuable consultants and Total Quality change agents. An IG team chartered to prevent problems by encouraging up-front process improvement can use knowledge and lessons learned from many units. A team of consultants and quality experts can help every unit committed to continuous improvement.

To succeed, IGs must overcome the impression of many customers that the inspector and the unit are in adversarial roles. IGs must mature away from defect catching and writing report cards, just as other units must mature during their quest for quality. The precedent of the inspector adding value through knowledge, teamwork, and integrity was established during the American Revolution by two heroes of that revolution, Generals Washington and Steuben. As IG teams and other units move to Total Quality, leaders can find inspiration in "The Tradition of Von Steuben."

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COMMANDING QUALITY: THE ENEMY WITHIN

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Commanding Quality: The Enemy Within

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Major Earlie Rose

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The Quest for Quality
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Montgomery, AL

ABSTRACT

This study examined the evolution of a Self-Assessment Questionnaire (SAQ) in a Fortune 100 company and addressed the implications of the resulting transactional model to Air Force Award Criteria. This model advances a structured approach to managing the self-assessment process and focuses on the importance of tailoring assessment criteria to meet Air Force organizational needs identified and measured by participants at the unit level. This study bridges interdisciplinary gaps between Air Force and corporate quality cultures by: (1) identifying linguistic and cultural barriers to transferability, (2) discussing theoretical challenges and disconnects in quality Air Force communication, (3) addressing postmodern perspectives on quality Air Force communication, (4) describing and demonstrating the Self-Assessment Questionnaire (SAQ) development process in a Fortune 100 company, and (5) communicating the applicability of processual implementation across typological institutions.

INTRODUCTION

In 1905, Elias Canetti was born in Bulgaria. After formal education in both England and on the Continent, he settled in Vienna. A noted scholar, he is best known in the United States for Crowds and Power (Canetti, 1962) - a remarkable sociological and psychological study of social power and the human condition. The key concept of this work is the notion of the 'sting'. Power, as explained by Canetti, is the expression of order via command. A command, accordingly, consists of 2 primary factors: "momentum" and "sting". The "momentum" is the force on the person to act. The "sting", however, is invisible and mute, remaining behind after

every command is obeyed. As Canetti explains, the sting is indestructible and waits, sometimes for years, for the chance to avenge itself by reversing the original command. To explain: "What spurs men on to achievement is the deep urge to be rid of the commands once laid on them" (Canetti, 1962).

The "sting" is therefore a device whose goal is to free the command's recipient of a deference order and thereby make the relationship 'equal'. Twenty-one years after Canetti (1962) first penned Crowds and Power , the United States Air Force finds itself facing the challenges of downsizing, cost-force reduction, globalization, and socio-politico diversification while simultaneously striving to implement quality initiatives. The metaphorical gap between the need for quality and the implementation of quality has not gone unnoticed. As Richard Johnson (1993), author of TQM: Leadership for the Quality Transformation, suggests:

> "...the Department of Defense (DOD) has, for several years, realized a need for quality through a TQM process. The Armed Forces cannot be supplied with quality, cost-competitive products that last and win wars without TQM. Realizing the need for TQM, however, is different from implementing a program that ensures every DOD employee is working on quality improvement." (p.73)

The inherent "sting" in the quality improvement process is the perception that the United States Air Force is commanding quality, a regressive spiral of disproportionate paradoxical intention. As organizational members fight to free themselves from the perceived deference order, thereby making the relationship "equal," the theoretical framework of a quality-based Air Force is called into question and the blueprint of an increasingly transitory foundation is exposed.

Quality principles and concepts, while theoretically sound, are victimized by cultural and linguistic barriers to transferability. The avant garde of the quality movement, born in the spirit of criticism and revolt, have become the heroes and heroines of a powerful anti-quality Air Force subculture.

The purpose of this paper, therefore, is to discuss linguistic and cultural barriers to transferability of quality concepts and principles within diverse organizational cultures with attention to theoretical and postmodern challenges. In Part I, the authors seek to address linguistic barriers within the Air Force Quality Award assessment instrument, the typology of organizational cultures within corporate and military educational institutions, the relationship between postmodernism and quality movements in the arts and sciences, and the reasons for nontransferability between the Air Force Quality Award assessment criteria and unit level participants. In Part II of the paper, the authors take a case study approach, examining the processual development of a Self-Assessment Questionnaire (SAQ) in a Fortune 100 company. The authors discuss the SAQ development process and challenge quality practitioners to overcome linguistic, cultural, and theoretical barriers through the creation and application of quality Air Force concepts at the unit level.

PART I

QUALITY AIR FORCE COMMUNICATION: LINGUISTIC AND CULTURAL BARRIERS TO TRANSFERABILITY

The challenges quality practitioners face within organizations are multifaceted; however, linguistic barriers stigmatize quality transformation and

stifle cultural adaptation. Throughout history, human beings have maintained a position of cultural prominence as time-binders and language, the tool of time-binding, has maintained a position of interdisciplinary prominence. We need look no further than the time-honored Sapir-Whorf hypothesis, or the principle of linguistic relativity. The Sapir-Whorf hypothesis suggests that language reflects thought processes and thoughts shape and reinforce attitudes, beliefs, and behavior. The "language of quality," therefore, has a profound influence on the adoption or the avoidance of quality concepts. The language of quality is defined as expressions used to denote quality or words with connotations and intensional significance associated exclusively with quality (Gray, 1993).

Linguistic barriers tend to overshadow the theoretical and practical significance of quality principles and concepts. As a result, the quality movement is resisted at the semantic level and maturation at higher levels of abstraction is subverted. Once this linguistic negativity pervades the organizational culture and is communicated, organizational members adapt their behavior to meet the imposed expectations, exacerbating problems, increasing resistance, and further deteriorating the principles and concepts traditionally associated with quality transformation. Likewise, as resistance within an anti-quality subculture increases, quality practitioners continually find themselves defending the transferability of the theoretical framework of the quality movement to the military culture. As a result, implementation of conceptually sound quality principles and concepts leads only to the decay of the cultural fabric of the organization. Cultural enervation becomes the by-product of linguistic sabotage.

THE THEORETICAL DISCONNECT: PERSPECTIVES ON QUALITY AIR FORCE COMMUNICATION

The creation of culturally-appropriate management structures within the parameters of a quality Air Force as defined by informational, military, socio-politico, and economic centers of gravity is not easily conceived. There is obvious value in embracing a variety of theoretical perspectives, since each makes potentially unique contributions to an overall understanding of communication in organizations. Given the complexity of human communication and the challenge of creating a quality Air Force culture, it is suggested that one refrain from advocating the general superiority of any one perspective over another. Instead:

> "...we need to be aware of what questions are askable, and hence, answerable within that perspective. We need to know what questions are unaskable and, hence, unanswerable as well. We need to know what we need to know and how to utilize the perspective that will be the most likely one to lead us to that knowledge." (Fisher, 1978, p. 323)

In the quest for quality, we have created the perception that we are "commanding" quality, creating a paradox of disproportionate magnitude that threatens to destroy quality of both life and work. By embracing a deterministic and mechanistic theoretical perspective, the quality movement has created an enemy within -- an enemy unknown to the observer, overlooked by the creator, and ignored by the practitioner; an enemy driven by the method rather than the question. In the search for knowledge, we have allowed static words to represent dynamic processes, and we have used pre-scientific linear structures to express non-elementalistic ideas. The "if you cannot measure it you cannot control it" syndrome

nonrationally assumes the predominance of prediction over persuasion, substance over symbolism, and control over culture.

The authors purport that research, application, and implementation in quality transformation espouses, either explicitly or implicitly, a particular theoretical perspective. This view shapes the way people view an organizational culture and the way they interpret what they see. The following discussion, guided by the work of the late B. Aubrey Fisher (1978), demonstrates how the essence of a quality Air Force culture changes, sometimes subtly and sometimes dramatically, depending upon the theoretical perspective endorsed. The discussion further servers as a reminder: The questions we choose to explore, problems we choose to attack, processes we choose to improve, and the methods we use to analyze our data are direct extensions of the perspectives we use to view human communication within cultural arenas.

Fisher (1978) suggested that organizational members and leaders view the world through four primary perspectives. The manager, leader, or commander who insists, "_____ just doesn't listen to me. I sent him that message several days ago" exemplifies the *mechanistic* approach to communication within an organizational culture. From this perspective, a quality Air Force culture is created through communication -- a materialistic substance that travels through computers, memos, telephones, and other concrete substances. From this perspective, communication within a cultural arena is viewed as a transmission process, with component "parts" such as senders, receivers, messages, channels, and feedback.

In contrast, those who view the communication and creation of a quality Air Force culture from a *psychological* perspective concentrate on the perceptions of the

receiver. Cultural adaptation and quality transformation, in this perspective, stems from adapting one's needs to meet the values and attitudes of the respondent. Those who operate from this perspective center on the cognitions and personality traits of organizational members.

Rarely do managers, leaders, and commanders have conceptualizations grounded in the *interpretive-symbolic* perspective. If they did, they would concentrate on how organizational members interpret the events in their organizational environment and how he or she influences the consensual meanings that organizational members socially construct. In the interpretive-symbolic approach, messages are not the basis for understanding communication; messages do not "link" or couple organizational members. Messages simply activate culturally based rules or assumptions which, in turn, function to bond organizational members. Those who espouse this perspective:

> " focus on symbols, but not as artifacts of the organization; rather, they attempt to decipher how these symbols represent the ways individuals socially construct their organization life." (Krone, Jablin, & Putnam, 1987, p. 38)

Finally, in the *systems-interaction* view of the creation and communication of an quality Air Force culture, managers and leaders concentrate on the patterns, routines, and sequences of interaction that define their relationships with others. They realize that these patterns can become self-sustaining over time since they are typically not in our awareness. Practitioners make sequential behaviors and message patterns the primary focus of their investigations. They aim to determine

how individuals get into ruts and routines through the way message patterns define their organizational environment.

It has been fifteen years since the late B. Aubrey Fisher first proposed what has become known as "Fisher's Four Perspectives," an examination of the four basic conceptual approaches to the study of human communication. It has been twenty-one years since David Silverman published his "Theory of Organizations", seminal in stimulating alternatives to positivist and managerialist organizational thought. The notions of organizational membership and management have faded as organizations without boundaries, networks and global organizations, chaotic intersections of old and new organizations, temporary and fluid ways of organizing have moved to the forefront of organizational theory. The new organizational forms of postindustrial society challenge the nostalgic image of the meaningful organization. Contemporary organizational discourse now involves the deployment of terms such as organizational culture, sexuality, symbolism, postmodernity and multi-paradigmatic.

Perhaps a "quality Air Force" has been conceived within the paradigm of an already past industrial society, searching for meaningful totalities and tacit systems capable of guiding, controlling and coordinating organizational life. If postindustrial society is characterized by fluidity, fragmentation, turbulence and ambiguity, what becomes of a quality-based Air Force approach that is perceived as nothing more than the newest "commander's kit-bag"- transcending theories X, Y, and Z, and revolutionizing the never-to-be-forgotten Management By Objective (MBO)? To be a quality Air Force, we must go beyond the quantification of a culture via histograms, scatter plots, and pareto diagrams to the qualitative analysis of organizational cultures. The metaphor of the machine is dead. Organizational life

can no longer be defined in terms of the instrumentality, goal-directedness, rationality, regularity and productive capacity of a machine. Organizational anthropology provides a characteristically holistic approach which transcends predominantly management-centered analyses to the building of culturally-appropriate management structures. The building of culturally appropriate management structures becomes more visible if the examine artistry of a quality Air Force. Specifically, as we study quality principles and concepts, modernist and postmodernist tendencies move to the forefront.

POSTMODERN PERSPECTIVES ON QUALITY AIR FORCE COMMUNICATION

It may be suggested that the US military sets standards of achievement for the culture; therefore, as the Air Force strives to implement quality, it serves as a design laboratory for the whole society. However, the US military, specifically the US Air Force, must meet and challenge the standards of achievement set forth by an even greater entity - The Arts. It is a widely held premise that "the arts" do not often cause change, but they reflect shifts in the fabric of society long before most people are aware of that change (Park, 1989). Art reminds us that change is inevitable; that life will never be the same. As we strive for a quality force structure, we find ourselves forming judgments based on the only criterion left - radical newness. If we listen to Trachtenberg (1985), we can learn much about the relationship between art and quality, for both:

> "...describe a sensibility, a feeling for innovation, for experiment with conventional ways of framing experience so that is at once removed from recognizable relationships and from the locations in which they exist..." (p.4)

In the mid-1800's, for example, the culture shifted from and agricultural base to an industrial base. With the advent of industrialization, society witnessed the growth of cities, the mass production of goods, the establishment of scientific methodology, and the birth of democratic institutions. Change was reflected in the works of Van Gogh, Monet, Manet, and other Impressionist painters who used primary, unmixed colors to evoke subjective and sensory impressions rather than attempting to recreate an objective reality. The Impressionists evoked truth to Nature and aspired to quality, aesthetic value, and excellence for its own sake. Art, which had traditionally served as a "sense making" mechanism, functioning as a record of religious and historical events, became free to look into its own nature. (Russell, !981). The US military, more specifically the US Air Force, faces similar challenge. No longer can the organization function as a mere record, scapegoating both the system and its peoples. The US Air Force, in its quest for quality, must instead look at its own nature while aspiring to quality, aesthetic value, and excellence within the force structure.

A quality Air Force culture has much to learn from the arts; however, we must force artists out of art's ivory tower and allow them to contribute to change in every day life"(Huyssen, 1986) Just as Degas, Cezanne, and Gaugin manipulated artistic tools such as color, canvas, and brush to transform the "real" world into a fictive representation, so too do we find ourselves manipulating words, subjects, and methods to transform the "military mindset" into a "quality conception." We have the potential to create a colorful, meaningful, vibrant image that is, not unlike Impressionist works, elusive to the eye. We must, however, ask and answer the critical questions if we are to create a quality force. As Trachenburg suggests:

"...it will be necessary first to determine whether it makes itself known primarily as a method, a philosophy, and attitude, a tonality, a subject, a theme, or even some characteristic concerns. What questions does it ask and what answers... does it propose. What tactical strategies does it adopt, what risks does it take in implementing them, and what relations does it propose..." (Trachtenberg, 1985, p. 4)

PART II

THE EVOLUTION OF A SELF ASSESSMENT QUESTIONNAIRE IN A FORTUNE 100 COMPANY: A CASE STUDY

We have to grant quality its moral dimension...It should be recognized as a virtue - something to be sought for its own sake - not just a profitable strategy.

Quality: America's Guide to Excellence
Winter, 1987

Quality has become the watchword of the 90's, with companies across the globe implementing quality initiatives while striving to achieve increased productivity through empowerment and innovation. Throughout the world, quality has become a way of life - a rite of passage for those organizations wanting to survive in a turbulent social, technological, and political cultural climate. For those companies choosing to embark on this long journey, there are numerous and difficult choices to be made. One wholely-owned subsidiary of a Fortune 100 company stepped up to the challenge...or so it seemed.

A financial service company, one of the top 15 in the world in leasing, with some 400 employees averaging 35+ years of age in a mid-sized, industrially-based, midwestern town, went from "What is quality?" to "Why do we have a quality director?" In February of 1992, the company appointed a Director of Quality, a 5-year employee of the company with a background in accounting, financial leasing, and management. The newly appointed director, not a political power player, was chosen on the basis of previous job performance and training in quality management. Enthusiastic and committed to quality principles and concepts, the newly appointed director hesitated to accept the appointment on the basis of previous experience. In the last year, he had lead several projects in which "quality" was being exercised, through action more than through words. However, critical and creative thinking was not being rewarded, and the "quality" catch word was already bedeviled by negative connotations. Still he accepted the position as Director of Quality with the hope that the dynamics of change would prevail. Within a matter of months, a thorough needs assessment had been conducted - an assessment in which the elements of commitment and motivation became more clearly defined. Within the context of this analysis, it became clear that the catalyst behind the quality movement was not a company's collective success but rather an individual's personal gain.

Despite the obvious complications the charge, as directed and determined by senior leadership, was to meet or exceed the Malcom Baldrige National Quality Award Criteria (MBNQA). This was to be accomplished via a previously created, corporate-wide, context specific variation on the MBNQA called the "6 Sigma Challenge". The first step, therefore, was to establish a baseline (i.e. analysis of the current state of the state) through self report data. The "6 Sigma Challenge" self assessment questionnaire was both the preferred and the predetermined feedback

mechanism. However, linguistic, cultural, theoretical and political barriers to transferability frustrated organizational members while presenting seemingly insurmountable road blocks. At the application level, the process had not progressed along the knowledge-comprehension-application-synthesis scale. The question had become not "Can quality thrive in the face of such turmoil?" but rather "Can quality survive in the face of such turmoil?

In effort to overcome problems of language, culture, and theory, improvement efforts began with a refocusing of the self assessment process. This Four Step process is explained in Table 1 (See Table 1). To further clarify the self assessment process, a transactional model was developed (See Figure 1). This model represents the four primary phases involved in the "6 Sigma Quality Challenge" self assessment: 1) Planning the self assessment, 2) Conducting the self assessment, 3) Reporting the self assessment, and 4) Corrective Action.

SUMMARY

This analysis bridges interdisciplinary gaps between Air Force and corporate quality cultures by demonstrating that linguistic and cultural barriers tend to overshadow the theoretical and practical significance of quality principles and concepts. As a result, the quality movement is resisted, sometimes sabotaged, and maturation at higher levels of abstraction is subverted. Quality practitioners continually find themselves defending the transferability of the theoretical framework of the quality movement to military and service cultures. As a result, implementation of conceptually sound quality principles and concepts leads only to the decay of the cultural fabric of the organization. In the quest for quality, we have created the perception that we are "commanding" quality, creating a paradox of

disproportionate magnitude that threatens to destroy quality of both life and work. The authors suggest that theoretical disconnects occur as a result of attempts to quantify organizational cultures and challenge the US Air Force to meet and exceed the standards of achievement set forth by an even greater entity - The Arts.

Table One

The Self Assessment Process

Phase One - Planning the Self Assessment
The purpose of this phase is to create a plan for the self assessment process. The primary tasks are:

1. Identify Category Champions
2. Form Assessment Teams by category
3. Educate and Train Category Champions and Team Members
4. Develop Assessment Mechanisms
    - Questionnaire
    - Interviews
5. Data Collection Plan

Phase Two - Conducting the Assessment
The purpose of this phase is to gather and summarize the information needed to assess the relationship between organizational standards and 6 Six sigma Quality Challenge criteria. The major tasks include:

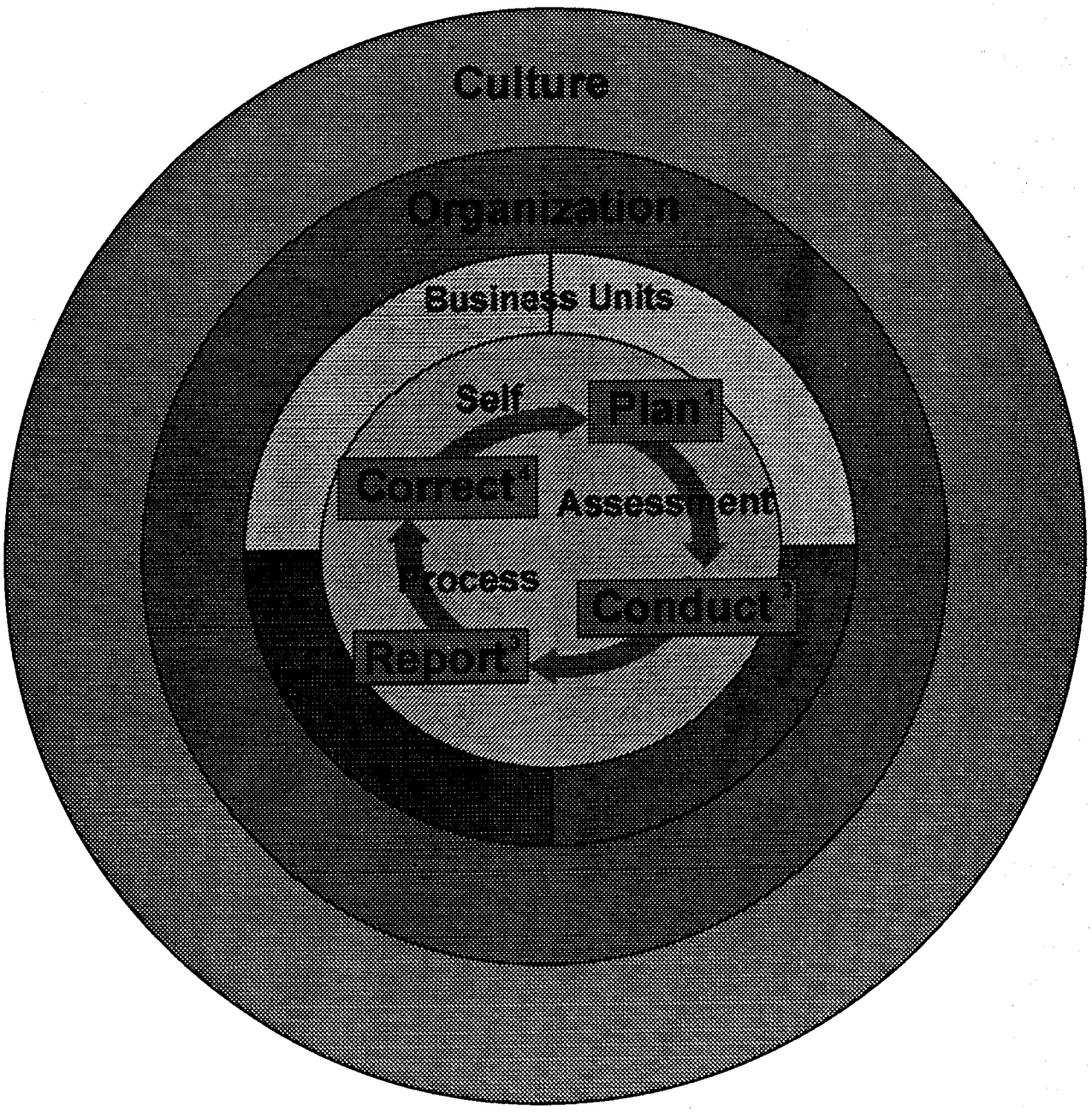
1. Gather and Document the Data
2. Summarize the Data
3. Evalute and Score
    - Indicator
    - Area to Address
    - Examination Item
    - Category

Phase Three - Report of Assessment
The purpose of this is to report the findings to senior management

Phase Four - Corrective Action
The purpose of this phase is to develop an action plan that will provide quality direction for the organization, its people and its culture.

FIGURE ONE

TRANSACTIONAL MODEL
FOR MBNQA
SELF-ASSESSMENT PROCESS



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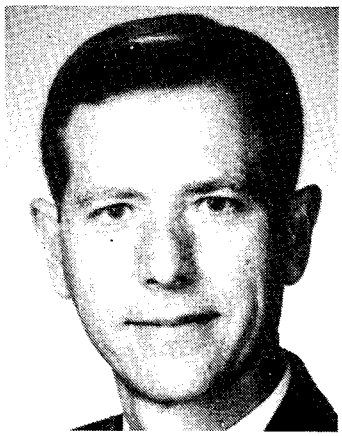
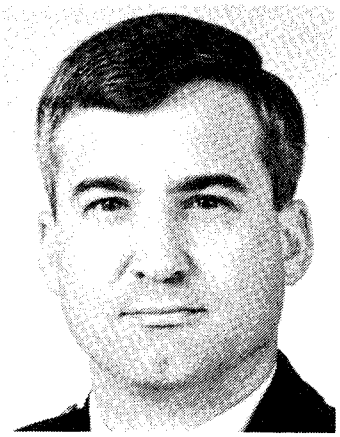
THE HQ AMC/IG QAFA PROCESS - IMPLEMENTATION OF THE QUALITY AIR FORCE CRITERIA



Lt Col Richard Mallahan



Lt Col Erwin Lessel

The HQ AMC/IG QAFA Process - Implementation of the Quality Air Force Criteria

by Col (sel) Richard A. Mallahan and Lt Col Erwin F. Lessel III

Introduction

During this past year the Headquarters Air Mobility Command Inspector General (HQ AMC/IG) has designed a new process for conducting Quality Air Force Assessments (QAFA). The current QAFA assesses unit leadership, mission performance, and combat readiness using the Quality Air Force (QAF) Criteria. The evolution of the IG assessment process during the past 3 years is discussed first as background information. A description of the primary purposes for the QAFA and the advantages of using the QAF Criteria then provides a framework for the specific details of the current QAFA process. Next, the assessment methodology is explained in terms of pre-visit, visit, and post-visit activities. Based on our brief experience with the criteria and the insight gained, we present lessons learned, current issues, and future plans. It is hoped that this information will improve the general understanding of the AMC QAFA process and the significant advantages offered by the use of QAF Criteria for assessment and improvement.

History/Background

Prior to August 1990 the Military Airlift Command IG Team conducted Unit Effectiveness Inspections (UEI) using extensive checklists based on compliance with a multitude of regulations and directives. With the rise of QAF initiatives, the inspection format was changed in January 1991 to a new Quality Visit (QV) program based on the Federal Quality Institute's Quality Improvement Prototype Award Criteria. The QVs became a vehicle for command movement toward a Quality-based culture.

Real movement within AMC toward a structured use of the Malcolm Baldrige National Award Criteria began in October 1992. The IG selected 40 members to attend Baldrige training offered by the American Society for Quality Control (ASQC). The 3-day program held at Scott AFB concentrated on understanding the criteria and consensus procedures, and applying the scoring guidelines. Immediately following this training, a process action team (PAT) was formed to integrate the Baldrige Criteria into the AMC QAFA process. Four weeks later the IG approved PAT recommendations for conducting the first QAFA using the criteria in December 1992 for the 317 AW and the Air Mobility Center at Pope AFB. Unlike previous assessments, this "new-look" QAFA depended heavily on the hard work and efforts of unit personnel in conducting their unit self assessments (USA). The 317AW Chief of Quality attended the IG Baldrige training session and then taught a cadre of unit personnel to prepare for the visit. Both IG and unit feedback from the QAFA validated the use of the Baldrige Criteria and the success of the new QAFA process.

Following initial QAFA validation, the IG conducted an internal self-assessment in February 1993 using the Baldrige Criteria. This USA helped train IG personnel in understanding and applying the criteria, encouraged active involvement by senior IG leaders familiarizing them with the criteria, and identified opportunities for future improvements within the IG. This effort proved extremely successful in getting the entire IG team involved with the new QAFA procedures and in highlighting some of the difficulties units may experience when using the Baldrige Criteria. Of most importance was the significant amount of time and effort expended by a unit in conducting a USA. The IG team, as it prepares for its second self-assessment, is finding that familiarity with the criteria, feedback from the last assessment, and using last year's USA report as a baseline, will significantly reduce the time required to conduct our next assessment.

The Baldrige Criteria was used through February 1993 at which time the Air Force codified the Baldrige Criteria (with minimal change) as the new QAF Criteria. Since its inception, AMC has now conducted 13 QAFAs using this criteria. The new QAFA format is proving to be an extremely effective, structured, and common-sense approach to assessing and improving unit mission performance and combat capability.

Purpose

The purpose of QAFAs is to assess and improve the unit's mission capability and performance. This is done by using two groups of inspectors using the QAF Criteria while performing the following three functions: validating the unit's self-assessment, conducting a Staff Assistance Visit (helping improve the unit), and inspecting compliance areas (special interest items and functions governed by local, state, and federal laws). The command is currently in the process of aligning Aircrew Standardization Evaluation Visits (ASEV) conducted by the Numbered Air Forces (NAF) with the QAFA.

Use of the QAF Criteria in the assessment focuses the inspection on several areas neglected in previous UEI and QV assessments. It places attention on leadership commitment; examines operational results; uses fact-based decision making; focuses on long-term continuous improvements; encourages teamwork; and provides an overall systematic approach to conducting the assessment. Evidence indicates that the QAFA goal of accurately assessing performance and readiness is significantly enhanced using this new approach.

Methodology

The methodology described below is the result of almost 1 year of experience in using the Baldrige/QAF Criteria.

Team Composition.

The size and composition of the team is tailored for each assessment based on the unit's mission, breadth of functional areas, and specific needs. Unit needs and requirements are determined by

the team chief during an advance (ADVON) visit conducted 60 days prior to the QAFA. An average team is composed of 42 members (including augmentees): one team chief; an assessment group (AG) with 10 members (7 category chiefs and 3 alternates/trainees); a functional improvement group (FIG) with 29 members (include 3 compliance inspectors for safety, environment, and contracting areas); and 2 administrative assistants. On average, six observers from outside the IG accompany the team on each assessment. Additional personnel, such as command Quality instructors, can be requested by the unit commander to assist with specific unit issues.

The team chief, normally a colonel (division or branch chief), conducts the ADVON visit, leads the two major assessment and improvement groups, conducts IG personal conferences, and participates in the unit's outbrief to the NAF commander. The AG members are the team's most experienced assessors, familiar in detail with the criteria and scoring process. These members are responsible for validating the unit's self-assessment report, investigating site visit issues, identifying strengths and areas for improvement, and developing next-step recommendations. The FIG members are fully trained in the QAF Criteria and are functional area experts. Their purpose is to work functional issues at the squadron level, identify crosstell and systemic issues, validate compliance with special interest items (SII) and The Inspector General (TIG) briefs; ensure compliance with federal, state, and local laws; and assist the AGs by gathering additional criteria-related information.

Pre-Visit.

Units are notified of upcoming QAFA visits up to 1 year in advance via a "target month" message and a 6-month "window" letter from the IG. At 120 days prior to the QAFA, a formal letter is sent to units notifying them of specific QAFA dates and requesting the unit to conduct a USA and forward the results to the IG no later than 30 days prior to the visit. The unit's submission is based on the QAF Criteria and uses the same format as Malcolm Baldrige and SECAF Quality Award submissions. At 60 days prior to the team's arrival, the team chief completes an ADVON visit with the unit to explain the QAFA process, detail specific IG requirements, and solicit unit issues and problems beyond unit control. This meeting serves to accurately align all customer/supplier needs and requirements to help ensure a productive QAFA visit.

When the IG receives the USA report 30 days in advance, copies are provided to all team members for scoring and visit preparation. The seven category chiefs normally begin trip preparations 2 weeks prior to departure while FIG preparation is completed within 1 week of the visit. The AGs spend approximately of 30 hours reviewing the report, identifying strengths and areas for improvement, and preparing site visit issues. During the week prior to departure, QAFA team members attend several meetings: a 4-5 hour consensus meeting by the AGs to score the report, additional Quality/criteria training sessions for all team members and augmentees, an AG-FIG meeting to discuss site visit issues (SVIs) and crosstell items, and a predeparture meeting to discuss administrative details.

Once the AGs identify SVIs for their category, the SVIs are collected and faxed to the unit 1 week prior to assist the unit in gathering additional data for the QAFA visit. Also prior to

departure, each FIG contacts counterparts in the squadrons they will visit to establish a schedule and agenda for meetings during the QAFA. This early contact helps the unit prepare additional data on specific SVIs. Additionally, individual FIGs are assigned as principal investigators for each SII, TIG interest item, or command issue.

Visit.

The QAFA visit takes 9 days from team arrival to the final unit outbriefing. The team normally arrives at the unit on a Sunday afternoon and departs the following Sunday--6 working days and 2 travel days (only the team chief remains for the outbriefing scheduled for Monday morning after team departure). Upon arrival at the host base, the assessed unit conducts a short inbriefing that includes key personnel introductions, appointment schedules, and local safety procedures. This meeting is followed by a short IG administrative session to review schedules, transportation, and lodging.

During the first 3 days (Monday - Wednesday) the AGs meet with the unit category points of contact (POC) and other unit personnel to investigate SVIs and collect additional data not identified in the USA. The team philosophy is to gather information about the unit that may have been overlooked in compiling the USA. This is important to note because the IG's key customer, the AMC Commander, requires an accurate assessment of the unit's operational readiness and mission capabilities. Until all units have an adequate understanding of the criteria and how it applies, it is incumbent on the IG, in the short term, to aid units' understanding and application of the criteria.

The primary effort for the FIGs on Monday and Tuesday is gathering and analyzing additional information for the AG developed SVIs determined from the USA. This requires each FIG to have a thorough knowledge of the criteria and the USA. The information is then provided to the AGs verbally at daily team meetings and in writing on a FIG worksheet. Data is used by the AGs in drafting their reports and for support during the consensus process. On Wednesday and Thursday morning, the FIGs work to validate SIIs, TIG interest items, compliance areas, identify systemic issues and crosstell, and attend unit Quality team meetings. As this work is completed, FIG emphasis is then placed on improvement efforts at the unit level within their functional areas.

By noon on Thursday the AGs are required to submit initial drafts of their category strengths and areas for improvement. These drafts provide a basis for the afternoon scoring consensus meeting, a 5-7 hour session to discuss site visit findings and to consense scores. The consensus meeting is open to the unit and attendance is encouraged for three reasons. In addition to arriving at a score, the consensus is a useful educational tool for learning about the unit's strengths and areas for improvement, it is an excellent source of crosstell for good ideas within the unit, and it provides a better understanding of the QAF Criteria and how to apply the scoring guidelines. While the AGs consense, the FIGs review the AG initial drafts and begin writing their report inputs based on information gathered on Wednesday and Thursday. The administrative assistants spend Thursday afternoon compiling the FIG inputs into the final report.

Thursday evening following consensus, the AGs revise their draft writeups based on team chief and FIG review of the draft reports and changes identified during consensus. It is important to note that if new, vital information is discovered late in the process, specific items of the criteria can be reconsensed and portions of the report rewritten. The final AG written assessments are provided to the administrative assistants by Friday morning.

Throughout Friday the administrative assistants work to complete a final draft of the QAFA report. The report includes an executive summary, the unit's self-assessment with IG-identified strengths, areas for improvement and recommendations, compliance areas; SIIs, systemic issues, and crosstell. While the QAFA scores are not included in the report, they are provided to unit commanders for their QAFA outbriefs to the NAF commander and are available from the IG for unit comparison and benchmarking purposes. During the QAFA visit, units are provided a score profile that provides high, low, and average percentiles for each item and category points for all QAFAs to date.

For the FIGs, Friday is specifically set aside to help individual functional areas with improvement efforts. Areas addressed can and do frequently include reviews of key processes (e.g., training, scheduling, operations, etc.), systemic issues (not unit controlled), Quality improvement efforts (e.g., metrics, strategic planning, training), and discussion of crosstell information. Throughout the week, the FIGs provide continual feedback to units on their observations and recommendations for improvement. To the maximum extent possible, FIGs attempt to crosstell good ideas observed during other assessments and from personal experiences.

On Saturday, the final workday of the QAFA, the team conducts a final review of the QAFA report and holds an internal IG "hot wash" to improve the QAFA process. The "hot wash" includes an internal IG survey of team members and identifies areas for improvement. Survey data and "hot wash" minutes are forwarded to the IG's full-time QAFA working group for inclusion in QAFA metrics and future process improvements. On Saturday afternoon the QAFA report is finalized and copies reproduced for distribution. Additionally, the unit is provided a QAFA survey to provide feedback on how well the visit helped the unit improve its performance and on the usefulness of IG recommendations.

Although the team departs on Sunday, the team chief remains for the unit commander's outbrief scheduled for Monday morning. The unit commander delivers this briefing to the NAF commander. The briefing includes summaries of the unit's self-assessment, significant mission challenges, the impact of Quality on mission capability, higher headquarters issues, the HQ AMC/IG team's performance, and value added to the unit by the QAFA process. The team chief's outbrief follows unit commander comments and includes the team's assessment, higher headquarters issues, success stories, systemic issues and presents Outstanding Performance Certificates to the unit.

Post Visit.

Once the formal visit is completed, IG efforts continue through the crosstell of information and QAFA process improvements. The QAFA report is distributed throughout the command and to

appropriate outside organizations to provide feedback, crosstell, and potential benchmarks. Crosstell information identified in the report is added to the AMC electronic bulletin board for wider dissemination. Systemic issues requiring command involvement are assigned a HQ AMC office of primary responsibility (OPR) and responses tracked by the IG. The IG selects significant higher headquarters issues for briefing to the AMC Commander in conjunction with ORI outbriefings. Thirty days after the QAFA, the IG receives the unit survey that provides additional feedback on the value of IG improvements and recommendations.

In order to ensure follow-up action is taken on the many QAFA process improvement recommendations, a QAFA working group was established to continuously monitor the QAFA process, take corrective and preventive actions, manage the flow of feedback information, and trend QAFA metrics. The working group is empowered by the process owner to adjust all internal subprocesses to optimize external and internal customer satisfaction.

Lessons Learned

While the AMC QAFA process using the QAF Criteria is less than 1 year old, the IG has observed extremely positive results from the use of this structured, Quality approach to assessing unit performance and readiness. The following observations are drawn from our experience conducting 13 QAFAs:

- The new style QAFA is a significant improvement over older style inspections. The current assessment focuses on results and key processes, rather than compliance; proactive leadership rather than reactive management; fact-based rather than "seat of the pants" decision making; and long-term improvement rather than short-term success.

- Use of QAF Criteria helps to standardize assessments so that USAs, QAFAs, SECAF Award packages, and soon, Presidential Quality Award packages, all use the same criteria, format, and standards. In the long run, this standardization will help improve the efficiency and effectiveness of unit assessment and improvement efforts.

- The criteria provides an effective, structured approach for conducting Air Force assessments. The AMC QAFA process clearly focuses on performance results and combat readiness, not on Quality for Quality's sake, as did the QV. When understood, the approach is popular at all unit levels by personnel of all ranks and positions.

- Unlike preparing for an old-style inspection, units cannot wait until the last minute to prepare for a QAF Criteria-based assessment. Long-term, consistent, and continuous effort is the only means to achieve success.

- Unit self-assessments are an indispensable tool for internal unit improvement efforts and as the primary source of information for the QAFA. The key to a good unit self-assessment under the QAF Criteria is proper structuring of the self-assessment team.

- The QAFA need not only focus on a QAF Criteria assessment, but can also serve as a vehicle for unit improvement efforts, compliance inspections (e.g., safety, environment, contracting), and as a method for identifying crosstell information and systemic problems.

- Greater IG and unit openness has eliminated the old style "adversarial" relationship resulting in enhanced communications, greater cooperation, and teamwork focused on improvement.

- The institution of a QAFA working group within the IG to continuously manage, monitor, and improve the QAFA process has significantly enhanced QAFA improvements, unit satisfaction, and IG team member performance.

Future Plans and Issues

As the AMC IG strives to continually improve the QAFA process, there are a number of current issues and future initiatives under review and consideration.

- In an effort to reduce the frequency of headquarters inspection visits per year to each unit, the command has combined QAFAs and ASEVs to the extent that they are conducted at approximately the same time. The IG has already conducted three QAFAs with this format and will continue to phase in this approach over the next 2 years. Early indications show this scheduling method can benefit all involved organizations.

- The IG has the goal of improving the efficiency and productivity of the QAFA team while at the unit. To reduce costs, we are attempting to shorten the report writing cycle time so the team can return home 1 day earlier. Efforts are underway to increase the productivity of FIG data collection and possibly reduce the number of team members.

- A future area of focus for the IG is the more effective crosstell of good ideas and comparative information. An IG customer survey indicated that the number one requirement of AMC units is the need for the improved flow of crosstell information. The IG is attempting to distribute this information in more meaningful, user-friendly formats and improve the quality of comparative crosstell information. Continued feedback to and from our customers and improvements to our electronic bulletin board will aid this effort.

- In order to improve the usefulness and readability of the QAFA report, the IG is placing emphasis on reducing the report size, improving the report format, and changing to an electronic media for report distribution.

- While the IG is currently conducting new-style QAFAs for all active duty units and has just begun using this format for ANG-gained units (two QAFAs completed), our desire is to include AFRES-gained units in the future. This will be especially beneficial to those wings with Reserve associate units.

- Command leading units are just now beginning to formalize metric programs and collect comparative information. Based on our observations, significant command improvements to productivity and combat readiness could result from standardized and comprehensive metrics, comparison, and benchmarking programs.

- In order to standardize and baseline QAFA scoring, the IG is developing internal metrics to monitor scores and trends for each unit and individual assessors. Additionally, we are using two Air Force Quality Center case studies to compare IG scoring with that of Baldrige examiners. The next step will be to standardize IG scoring with the Air Force and other MAJCOMs by comparing scores from the SECAF Quality Award nomination packages.

Conclusion

Quality is the result of good leadership. The purpose of the AMC QAFA is to effectively assess the results of leadership and its impact on mission performance and combat readiness. The QAF Criteria has potential to be the best possible and most cost-effective measurement for commanders to determine how well their units can perform in wartime or peace.

To date, the AMC IG has conducted more than 13 QAFAs of active duty and ANG units using the QAF Criteria. From the IG perspective, the criteria provides a very usable, well-structured assessment tool. Unlike the UEI and QV days of old, the current QAFA emphasizes results, not just compliance or Quality for their own sake. The new format permits greater openness and teamwork between the IG and the unit in achieving the common goals of accurate assessment and improvement.

Standardized use of the QAF Criteria will benefit all future users since programs such as Air Force USAs, QAFAs, SECAF Quality Award, and other government programs use this criteria for assessment and improvement. In the early stages of QAF Criteria implementation, the effort expended by assessed units is time consuming and labor intensive. However, as units become more proficient in applying the criteria and conducting a USA, the reduction of time and effort will be significant. Of more importance, there will be a marked increase in its usefulness to commanders as a tool for continuous improvement.

With AMC's current QAFA process, what a great feeling it is for the IG to say "we're glad to be here" and for the unit to say "we're glad you're here" -- and everyone really mean it!

IMPROVING ENVIRONMENTAL MANAGEMENT BY OBTAINING AND USING CUSTOMER FEEDBACK

Lawrence Bailey

Charles Walters

COVER SHEET

Improving Environmental Management By Obtaining and Using Customer Feedback

a paper for
presentation at the

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Better customer service through Total Quality training is the key to realizing the Air Force vision of building the world's most respected air and space force."

-- Gen. Ronald Yates, commander
Air Force Materiel Command

(Speaking at Southwest Regional Quality Conference, San Antonio, Texas, Aug. 4, 1993).

Improving Environmental Management By Obtaining and Using Customer Feedback

The purpose of this paper is to tell how the Environmental Management staff of Kelly Air Force Base changed their communication behaviors to secure and apply timely customer feedback.

Back in the 1980s, the functions now performed by the Environmental Management Directorate were spread over several multiple organizations within the San Antonio Air Logistics Center. Each organization had its own distinct goals and its own agenda to pursue. Relationships between the base and the regulatory community were reactive and confrontational. By virtue of its size -- the largest DOD industrial complex in the Southwestern part of the U.S. -- and its long years of operation, the general public considered Kelly AFB to be one of the worst sites of industrial contamination in the state and, perhaps, in the nation. Skeptical news media, the community and the Kelly work force all accepted the image without question, while any claim to the contrary was met with suspicious disbelief.

Environmental functions recognized only one sole customer, the industrial plant and its mission requirements. Information about environmental processes was not routinely shared and little effort was made to educate the community or the regulators about environmental programs on the base. When efforts were made to communicate with the public, they were invariably one way messages to tell what had been done with few details and no opportunity for public comment.

The environmental regulatory community consists of agencies at both the state and federal level. Principal involvement and direction comes primarily from two state agencies -- the Texas Water Commission and Texas Air Control Board -- which became the Texas Natural Resource Conservation Commission on September 1, 1993.

The *regulators have the "power of the pen"* and will use it without prior coordination. The practical effect is that regulators could bring enforcement actions against the base without consulting the base commander, the installation commander or the environmental management director.

The base was vulnerable because it lacked an advocate for environmental issues within the organization or in its relationship with the public.

A long, arduous process was required to bring the pieces together in a single Environmental Management Organization with measurable goals and unity of purpose. When the EM Directorate was created, it was given a dual mission:

- **First, to ensure the base complies with all appropriate environmental laws and regulations.**
- **Second, to educate the maintenance community and institutionalize the concept that an equitable balance can be reached between production and spending monies on environmental requirements.**

As conditions have changed, day-to-day emphases may shift between short range compliance and longer term pollution prevention/waste minimization efforts, but a balance is not only possible, but essential, in pursuing the two facets of the mission. Although requirements sometimes appear as competitors for the same resources, the two mission objectives are not mutually exclusive.

The dual faceted mission acknowledged -- and gave precedence to -- a new customer. Compliance can only be achieved when the regulators are satisfied. To place compliance first also accepts the reality that the Air Force provides no shield for the environmental "sins" of managers and workers. If poor decisions or negligence violates environmental laws, the first customer (the regulator) can present the environmental management staff and its second customer (the industrial managers of the base) with fines, penalties or imprisonment.

Changing the public's perception and establishing communication with regulators and the public represented a transition from one way communication to constructive dialogue toward a common goal. Results come slowly, continuous effort is necessary, and you must be committed to making the process work. You can't half-step your way through it.

Beginning in the late 1980s, the initiative became more focused and positive results started to appear. This was a direct result of creating a distinct Environmental Management Organization that placed emphasis on customer feedback.

Everything we do is somehow affected by how we see ourselves, what image and expectations others have about us, and how we are structured to meet the expectations of ourselves and others. The reorganization helped us evaluate ourselves and adapt our efforts to customer desires.

Who we are..

The environmental management organization is a multidisciplinary team of scientists, engineers, administrators and field technicians working in areas from well-drilling and soil sampling to health risk assessment and writing contract specifications. Team members include active duty and federal civilian employees, contractor and subcontractor employees and regulatory agency staff. A staff comprising varied educational and cultural backgrounds offers opportunities for innovative structures and approaches.

The organization has a Director, three Division Chiefs and numerous team leaders. The outcome of this is a highly flattened and streamlined organization. Information flows quickly

from the top to the bottom and vice versa. Complicated environmental issues are surfaced in an accelerated manner and attention is then focused by senior staff.

Environmental Management is a relatively "flat" organization that presents its managers with a wide span of control. This is important because it makes a short flow for information going up or down the management chain. Issues can quickly be surfaced to top management levels and guidance has few filters on its way down. The structure works because the staff are highly motivated professionals who do much of their work independently. "Empowerment" is an accepted way of life for engineers, scientists and environmental protection specialists. The short supervisory chain ensures the access to, and support of, top management, when it's needed. The wide span of control facilitates and encourages delegation of authority.

Values: Integrity, accountability, ownership

A primary value of EM was to ensure its customers recognized that the environmental programs were going to be managed in an up-front, sincere and honest approach. Civility and dealing with negative feedback in a positive way were two behavior traits that would soon become entrenched values of this organization.

It was also recognized by EM that the relationship with the environmental regulatory community was critical, and extensive efforts must be made to gain the confidence and trust of these groups.

Moreover, the EM staff are recruited and later informed of the many professional values that represent the EM organization. Some of these include; being held accountable for their work, being held responsible for doing it right the first time, maintaining credibility with the customers, being honest and genuine, and promoting teamwork whenever possible. These behaviors or values, along with the proper organization and alignment, have allowed Kelly AFB to focus on its three primary groups of customers. These are the environmental regulatory community, the local City of San Antonio community, and the base employees.

Approximately four years ago, certain federal agencies and industries were used as benchmarks in determining how environmental performance was being tracked, measured and improved. Feedback and material from that effort resulted in all of EM's performance standards being rewritten to highlight the process and what was expected and needed to meet certain standards.

This was an attempt to eliminate the prominent technique of annually using only -- or mostly -- quantifiable techniques to measure someone's performance. At the same time, the employees were routinely seeing only the "fully successful" or "average" standard. No processes or pathways to achieve superior performance were identified. Thus, significant revisions were necessary to strengthen the performance standard concept of evaluating staff. New performance standards were prepared and meetings occur three to four times during the year to discuss each employee's performance. At the beginning of each year, each employee signs a performance standard value statement that identifies that he or she is expected to produce high quality work and products. Superior -- the highest rating -- is achievable, but it is difficult. Additionally, it is the responsibility of each employee to show examples of the quality of work they performed, and he or she is expected to identify any assistance needed to meet career goals.

Our institutional values form a part of performance appraisal, just as they permeate our daily activities. Individual and institutional commitment to those values underlie our credibility. ***Credibility may take five years to gain and five minutes to lose.***

The directorate is a highly effective, visionary organization because of its structure and values. More traditional approaches have been considered from time to time as we reevaluate our performance, but our nontraditional approach continues to get the measurable results that satisfy the customers.

What we do...

The customary "product" of environmental management was empty space, ready to be filled again by the customer's waste. The customer was satisfied when we gave him empty tanks, empty holding areas and a drainpipe with unlimited capacity to accept liquid wastes. The goal was simple: To get the waste out of the work area and reduce or avoid any waste handling constraints that may affect the industrial process.

There's a problem with this traditional view: Environmental concerns were **external to the industrial process** and subordinated to production goals. The waste producer, as customer, **drives** decisions about schedules, quantities, and requirements. Environmental staff in several programs then worked to **satisfy the customer within constraints set by the regulatory community.**

Environmental management in the 1990s is a different proposition. We can identify our **product: Clean Water, Clean Soil, Clean Air, and Protection of Human Health and the Environment**. This is done in concert with the environmental regulatory community.

> **Environmental Management today is a wider function than simple waste disposal.** It involves reducing the quantity and volume of hazardous materials used industrially, identifying and providing substitute materials or processes, and scheduling the movement of industrial waste into the disposal process to optimize treatment capabilities. **The total process culminates in hazardous materials control, on-site waste treatment and safe disposal alternatives that minimize employee exposure to hazardous materials and will eventually allow only clean air and clean water to be released into the environment.**

How we define ourselves is important. In the railroad industry there were those who defined their role as "running a railroad" while others felt their business was transporting people and things: Many railroads went out of business when the airlines and trucking companies came along, but the transportation companies diversified into these new areas and prospered. Their self-image allowed them to change with the needs of the world around them.

Change is an inherent part of daily life. In the area of environmental management, changing standards, changing methods, new technologies and varying emphases all affect the way we do the things we do.

Going back to the definition, our ultimate product is a safe, clean environment. One of our primary goals is "zero discharge," the point at which no hazardous wastes or byproducts leave our facilities to go into landfills, pollute underground or surface waters or escape as air emissions. All customers, along with environmental staff, work aggressively to attain this goal, whenever possible.

Who is really our customer...

Regulators used to be considered "outsiders" whose function intruded upon our routine procedures. And we were seen as "outsiders" to maintenance, production and other direct mission processes. Once they put their waste into the drainpipe or filled their holding area with drums, it was "someone else's problem."

When we consider clean air and clean water as our product and "zero discharge" as our goal, everyone who benefits from our work is a "customer." Citizen groups, individual residents, workers whose health may be affected, and anyone whose taxes fund our program is a "customer."

These customers have already communicated some of their desires to us in the form of environmental legislation. When we fail to adequately satisfy those customer desires, we may have to pay a price. In fact lack of satisfaction and a low level of trust and confidence could result in expensive rework of studies and construction projects, constant oversight, unexpected delays or work stoppages and/or even fines and criminal penalties.

The regulators have their authority as representatives of the people. Their powers are established through the elected officials who produce the legislation on environmental matters. Today, we must acknowledge the regulator's "customer functions" such as specifying how much, to what standard, on what schedule, etc.

> **In the larger sense, our customers are our own workers and our neighbors in the community. Their interests are represented by regulators who, in a very real sense, have become our primary customers when we objectively look at our processes. At the same time, our traditional customers have, in this new way of thinking, a new regard for environmental issues as an inherent part of their processes.**

Are regulators really customers?

The regulatory community **sets requirements** regarding the type and amount of waste to be treated, **standards** to which the waste must be processed, specifies acceptable **methods** for treatment of waste, approves **schedules** for transportation **and final delivery** of processed or unprocessed waste to approved disposal sites, and performs or oversees inspection activities to ensure requirements are met. By its activities, ***the regulator is the "customer"*** for the process.

The industrial plant makes the input of raw materials into the disposal process: Industrial rinse water, liquid wastes, solid waste which must be treated or transported to the satisfaction of the regulator. ***The industrial plant isn't merely a customer; it's also a supplier.***

Implications of this simple change of outlook are dramatic.

When you "satisfy the customer" by making the waste disappear, you simply deal with whatever the "customer" chooses to flush or dump, based solely upon the needs of the industrial process. Identifying the industrial process as a ***"supplier"*** makes it **not only logical, but essential, that decisions regarding the quantity, scheduling, and concentration of inputs into the disposal process be negotiated to achieve maximum efficiency for both processes.** You can't repeatedly overtax your disposal processes to gain the last increment of productivity in your industrial plant. Both must operate efficiently for long term success of your installation.

The increasing stringency of environmental regulations may appear to make the two facets of our dual mission incompatible. But a sound balance must be reached between implement-

ing environmental requirements and the industrial growth of the base. A certain percentage of the industrial workload is being identified for contract purposes in the competitive market. The end result is that Kelly AFB must be as competitive as other potential contractors, while complying with environmental laws.

Investments to introduce environmentally "friendly" alternatives aren't simply an expense. As we help our product directorates research, test and select better alternatives, we're finding that most of them offer benefits such as lower operations and maintenance cost, savings in manpower requirements and reducing the possible exposure to harmful chemicals.

The "do more with less" philosophy has its place in a competitive environment, but we are more concerned with putting the limited dollars we have into those new processes that give the greatest benefit. Instead of simply pushing our systems beyond their limit to avoid new investment costs, we are giving our systems new capacity and reducing the cost of doing business as we implement new environmental requirements.

Our environmental investments protect our ability to compete in the future. Environmental concerns will not go away and standards are still evolving. By communicating with the regulatory customer, we can anticipate the direction that regulatory rule making is taking and position our industrial customers for success now and later.

Accepting the regulatory community as a "customer" and benign waste materials and safe disposal as "products" of the process is an important attitude change for the Air Force. Regulatory **standards are no longer an outside barrier to efficient, timely service** to the customer -- the standards become a benchmark for measuring our "quality."

As an outsider who can hinder or halt the process, the regulator was traditionally told only the barest essential information required to determine whether the product meets the legal requirements. When the regulator is rightly seen as the "customer" or the customer's representative, logic demands that **we give the customer maximum information about the process and encourage the customer to provide input that improves the process or product.**

By objectively looking at what we do and our organizational goal, identifying our customers and taking stock of our "image," we identified a necessary change of attitude and emphasis to improve our performance. The regulators were no longer an irritant or an imposition, they have become a customer. The demands of the industrial "customer" would no longer be absolute, but would be negotiated to optimize our productivity as well as theirs.

Making it happen...

Recognizing the regulatory community as the customer means that customer feedback must be sought. Just because we had new ideas didn't mean that the Texas Water Commission would now flood us with helpful advice and hold meaningful conversations about our mutual interests. To acquire that sort of feedback, someone had to open a conversation.

We needed the feedback, so it was up to us to open the dialogue.

A meeting was scheduled with key members of the TWC staff in Austin and Kelly's EM leadership hit the road.

How do you start?

Here's a distillation of lessons learned from that first session and later meetings with our regulator "customer."

The first meeting is a demonstration of sincere, serious commitment to a process. It's a confidence builder, plain and simple. Trying to do too much, too soon usually won't work. Begin with an explanation of what you do and what your goals are.

When you first meet with your customer, don't dump all your discontents or new ideas on the table. Your first contacts should concentrate simply on opening a dialogue and creating a mutual desire to "smooth the rough edges" so that both can benefit.

Dealing effectively and placing proper focus on customer feedback is a new concept for many regulators and government workers. Expect your customer to come to the first meeting with the list of every mistake or disagreement since you came to your position -- and a critique of your predecessor's major shortcomings. It's normal. It may be uncomfortable, but it's a necessary step in the process. Try to focus on your desire to minimize such incidents and your willingness to cooperate in finding a better way to operate.

Change takes time. Expect your customer to spend several meetings venting past dissatisfaction or telling you about constraints and problems that affect his or her organization. Being a good listener is critical. Listen for underlying themes or recurring irritants. These will help you adapt your approach to your customer's perceptions.

Listening is the most common communication process. We listen more than we speak, read or write. Effective listening helps us adjust our speaking and writing to get our message across. Active, attentive listening also communicates our desire to understand and to engage in a mutual process. Use questions or affirmations to guide your customer back to the goal of cooperating. **Be the patient and supportive "team player" that you, yourself, would want for a partner.**

The old management paradigm stressed control and power, while the new concept is shared ownership of process and empowerment for each team member. Going into the early meetings with the compulsive need to "tell" your message and state your desires may seem like an open, forthright approach. But it can sidetrack the meeting into opposing sides instead of creating an inclusive atmosphere that identifies mutual goals. The object of the meeting isn't to fence off territory and it isn't to "mend fences." The purpose of meeting with your customer is to move the customer inside your fence as a partner in your process.

If your customer goes over a catalog of past sins, try to identify one or two specific things you can do to increase customer satisfaction and build confidence. Then, make sure that everyone in your organizational team understands that those few things are now your priority projects.

Beginning in 1986, when the Environmental Management (EM) Directorate was formed, the relationships between the base and its environmental customers changed. This single organization began quickly to place increased emphasis on all issues raised by its customers. This involved placing equal attention and rigor on what appeared to be the smallest and most inconsequential issues.

Credibility stands or falls on one question: Do you want the feedback or not? At this point, it is essential to give the same serious consideration to requirements that seem impractical or criticisms that you feel are unwarranted that you give to the good suggestions and compliments.

Relationships develop over time. Early meetings that seem fruitless will eventually lead to team gatherings that honestly assess the cooperative effort, clearly identify areas that need improvement, and provide an agreed plan for seeking and implementing a solution.

"Customer focus" means

- Judging your achievements by the value you provide others.
- Emphasizing the needs of the customer, rather than your organizational requirements.
- Optimizing your product and streamlining processes on the basis of utility, rather than internal concepts such as "efficiency."
- "Biting the bullet" to accept and adjust to information about your shortcomings.

The partnership with your customer is a relationship that must be nurtured and cared for.

What can we anticipate as we make seeking and using customer feedback an institutional priority? Cooperation without sacrificing our respective roles. This is essential in dealing with the regulators because of their past conditioning as distant inspectors and enforcers. Gently, tactfully and carefully, we are leading our partner into a "team approach" through common goals and a willingness to consider the other team member's requirements.

Our experience shows that later, as the relationship develops, you can begin *"advancing your issues"* to stimulate the customer to evaluate his requirements and consider the desirability of changing the requirements to increase the productivity of your process.

The regulators...

The product of environmental restoration, pollution prevention and environmental compliance programs is defined by federal and state laws. The laws are interpreted and applied by the regulators, so that the regulatory community's satisfaction with Air Force programs is the ultimate measure of product quality.

The *regulators have the "power of the pen"* and will unhesitatingly use it when other communication channels are closed. By opening communication channels, constructive dialogue could occur when enforcement actions were contemplated. Opportunities would exist for discussing the proposed action, outlining corrective actions that had already taken place, defining a strategy if action was not yet underway, and assuring the regulators that Kelly AFB was genuine and open about complying with appropriate environmental requirements. If a simple telephone conversation or a face-to-face meeting can get the results they desire, regulators are less likely to resort to the written warnings, notices, and directives.

Often, we see the regulatory community as a skeptical, slow-moving stranger. Their self-image involves maintaining an arm's length distance that allows them to objectively evaluate the regulated function. Most of their perceptions and attitudes are based on industrial clients, many of whom do only what is required of them and spend as little as possible in funds and effort for environmental cleanup.

Traditional practice kept the regulators distant and gave them only the minimum information that the directives required. This almost invariably ensured that anytime they had to decide which rules apply, the choice would be made in favor of the more stringent standard. Regulatory input was process-oriented, directed toward methods rather than output. The result was an inflexible, structured confrontational posture.

Kelly's status as one of 43 federal facilities in Texas meant that none of the TWC staff could devote full-time to Kelly issues. The sheer volume of technical information (remedial investigation reports, work plans, sampling plans, feasibility studies, etc.) sent for review represented a six to eighteen month backlog with no way to prioritize them. It seemed inevitable that Kelly staff, working full-time on a single project, were constantly returning to the starting point when dealing with the regulators.

Regulatory discretion...

Applicability of standards is frequently determined by the regulator's interpretation of rules and data. By creating an open program that allows the regulators access and input, we give them an appreciation of the professional qualifications, corporate culture and environmental commitment of our Air Force people. By discussing schedules, target dates and future plans with them, we give them the information they need to do first things first.

Through frequent contact, they have developed the confidence that sufficient opportunities exist for them to make inputs or adjustment in a flexible, goal-oriented team process. As a result, decisions are no longer the result of an agonizing process with the result chiseled into stone. Now, tentative verbal approvals occur often and written confirmations follow later. A cooperative and team oriented approach to each issue has been institutionalized. Even though disagreements occasionally occur, team members have maintained a high level of respect and confidence with one another.

Cooperation builds mutual respect and trust. Success breeds success. As we see results from working together, the idea of working together becomes more firmly entrenched. Because things go faster, operate more smoothly, and results are more evident, the cooperative relationship grows.

Getting results...

Federal facilities staff members at the Texas Water Commission know their respective teams at Kelly and understand their language because they meet on a near-monthly basis and have frequent phone contact.

Kelly staff routinely visit the state regulators to conduct information exchanges and share ideas and concerns on implementing various environmental programs. At these times and others, the EM Director visits the Chairman and/or other commissioners of state agencies to elevate issues needing visibility and obtain feedback on the perceptions of how Kelly AFB is performing. These meetings are focused and constructive. The state regulator staff at all times recognizes that Kelly is serious about protecting the publics health and the environment

When the Defense-State Memorandum of Agreement between DOD and Texas was signed, a Federal Facilities Team was created in the Texas Water Commission. From the beginning, we were in contact with the new team leader and other staff members.

Kelly's Installation Restoration Program was organized into teams to manage specific groundwater zones. Beginning about January 1992, when TWC created its Federal Facilities staff, zone teams met with their TWC representative in Austin an average of twice a month. For formal quarterly technical review committee meetings, the TWC staff came to Kelly. The scheduling of other meetings was flexible; sometimes, the Kelly staff made the trip as often as weekly. The effort helped to prioritize the tasks each must complete and to agree on target dates. It also gave our regulatory "customer" an understanding of who we are, what challenges we face and how we plan to meet those challenges. The relationship evolved into frequent telephone coordination and a "partnership" approach.

Customers (regulatory agency staff) are process-oriented. Their critical variables involve measurements and samples, maximum contaminant levels, implementation schedules, procedures and methods employed, and such. Their frustration factors include a basic skepticism of waste generators' commitment, a large backlog of technical work that must be reviewed from various federal facilities, and the engineers' and scientists' inability to understand the time required to adequately review and approve documents. Organizationally, the TWC federal facilities staff is a branch within a division and must adjust to the goals and agenda of various division chiefs and power centers within the TWC structure.

By keeping the TWC informed of our activities and inviting their input, we've helped them adjust to an attitude that looks at "how can we do this job" instead of "what requirements can we place on them that will make them do the job."

As a result, the regulatory decisions now tend to focus on the goal first, favoring the least restrictive avenues available to achieve results that protect human health and the environment.

Taking initiative...

In the most recent example of this attitude, we saw TWC taking initiative to get EPA agreement to characterize soil from the delayed Quintana Road storm drain project as "impacted by a hazardous waste source" rather than "hazardous waste." This will simplify cleanup methods and allow on-base treatment of the soil. It avoids the very high cost of more elaborate, but unnecessary, excavation and transportation precautions and disposal into a regulated landfill. In the past, TWC would have waited for Kelly to initiate a formal request and provide extensive written justification. This time, a meeting between the City of San Antonio public works staff and the respective Kelly AFB and TWC technical staff gave the impetus and information needed to get the ball rolling.

Tanks..

Storage tank removals can be completed under two different standards. Petroleum storage tank (or PST) rules are streamlined and straightforward, thanks to Texas role in the oil industry. Industrial and Hazardous Waste Abatement standards for tank removals and cleanups are more stringent and normally apply when there is reason to believe that hazardous liquid material or waste was stored in the tanks at some point.

Simple though the distinction may appear, determining which rules apply is an important decision with many implications. These included an underlying jurisdictional question within customer's structure. The Federal Facilities Team existed with the I&HWA division, while PST issues resided elsewhere in the TWC. New procedures and relationships would have to be nego-

tiated within the commission staff to implement the appropriate, less stringent requirements.

Because most tanks on Kelly AFB are very old -- some dating back to 1917 -- the records to prove conclusively that only petroleum had been stored in them do not exist. The simple path for TWC would have been to simply move ahead under I&HWA standards.

Through frequent meetings, the Kelly AFB EM staff helped the customer understand how the decision affects productivity of our cleanup. While expressing the appropriateness of PST rules, the staff assured the customer of willingness to accept creative or innovative applications of shared TWC oversight. By patiently, but consistently, presenting the common sense logic of the simpler rules, the TWC customer was convinced. A single point of contact was designated in the PST Division to work with the Federal Facilities Team on Kelly AFB tank removals.

By allowing underground storage tank removals and soil treatment under petroleum storage tank rules and the CERCLA petroleum exclusionary clause, TWC expedited Kelly's removal of 68 unused tanks this year. Had the TWC insisted on applying more stringent requirements of the state's Hazardous and Solid Waste Abatement rules to the process, additional sampling, feasibility studies, public comment periods and restrictive work procedures would have delayed progress and added significantly to costs.

Permits...

Because permit applications pass through the hands of regulators who know what it is that's being done and understand how the permit contributes to goals of the Texas Water Commission as well as the Air Force, processing time has been cut considerably and modifications are seldom required.

Risk-Based Cleanup Standards.

The Resource Conservation and Recovery Act (RCRA) restores the environment to a natural state, while risk-based cleanup criteria allow the effort to end when potential impact on human health or the environment is eliminated. The final increment of cleanup is generally the most costly to achieve, so that risk-based standards are preferable to the Air Force. RCRA standards have been used by the regulators in Texas as a matter of course to ensure reluctant parties perform adequate environmental cleanup work.

Consistent effort was made over time to familiarize TWC with the risk-based Preliminary Remediation Goals (PRGs) used in Air Force's Installation Restoration Program. Sharing information on risk-based cleanup goals prepared the TWC staff for the day when risk assessment methodology would be applied in the state.

While the state was still promulgating new cleanup rules embodying risk-based cleanup standards, TWC Federal Facilities team members worked with the Kelly IRP staff to adopt Preliminary Remediation Goals (PRGs, the Air Force's terminology for CERCLA cleanup standards) that would meet the new state guidelines. This avoided time-consuming revalidation of cleanup goals after the risk-based standards became law. It also expedited planning.

Less interest in the customer would have left the regulators on their own to develop the relationship between Air Force and Texas state versions of risk-based cleanup goals. Less responsive regulatory oversight would have continued to impose more restrictive standards without regard to the fact that the work being planned would be done after the new rules were enacted.

Teamwork with the regulators has also resulted in various industries and businesses visiting Kelly AFB, at the request of the state. These companies were undergoing some type of enforcement action. The state believed that due to the wealth of environmental knowledge and hard driving programs, the base could provide valuable insight and lessons learned.

Reciprocity...

The "team" idea works both ways. We're a part of the TWC's environmental "team" just as they have become key players on ours. Air Force efforts that parallel state programs are now associated with Texas Water Commission programs.

Pollution Prevention, Recycling, and Hazardous Waste Minimization are shared goals. By documenting San Antonio Air Logistics Center efforts in the format and context of the state program, "Clean Texas 2000," Kelly AFB made its successes visible as part of the successful statewide TWC program. No rules required the Air Force to participate and it would have been easy to simply congratulate the state on encouraging industry to implement things we were already doing.

The extra time to submit the Air Force efforts in a consolidated Kelly AFB nomination paid off when the base was the only federal facility named to Governor Ann Richards' *Clean Industries 2000* honor roll. By acknowledging our program as part of theirs, we share our successes with our "partner" and can also call upon that partner for resources or advice. This created credibility with the TWC staff and gave the base new avenues of access to the commission. Clean Texas 2000 is a high-visibility, high-priority program for TWC. By "signing on" as a charter member, we lend our support toward the mutual goal of a clean, safe environment.

The effort was not without its reward. Most recently the Texas Water Commission recognized Kelly AFB an environmental leader and only federal facility to be inducted into the Clean Texas 2000 Industrial Roll. This is significant because it represents the regulatory community's satisfaction with the progress of the Kelly AFB environmental program and is the ultimate measure of product quality.

Because conservation of the regional Edwards Aquifer drinking water source was a major issue for the Commission, Kelly AFB gave added emphasis to water reuse initiatives that would save 1.83 million gallons per day during the driest months of the year. In the process of issuing the required permit, commissioners were given a platform for encouraging industrial and civic reuse efforts and were presented with tangible evidence of the Air Force's commitment to "partnership with the environment."

By consistently demonstrating the Air Force's serious approach to environmental issues, Kelly AFB has overcome the first hurdle of the regulatory process -- the presumption that the regulated activity will do only those things that it is forced to do and that they will be done at the lowest possible cost.

Let's live together

Normal day-to-day issues are generally dealt with at the action officer level with higher management levels on some occasions. This, along with having quarterly meetings, is the common mode of operating with state and federal environmental agencies. Kelly AFB has taken a non-traditional approach in dealing with regulators. Specifically, Kelly AFB was perceived as being noncompliant and not forthcoming when violations of laws and regulations occurred.

Kelly AFB instituted a bold strategy and approached the state by requesting a state representative be located on base. Lengthy discussions followed and the state eventually agreed. This regulator works closely with the EM staff in discussing the impact of current and proposed environmental legislation, assisting EM in development of program strategies and implementation plans and discussing the progress of Kelly's environmental programs with federal regulators and the local San Antonio community. This partnering arrangement allows the state regulators to develop a better understanding of what specific benefits from this initiative are seen in the progress of the Installation Restoration Program, reduction in formal enforcement actions and the receipt of regulatory approval on site on various types of projects can be expedited.

Meetings and phone calls are helpful, but the inspection and coordination requirements of environmental management required something more. The EM director made office space available for a TWC inspector to work within the EM organization. Desk, office supplies and all the same amenities we would provide any new member of the staff were provided for the "customer's representative."

TWC designated one inspector to work at the base each Thursday. Here are the activities reported by this inspector on a "typical day" -- in this case, July 15, 1993.

By making an early input regarding the product standards that apply, the regulator made the planning-programming-budgeting effort more effective.

The inspector sat in on a meeting on a joint effort with the city to remove and treat contaminated soil from an off-base storm sewer construction project. The line will go through an area of contaminated shallow underground water from past industrial operations on the base.

The inspector was able to advise EM and the contractor of TWC/EPA progress toward redefining the soil as "soil impacted by a hazardous waste source" instead of treating it as "hazardous waste." The change significantly affects the acceptable methods for excavating, transporting and treating the soil and consequently impacts the cost of the project. Without the inspector's input, time consuming planning and budgeting would have proceeded on a high cost, worst case scenario.

The regulatory "customer" demonstrated the "shared ownership of process" philosophy, getting involved to expedite a project.

In a Technical Review Committee presentation for a bioremediation project; he realized he knew the subcontractor from inspection of a recent non-Air Force project. Contacting the subcontractor, he talked with him and determined that the subcontractor didn't have enough information. The subcontractor was unaware that he lacked details necessary to meet the start dates projected by the base and its partner, the University of Texas at San Antonio. The inspector arranged to meet the key players at the site and go over what the project required. This helped the Air Force meet its projected schedule, while ensuring that the work would be consistent with state requirements. Again, the inspector's presence in the EM community helped avoid additional costs or wasted time.

Before the EM directorate opened its door to the inspector, these opportunities would not have existed. The inadequately coordinated project would have gone forward, schedules would

have slipped, and the inspector's role would have been merely to observe and specify any required corrective action.

The customer provided a timely answer to the question of "how much is enough."

An engineer was offered funds to investigate a suspected contaminated site, but would have to have a proposed work plan and statement of work ready within 24 hours. The TWC inspector suggested the number and general location of soil borings and groundwater sampling wells to obtain results that satisfy state requirements.

Without this input, the engineer would have been forced to specify additional soil borings and groundwater sampling wells to be sure that the data met state requirements. Sampling activities, without early input from the customer, will generally reflect the philosophy that "too much data is better than too little" and incur charges for useful but unnecessary work.

These three examples -- taken from one single day of the inspector's calendar -- typify the beneficial results of having the "customer" represented within the EM directorate on a weekly basis. The most important benefit is the evidence it gives that we are committed to an open program without any "dark secrets" hidden away. The inspector is free to go anywhere and talk to anyone when he's on the base. It goes back to the idea of trust, integrity and accountability -- which underlie our credibility with the customer.

The Public as a customer...

The general public, through various environmental statutes, has the right to comment upon environmental programs. An uninformed public is denied that opportunity.

Before the Environmental Management Organization was created, the public had little information and only limited opportunities to define its priorities and concerns regarding the environmental program of Kelly AFB. Calls for public comment -- carried out perfunctorily when required by law or regulation -- were unanswered. Past efforts were based on traditional methods, but their result was "one way" communication.

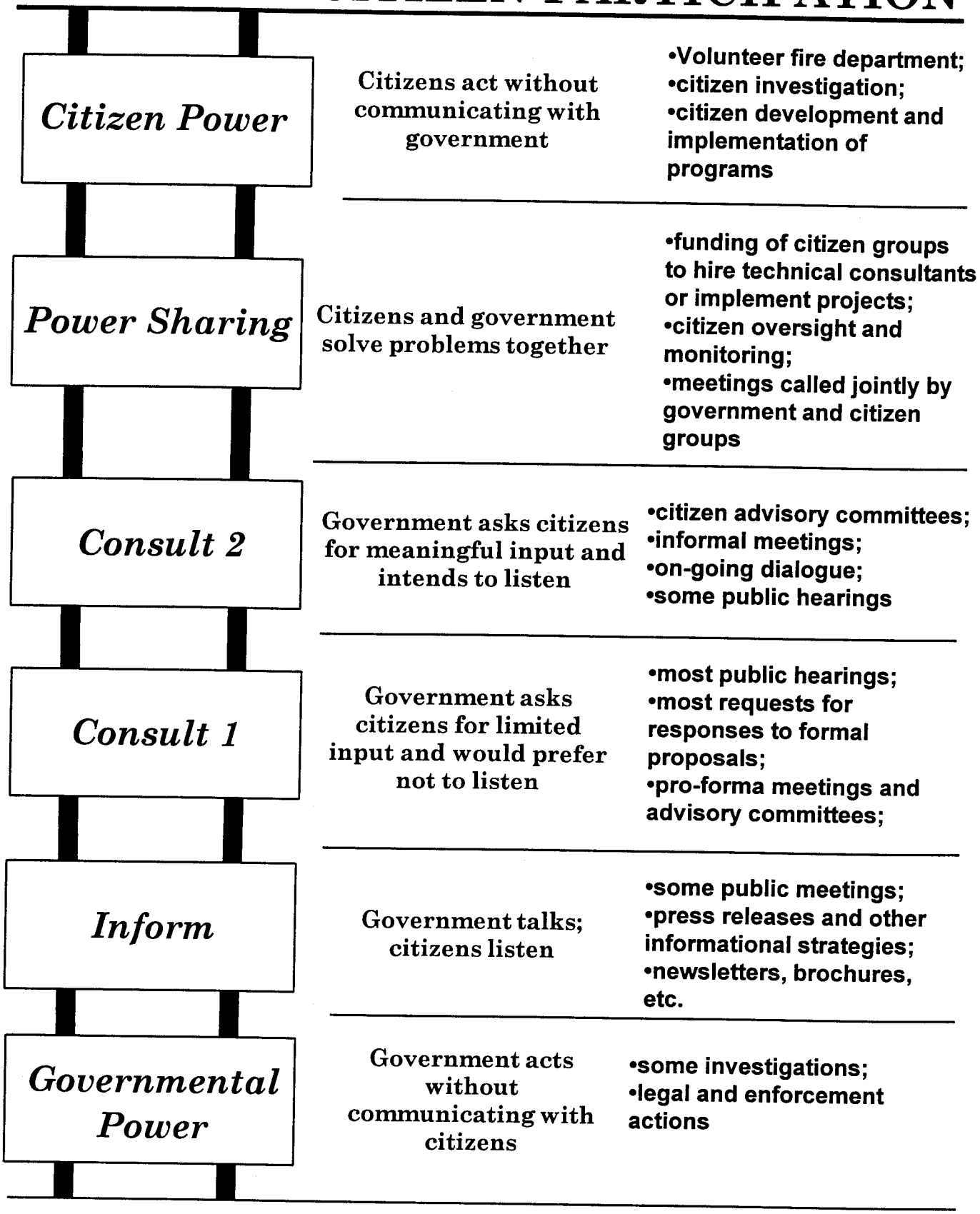
The Environmental Communication Research Center of the New Jersey Agricultural Experiment Station has depicted government communication efforts as a ladder of public involvement. Prior to the establishment of the EM organization, the base waivered between the bottom rungs of the ladder.

When the Environmental Management Directorate was formed, changes were made. Staff were hired and trained. News releases, direct mail correspondence, and public meetings were used to introduce the environmental program and share its message. The public began to show interest.

Learning comes with a price tag. When a permit application was filed with the TWC for the Defense Reutilization and Marketing Office's newly built temporary hazardous materials storage area, a public hearing was required. The storage area, with all required containment and safety features, was adjacent to the base boundary.

Without prior efforts to identify community concerns, the Air Force was "ambushed." A parochial school and a public park were located just across the base fence from the new facility. School parents, residents, the local citizens group and others showed up at the hearing to protest the permit application. These hearings did not highlight or point out any technical deficiencies in

LADDER of CITIZEN PARTICIPATION



the facility or legal reasons for denying the permit. Emotions and "local politics" were on the front burner. Even after the permit was granted, meetings were held with residents and additional safeguards were proposed.

The Air Force eventually gained public acceptance -- but not public approval -- of the facility by installing a visible warning siren and by taking other measures that reduced the need for -- and therefore the amount of -- hazardous wastes in temporary storage.

Adding a warning siren and placing "reasonable" limits on use of the temporary storage facility at the DRMO went beyond the requirements of the operating permit. But the permit and state regulatory oversight were not the sort of reassurance that could be seen. By adapting to the expectations of our neighbors outside the fence, the Air Force gave them visible evidence of our commitment to safeguarding their neighborhood.

The public has no obligation to make its concerns known; it is the responsibility of the government -- Kelly AFB -- to initiate the dialogue. Outreach must precede feedback.

Feedback sometimes may appear unrelated to the issue. When a radio frequency heating technology demonstration was planned, a public meeting was central to our planning. We anticipated concerns about three large petroleum storage tanks next to the site. But instead, we met concern for potential property damage and past unresponsiveness of the bureaucracy to off-base callers. Apparently, paint overspray from an on-base project had affected cars in the neighborhood and residents had received little acknowledgment for their complaints -- and no instructions for submitting a claim for damages.

The painting complaints several years before may seem irrelevant, but the image of an uncaring organization and the perception that the base is unresponsive to its neighbors translates directly into a lack of customer focus. It validates the need for community relations activities for environmental projects and the need to integrate environmental outreach initiatives with other base public outreach efforts. We have the tools: public meetings, newsletters, and a single designated point-of-contact for environmental issues. Our challenge is to tell the public how to contact us and to respond in a timely manner to every call or letter.

The customer needs assessment should never be considered only in the organizational vacuum of our own experience or knowledge of customer needs. The inclination is to think we know what the customer needs, but there is only one sure way to assess customer needs and that is to ask the customer to provide the information.
(David Griffiths, "Implementing Quality with a Customer Focus," ASQC Quality Press, 1990)

Challenges change, too...

Sharing information and keeping the program open to public scrutiny offers challenges of a new sort. When the public or the media feel that you're hiding something or that you're not doing the job, they will show up for public meetings and bombard you with phone calls. When people are satisfied that they know what you're doing -- and feel that you know what you're doing -- their interest level declines.

After many months of constant news releases and frequent media visits, San Antonio's television news directors yawn over yet another Kelly environmental cleanup story. Our consistent message has been that we take our environmental responsibilities seriously, that we want our

neighbors to see how we spend their tax dollar for cleanup and pollution prevention, and that we are using the best science and technology to attack our problems.

Between January 1992 and August 1993, this message was carried by 22 news releases and 82 separate stories used by newspapers, radio and television stations in San Antonio. A constant flow of information was provided to the media. As their understanding of environmental issues increased, the time given each story tended to shrink and their coverage has become more selective. The threshold we must cross to get our message into the media was raised by our earlier successes. They now challenge us to find new directions for this continuing story.

Neighbors outside the fence know what's being done and sometimes call with a question or concern. In the same 1992-93 period, 22 separate products were mailed to residents near the base and local civic leaders who have an interest in Kelly's environmental programs. When television reporters documented drilling of off-base wells for soil and water sampling, they questioned our success in notifying residents of the project. They visited several homes to ask residents about the work. And an elderly lady sorted through her recent mail to show our *Progress Report* to their camera and tell the reporter how helpful the base had been. That's a quantum leap from the days of an unresponsive, uncaring bureaucracy.

In addition to direct mail correspondence and media stories, we have reached out to the public through two visitors day programs at cleanup sites and two public meetings. We've ensured that spokespersons were available to deal with environmental issues in Spanish as well as English -- and made special efforts to enlist Spanish-language television stations in our media efforts.

And we've included our TWC partners in our public meetings. As part of the state government, they represent the people and their presence also adds credibility to our statements.

Today "partnership for the environment" is a familiar theme to Kelly's neighbors. What we're slowly accomplishing is a climb up several rungs of that "Ladder of Citizen Participation." Our goal is not only to seek public comment, but to listen, understand the message, and provide meaningful feedback to the customer.

That listening is important. As outreach succeeds in raising the level of public awareness, the customer education process will increase the quality and quantity of feedback from the community.

In San Antonio, we've noted a dynamic that seems to operate when environmental issues are surfaced. In the case of Edwards Aquifer flow, the Applewhite Reservoir referendum, and replacement of the Nelson Gardens landfill, we've observed that as citizens became involved, the possible solutions changed. The discussions evolved from emotional obstructionism (the not-in-my-backyard syndrome) to constructive engagement to seek an acceptable answer for the problem.

When the city's Quintana Road drainage project was stalled by contaminated shallow groundwater from Kelly's industrial area, the citizens group behind the project turned its attention to the Air Force as the "bad guy." By constantly keeping the group advised of progress in sampling, evaluating, working with the city and the regulators, the Air Force gained credibility and avoided a major public controversy.

Obviously, the group's goal was to see the project finished as quickly as possible. In the meantime, they also needed to know that their concerns were taken seriously and respected. By providing information -- including making contact when there was little news or the news was bad -- the citizens group was reassured that they were taken seriously and respected.

Respect, reassuring actions that show we take their concerns seriously and visible evidence that we care about their health and safety are important to our neighbors. They are the symbols that underlie credibility with the public.

Through meetings and interaction, we verify our understanding of the concerns of our neighbors and demonstrate the seriousness of our commitment. Through our response to their input, we encourage future cooperation.

Efforts to involve the TWC with our team and to open a dialogue with the public were parts of a total program. Today, barriers of language and mindset have been overcome. By pursuing our values of integrity and accountability in an open program that shares a maximum amount of information, we've created conditions that encourage success.

And our workers

Feedback from external customers is not enough to support continuous process improvement. The internal customer must also have the opportunity to commit his or her thoughts, talents and abilities to the effort.

The environmental program is heavily directed towards a large clientele of internal customers. This group is comprised of over 15,000 people whose skills cover many professional, technical and administrative disciplines. Examples include engineers, lawyers, metal workers, machinists, painters, supply clerks and accountants. From the time new employees begin work on base, they are exposed to the environmental program. The new employee orientation briefings include a presentation on the scope of the environmental laws and regulations and how each employee is responsible for complying with these laws. Depending upon the person's skills and area of work, different types of environmental training are later provided.

A customer feedback structure exists in the environmental community at every Air Force installation, so Kelly's formal program should be familiar to the average Air Force member. The Environmental Protection Committee and the Environmental Protection Committee Working Group are forums whose purpose is to inform, educate, discuss current status of projects and programs, and develop joint environmental strategies for the future. The quarterly Technical Review Committee evaluates progress of the Installation Restoration Program.

Through the committees and, as an additional duty, most organizations have a pollution prevention representative and a point of contact for environmental compliance matters. Most also send a representative to the Technical Review Committee meetings. Participation in Kelly's environmental programs goes beyond the formal committees and designated individuals to reach workers throughout the base.

Today, engineers and scientists, plant operators and chemists, typists and truck drivers are equal partners in the environmental program at Kelly AFB. Workers in the product directorates -- engineers, metal workers, machinists, painters, as well as supply clerks, accountants, schedulers and supervisors -- are regularly visited by pollution prevention and environmental compliance staff seeking their ideas and opinions. Regular visits help gather their impressions of the effectiveness of on-going and planned environmental projects.

Everyone knows something about the environment and everyone has some notion of what the environmental management staff <u>ought</u> to be doing...

When you work in the environmental management field, you'll sometimes need *alligator skin,* but you also must acquire the hunting dog's ability to listen through the wind to hear the rustling signals of a progressive idea -- then seek out the path toward it. And our customers bring some very good ideas to our attention.

An engineer in the Aircraft Directorate noted that their largest waste stream -- 120,000 pounds per year -- was mixed JP-4 fuel, hydraulic fluid and lubricating oil that had been drained during aircraft maintenance operations. Separately, the JP-4 could be reused in the jet engine test cell and the other fluids could be recycled. When mixed they became liquid hazardous waste. He suggested new labels to help separate the three fluids and a redesigned drain barrel to keep out rainwater and improve efficiency. When the appropriate Pollution Prevention specialist looked at the idea, it was adopted and is being implemented.

Another aircraft directorate worker suggested eliminating sodium dichromate deoxidizer from the anodize line by adopting a patented process that used phosphoric acid instead. Our pollution prevention staff reviewed the idea, agreed, and the change was made this summer. It replaced 1,300 pounds of sodium dichromate -- which becomes toxic waste -- with a treatable liquid waste.

And we have many similar success stories that begin with our industrial customers.

Consumer education...

Considerable time, resources and energy are applied to increasing the awareness and knowledge of internal customers on environmental issues, with specific emphasis on outlining the environmental priorities and game plans to reach various goals. A good example is in the pollution prevention program where the internal customers are presented observations and action plans for changing existing processes.

Engineering and support staff that have worked for a long time on a process experience some anxiety when environmental staff provide their insight on changing or modifying an existing process due to new Air Force, federal or state requirements. Their need is embodied in environmentally preferable alternatives that simplify their work (eliminating need for personal protective equipment or hazardous materials handling training, etc.) or improve their productivity (e.g. plastic media bead blasting removes paint faster and at less cost than chemicals). Frustration factors are new procedures that restrict availability of traditional materials, place added constraints on use or disposal, create added documentation requirements or necessitate purchase of expensive new equipment.

It's imperative the environmental staff recognize the behaviors that guide these professionals, and concentrate on these behaviors as changes come about. Attention is placed on outlining the values and benefits of meeting these goals in lieu of misplacing attention on short term barriers or concerns. Unfortunately, a tremendously large barrier is the concept of change, especially when it involves changing the way business has been conducted for a long period of time.

Customers (internal product directorates) tend to be efficiency-oriented. Their concerns include down time and delays, additional training hours, and the impact of regulatory restrictions on their productivity. Change frequently brings these concerns to the forefront.

After the change is made, however, we are careful to insure that credit and "ownership" go to the product directorate and not the EM staff. We customarily drive responsibility, account-

ability and "ownership" toward the hands-on workers. From persuasive presentations to painful prodding, we help them achieve their successes.

When the Air Force held its Worldwide Pollution Prevention Conference in San Antonio, we provided a Kelly tour. Our Pollution Prevention Division set it up, but our customers from the product directorates gave the presentations. Engineers and specialists from the Propulsion Directorate and the Aircraft Directorate explained their pollution prevention initiatives to visiting environmental, safety, occupational health and product engineering professionals.

Throughout the planning and coordination, we maintained our theme that they were showing their processes, their equipment and their people. It wasn't a case of "helping the environmental folks with their tour." The product directorates own up to their environmental responsibilities and are learning to deal with them as part of -- not an outside interruption to -- their mission.

Reading the nonverbals...

The Hazardous Materials Cell adapts the controlled issue of hazardous materials to the things we've learned about our customers. Various ESOH constraints on ordering, issuing and using hazardous materials made the process difficult and time consuming. Specialists in several buildings had to certify each order. Time was wasted getting signatures and carrying paperwork. To confuse matters, several different supply and purchasing systems could be used to obtain the same materials, so that orders entering one system might require time to contract and purchase them while the needed quantity was in a warehouse bench stock through a different system.

To avoid the lost time and productivity of a cumbersome issue system, customers developed a tendency to stock an extra supply of hazardous materials somewhere in the work area. This was a clear message that they weren't satisfied.

Adjusting to the customer's need for a simple, less time consuming system meant creating a one-stop processing center staffed by several agencies. The results we expect include fewer purchases because the various systems will be linked to find what's needed within the existing stock first. Orders for hazardous materials that have non-hazardous substitutes -- and there are many now -- will receive the substitute. Providing timely, responsive service -- while limiting the user to realistic use and bench stock -- should also reduce those extra supplies tucked away in the shop areas.

Everyone's an expert...

In the environmentally aware culture of the 1990s, everyone has an idea of what environmental management's role should be. Another challenge is providing education so all appropriate staff can see the "big picture" and understand how modifications to their processes are needed.

This poses further challenges with the customers because they commonly view the environmental staff as not supporting them. On the other hand, the environmental staff highlights their two primary objectives as meeting the environmental goals and changing or modifying the process while ensuring the industrial base can understands how processes that preserve the environment also ensure the capacity operate competitively in future years.

Customer education is an important technique for making the customer part of the quality team. At Kelly, frequent contact with the work force is helping them understand our basic roles.

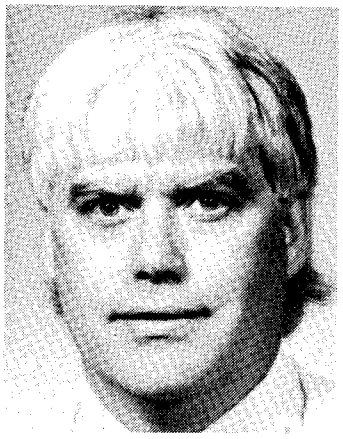
- **Warning them of hazards and ensuring they have the required training and protective equipment.**
- **Helping them identify and test substitute materials that aren't hazardous.**
- **Helping them find new, "clean" technologies that replace chemical processes.**

The 1993 Base Closure and Realignment Commission underscored the importance of competitiveness and sound environmental stewardship for every Kelly worker. The environmental impact of the base and its long term viability were important considerations, along with its cost and productivity. Faced with the possibility of base closure, the community became much more aware of the integrated "team" that makes an Air Logistics Center successful. The dual mission of Environmental Management, ensuring environmental stewardship today and positioning the industrial plant for tomorrow's environmental challenges, provides an example of the teamwork that will "Keep Kelly Alive in '95."

"Partners with the environment" and the San Antonio Air Logistics Center Commander's stated goal of being "An Environmental Good Neighbor" are more than slogans at Kelly AFB. By applying the Total Quality philosophy to open a constructive dialogue with customers, a dynamic program makes daily progress toward a cleaner, safer environment.

People come to work with a smile and many are leaving through promotions and transfers because of the reputation they -- the Kelly EM staff -- have earned for excellence. And challenges loom ahead as this corporate culture absorbs new staff, makes greater efforts to reach the community, and reaches out for better feedback.

APPLYING THE JURAN CONCEPT OF SELF CONTROL AT THE AEDC ENGINE TEST FACILITY



Harry Clark

APPLYING THE JURAN CONCEPT OF SELF CONTROL AT THE AEDC ENGINE TEST FACILITY

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The Juran concept of Self Control (J. M. Juran, *Juran on Leadership for Quality, An Executive Handbook*) is a purposeful, common sense approach which allows the people who perform a job to control the quality of the work. This paper will discuss the utilization of the Self Control concept in a workplace environment, address how implementing this concept facilitates employee empowerment and document the benefits realized from the application of this quality concept.

The Arnold Engineering Development Center (AEDC), located at Arnold AFB, Tennessee, is the world's most diverse complex of aerospace ground-test facilities. The Engine Test Facility (ETF) at AEDC conducts propulsion testing for advanced aircraft, missles, satellites and space vehicles. These services are provided to the Air Force, Army, Navy, NASA and other customers in nine turbine engine test cells, four rocket test cells and eleven research cells. Sverdrup Technology, Inc. (the technical services contractor responsible for operating the ETF) has applied Juran's principle of Self Control with significant success to the testing of rocket motors in the J5 Altitude Test Cell.

In 1989 the senior leadership at AEDC began a journey toward implementing the Total Quality Management (TQM) philosophy. This effort involved introducing a cultural transformation designed to ensure that the center became the preferred ground test facility for all aerospace testing requirements. In support of this effort, Sverdrup management adopted TQM principles to achieve their long-term goals of sustaining the quality of testing performed in the ETF while reducing the cost of that testing. Furthermore, they recognized that adopting an established methodology, such as that presented by Dr. Juran, would expedite the acceptance and implementation of this philosophy. As a result, they initiated the TQM efforts which Sverdrup continues to pursue in the operation of the ETF.

The Instrumentation and Controls (I&C) Department of the ETF is responsible for design, installation, operation and maintenance of instrumentation, data acquisition, controls and data processing systems which support propulsion testing. As such, personnel routinely deal with hundreds of data channels and with systems which control the facility test conditions and test article subsystems. The complexity of these I&C systems and the actions necessary to

configure them for testing present formidible challenges to the workers (both engineers and craftsmen) responsible for their operation.

Recognizing an opportunity to enhance their operations, the I&C Department established a team of management, engineering and craft personnel to define Juran's concept of Self Control with respect to their mission at AEDC. This group was challenged to come up with a way to relate the Self Control concept to the highly specialized work of rocket and turbine engine testing and to convey this to the work force.

As Juran defines it, Self Control is a condition wherein the worker

1. Knows what the quality goal of an operation is.

2. Knows what the actual performance is with respect to that goal.

3. Can change the performance of the operation so as to meet the quality goal.

The I&C team began by developing examples of Self Control which were relevant to their work. They then devised a framework which would facilitate the use of Self Control in ETF operations. Finally, the group communicated these findings to the I&C work force.

A simple example was chosen to illustrate the concept of Self Control. A task might be setting the excitation voltage for a transducer, with the quality goal of that task to be a setting of 10 (+/- 0.1) Volts. The performance indicator could be a visual display from a voltmeter measuring that voltage; the ability to alter the performance would be the excitation adjustment capability of the power supply. Later, the examples would be expanded in both scope and complexity to demonstrate the applicability of Self Control to the entire work force.

The method devised for facilitating the use of Self Control was quite simple. It required those who assign work to assume primary responsibility for providing the three conditions for Self Control. Also, it stipulated that those who perform work have primary responsibility to exercise the Self Control provided by those who assign the work.

The final item necessary for Self Control is the means for the worker to alter measured performance to meet the quality goals. Both upper management and the I&C team agreed that the key to this step was communication. Those who assigned work had to be receptive to feedback from those performing the work. Likewise, those performing the work had to feel empowered to make corrective inputs when they encountered situations that deviated from the quality goals.

This model was presented to all I&C Department personnel. The briefings were conducted in small groups to facilitate an interactive exchange between members of the audience and those presenting the material. Engineering

personnel were encouraged to examine the work processes in their areas of responsibility and to determine if the conditions for Self Control were provided. Craft personnel were encouraged to provide feedback directly to engineering to ensure the establishment of Self Control.

Concurrent with making the workforce aware of Self Control, upper management was striving to fulfill their quality requirements. As described by Juran, these requirements may be summarized as

1. Establishing specific quality goals.

2. Establishing conditions which permit the workers to exercise Self Control.

The I&C Department established a quality goal of zero operations anomalies for rocket and turbine engine testing. An engineering team was tasked to determine what might be required to fine tune the fundamentally sound processes employed in the I&C operations. This team reviewed operations in the areas of data acquisition and control systems. In each case the various attributes of system components were listed, as were the actions which were taken to ensure the integrity of the system. The team then evaluated which actions resulted in confirmation of attribute performance.

The review team identified several operations where the potential for failure existed because of inadequate or unavailable performance indicators. In cases where system attributes were found to be unchecked or inadequately checked, new actions were instituted to ensure that the worker had the means to measure the performance of that aspect of the testing process. This process became the initial deployment of the I&C Department's quality goals.

These two paths (work force awareness of and management provision for Self Control) converged into a briefing presented by the General Manager to the entire workforce. Having spelled out his commitment to Total Quality Management, these two efforts were presented as an example of the direction that he wished to lead the company in the pursuit of TQM. At this point, the real work of implementing Juran's concept of Self Control began.

The I&C Department continued to deploy their TQM goals, determining that the next step should be the further development of structures that enhanced Self Control in I&C operations. Because critical operations in the testing process at ETF are directed by written procedures, a Quality Improvement Team was chartered with the mission to "Improve the Self Control Features of Rocket Test Procedures." This team included both engineering, supervision and craft personnel.

The meaning of Self Control with respect to procedures was not an easily elucidated concept. Procedures specify an exact series of steps, the coordinated performance of which yields a "test ready" configuration. Finally, a definition was constructed:

Self Control with respect to procedures means that when the worker has completed the job, she knows that it has been done correctly.

The attributes of a procedure which were essential to ensure this condition were determined to be:

1. The SCOPE statement should inform the person performing the work of the overall quality goal (objective) of the procedure.

2. Each step (or sequence of steps) within a procedure should contain language which indicates the goal of the operations, not just the sequence of actions to be performed.

3. Where non-standard operations or operations with unfamiliar equipment are directed, the procedure should indicate what response is anticipated following the performance of individual steps or sequences of steps.

The team audited a representative sample of I&C rocket test procedures for compliance to these criteria. The results were analyzed, and several procedures were revised to serve as examples of how these criteria should be incorporated by future procedure authors.

The Quality Improvement Team reported the results of its work to management. In this report it noted that the attributes it had identified as being necessary for Self Control in procedures were easily incorporated into existing documents. The team also noted that inclusion of these attributes provided a common-sense approach to ensuring that the work required for testing operations can be performed correctly and in a timely manner. The team also addressed the necessity for communication as the means of "closing the loop" in the Self Control process. The avenue for communicating anomalous (and non-critical) conditions encountered by performers of established procedures already existed as a formal final page of each procedure. This page specifically provided a place to list difficulties encountered by the performer. Current policy required the person issuing a procedure to review this comment page and to respond to any input from the workforce. Likewise, current policy required the preparer of new or significantly modified procedures to conduct a "walkthrough" of that procedure with craft personnel who would be performing the work. These practices were found to be practical, common-sense ways to ensure that the workforce retained the conditions necessary for Self Control. Therefore, the team recommended that management reinforce the value of the communication process required to fulfill these existing policy requirements.

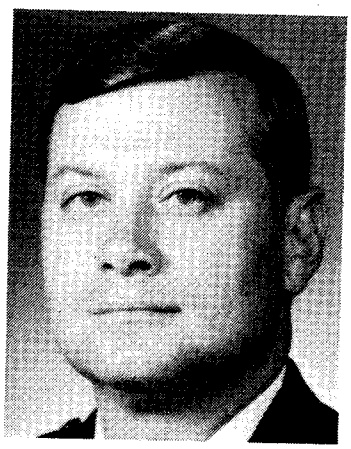
The team's report to management finished those activities specifically directed toward establishing Self Control in the rocket testing workplace. Those formal, directed actions were succeeded by an organic evolution in the work environment; the seeds for which had been planted when the General Manager presented his company-wide briefings. These seeds were nurtured by

the structural enhancements in the testing process that were identified and implemented by the audit team. They were also nurtured by the increased communication between engineering, supervision and craft personnel which transpired while the Quality Improvement Team was working toward its final product.

Following the introduction of the concept of Self Control, and with increasing frequency during the life of the Quality Improvement Team, workers in the rocket testing branch of the I&C Department began acting proactively to ensure that the goal of zero operations anomalies was realized. Engineering sought craft involvement with decisions concerning the methods to use for particular tests and craft assumed more responsibility for independently assessing and solving problems. Also, communications between these groups moved from the assignment of tasks and reporting of task completion to discussing the reasons for performing tasks and the rationale for these tasks within the requirements of the test programs. This has led to an increased participation by all parties in understanding the requirements of the work and to a sense of universal ownership of the process employed in the rocket testing areas of the ETF.

The major benefits realized from adopting Juran's methods have been continual improvement of the process (through increased reporting of problems and better communications), higher quality work performed (fewer reworks required) and earlier responses to problems (as workers assume responsibility and ownership of the process). In addition to these tangible but not easily quantifiable benefits, the rocket testing team has conducted 16 tests since this effort was begun with a record of no operational errors and no data loss. This record alone would justify the effort, but this reward cannot match the spirit of cooperation and teamwork which has developed during this journey.

DEVELOPING PROCESS ANALYSIS IN A FUNCTIONAL DISCIPLINE



Maj Paul Adams Willard

Developing Process Analysis in a Functional Discipline

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ABSTRACT

Most attempts at Total Quality consist of forming Process Action Teams (PAT) that ultimately end up attacking a problem. The results are much the same in that most PATs become problem solving teams and recommend solutions of the immediate problem or irritant. The real opportunity is rarely challenged, that being the actual way we do our work. In order to change a process we must analytically examine the processes we go through in our work.

Aeronautical Systems Center (ASC), Contracting Directorate (PK) felt that the real opportunity for improvement was in the processes themselves. In the fall of 1992, a "Process Analysis" group (ASC/PKCA) was established with the charter of examining and improving upon the actual contracting process. This group of dedicated resources has started analysis, which any functional organization can conduct in house on it's processes. The experiences of this analysis cadre can be related to any functional discipline to improve work processes. Lessons learned, problems encountered, early successes and strategies utilized will be discussed.

INTRODUCTION

Currently in federal government many organizations are attempting to embrace Total Quality in order to better provide services. For many organizations, the answer has been to form a PAT to study some process or problem. These teams often study the problem once and usually for a limited duration. While this is a good method, the results usually involve remedies for things which tend to be of an irritant nature. The solutions are designed to solve the immediate problem with fixes, in most cases, with a tendency only to address the speed of work or the working conditions. Examples of this are: better copying machines, improved parking conditions, or more advanced computers. While these are good ways to accelerate the way we do business, the results only allow us to work faster or with less discomfort. The actual way we do business or the processes of our day to day work are rarely challenged. With process analysis, we are concerned not only with improving the speed or ease of work, we are more concerned with the question of "Why are you doing what you are doing" and "How are you doing it"?

With over 180,000 annual contracting actions, the Aeronautical Systems Center at Wright-Patterson Air Force Base is one of the largest buying activities in the Air Force. In addition to offices in Dayton, Ohio, there are ASC contracting personnel at Eglin Air Force Base, in Florida and detachments in Palmdale, California and Robbins Air

Force Base, Georgia. The combined offices represent over 1200 contracting personnel.

In an organization of this size, we are working the obvious things such as the aforementioned remedies like better copiers, faxes, and computers to speed our processing of work. However, we felt the actual processes we use represented the largest potential improvement area. In the fall of 1992, the Contracting Directorate decided to undertake the mission of embracing metrics and process analysis.

HISTORY

Like any organization in today's DoD environment, ASC is getting leaner. There is simply going to be fewer people involved in accomplishing the DoD mission. This is the environment we faced in making the decision to organize an effort in what would be a new staff function. The next issue considered was if we were going to try to undertake efforts in process analysis, would it be approached from a centralized or decentralized approach. We felt that centralization would be the best approach in that we would have a group with a specific mission to analyze processes throughout the entire buying spectrum at ASC. This new process analysis group would be a branch in our Contracting Policy and Business Clearance Division. Our next problem came with identifying bodies to actually do the work. The facts indicated that we would not get any authorizations for additional staff to support this type of work. If the Contracting Directorate wanted to do this, they would have to find existing resources to do the work. Quite simply, we took them out of our hide.

Our next challenge was in putting the faces to the places. We found people who had varied acquisition backgrounds and were qualified in the normal aspects of buying, negotiations, policy, etc., but the reality was that the area of process analysis has been fairly limited in Air Force Systems Acquisition and our personnel had limited expertise in this discipline. We set out to get this new cadre exposed to an unfamiliar arena of metrics, measurement, and most importantly statistical process control.

Statistical Process Control (SPC) is not a new science or technique. It had its heyday during World War II when a large volume of our country's industrial operations were mobilized to a war production scale. It seems, for reasons unknown, that in the 50's or 60's SPC went the way of the hula-hoop. Problems started happening in the 70's when more of our corporations found that business was going overseas. Foreign products were coming ashore with higher quality and lower prices. Today SPC is making a comeback based in large part on the teachings of people like Dr. Walter Shewhart and Dr. W. Edwards Deming. The challenge in our new branch was not only discovering what SPC was, but, how we were going to apply it to systems contracting. We were fortunate to be introduced to Mr. Mark Fryman at Air Force Logistics Command (AFLC), now Air Force Materiel Command (AFMC). He assured us that if you did anything more than once, you in fact had a

process and that the rules of SPC could be employed in that process. At the same time we were getting started with Mr. Fryman, the Air Force decided that Total Quality may be something to help in the upcoming frugal years. Where TQ had been a common buzzword in the Air Force Systems and Logistics Commands, it was now being embraced across the board. This helped in that more training and specialized courses were made available. In addition to SPC, we are now being exposed to concepts like metrics, benchmarking, design of experiments, six sigma, etc.

With some training under our belts we went about the task of beginning process analysis. We felt that our approach to process analysis would be based on five key tenants:

1. Assess our customers needs.
2. Examine processes which use PK resources.
3. Identify inefficiencies in our work.
4. Reduce cycle time and variability of our products.
5. Standardize good processes and data bases.

At ASC, like any other DoD buying organization, we have the full gambit of contract actions. In order to focus our approach, we wanted to examine first the things which get the most visibility at the Center. As part of our Center's Functional Management Review, Contracting is tasked with presentations which address the health of the Center. Presently our Contracting Directorate tracks 8 major indicators of how we are doing business. They are:

1. Funding Modifications
2. Contract Delivery Orders
3. Modifications and Supplemental Agreements
4. Undefinitized Contracting Actions
5. Definitization of Undefinitized Contracting Actions
6. New Sole Source Contracts
7. New Multi-Source Contracts
8. Zero Dollar Modifications

In examining the list, we wanted to select one which would have as much applicability across the Center as possible. Also, we wanted something to cut our teeth on which wouldn't overwhelm us, but would allow us to develop the process for how we would do our future analyses. Funding modifications were selected as our first official attempt to conduct process analysis.

Once we selected the process, we decided our focus would be centered around six questions:

1. Is it meaningful to PK, ASC, or AFMC corporate goals?
2. How can it be measured?
3. What are the existing processes?
4. Who knows the process?
5. What do they think?
6. What does the data tell us?

FINDINGS

We started our analysis by identifying ten buying organizations across ASC to chart the process they used in performing contract funding actions. We went into our existing contract data base and pulled data we were currently using to track the funding actions. Next, we conducted interviews with the people who actually did the work. We provided them with a very basic flow chart in which they were asked:

1. To identify the actual steps in their work.
2. Keep the efforts at a surface level as much as possible (we wanted a macro-level look at the process).
3. Track every step performed in producing a contract modification.
4. Track the number of days for each step.

During our review we examined over 100 contract files.

This ended up not being a simple process after all. When we went into the data base, we found the data was not reliable and contained numerous errors. Our FY92 data showed 19 actions with 0 days in processing. The data from the data base when matched against the contract files indicated that 26% of our files and data did not match and that there were several input errors. The range of 2557 actions showed negative 18 days to a positive 1549 days, with an average of 17 days to complete a contract funding modification. In our sample of actions, we adjusted the data to correct the mistakes for a more accurate baseline. We narrowed the sample size down to the top 313 actions during the FY92 period. After corrections were made, our range changed from 0 to 257 days. Our average now was 11.8 days to process a funding modification.

When the process flow information was received from our ten buying organizations, we were surprised to find four distinct processes in funding actions. After further analysis in each organization, we found that there was wide variability in the cycle time of the different processes. As more analysis was developed, we found that our current measures were incomplete. We were measuring at the mean without considering the normal variation which exists in every process. We felt we had to change our logic to require analysis of the mean and the range. A logic change would allow us to:

- Develop better indicators which would allow reduction of variability and shift the mean with respect to throughput.

- Communicate our measurement and improvement efforts to the workforce.

- Indicate more clearly the actions that expand the range.

In addition to our change in logic, we felt we had to develop a standardization of data bases and the processes across ASC as well as within the different organizations.

Our next step was to conduct a micro level analysis of the processes being used by the buying organizations. It was felt this would allow us to determine those things which were value/non-value added in our processes. Four organizations at ASC were selected to perform the detailed analysis. The organizations consisted of Wright Laboratory, two system program offices, and our Eglin contracting office. This analysis is currently being conducted.

During this analysis, we examined what other organizations were doing in process analysis. What we found were few examples and most without a happy ending. Examples of outstanding work in process variability reduction were never realized due to

staunch resistance to change and outdated paradigms such as short term profit margins and production first, quality second. When there were actual reductions in variability, it was not due to a change in process. The majority of improvement was due to traditional problem solving techniques (e.g., additional resources).

Another problem our team found was that our responsibilities were expanding while our numbers were declining. Along with many other organizations at ASC, we lost one of our three analysts to downsizing efforts. Although we had a vacancy for a number of months, we were fortunate to be able to get a back fill. Of course, our challenge now is getting a new analyst up to speed. Another problem we found was that when people are tasked to start a new project, you have to make sure they are not still doing the work they used to do. While this is a simple scenario, the fact is we tend to expect people to do both which further limits the resources until you can get previous tasks transferred.

In the summer of 1992, AFLC and AFSC became AFMC. The new command immediately began moving into high gear on metrics. General Ronald Yates, Commander of AFMC stated that AFMC's number one goal is to satisfy our customers' needs in war and peace. He planned to assess this goal through measurement and with the specific measurement tool of metrics.

We have become the focal point for measurement and metrics within ASC/PK. This was a logical placement and integral to our work in process analysis. The challenge then came from across the Center in answering the question, "what are metrics and how do we get them?" The answer we were told was "whatever you use to tell how well you are doing your job in meeting your customers needs qualifies as metrics." We are now taking on the responsibility of metrics training and development for ourselves as well as the Contracting Directorate. As part of this, we have become the focal point for numerous customer satisfaction surveys which are being generated by Headquarters AFMC/PK. While this interaction is necessary to ensure the satisfaction of our customers, we may be getting to a point of over surveying. Surveys are a valuable tool and some excellent feedback has been received on how we are doing business. The tough part comes when you then have to start implementing the results. Finally, something which was destined to happen, any correspondence received that referenced metrics was automatically sent to our branch to work. Our problem initiated from AFMC moving toward everything being associated with a metric. The result was that we were being tasked with issues which were clearly not process analysis or metric development. We had to educate some of our staff, and the problem seems to have sorted itself out at this point.

CONCLUSION/SUMMARY

The question you may be asking is "Do I want to create a process analysis branch in my organization or not?" I would give you a resounding "yes." However, I would also advise you, "don't expect to solve world hunger tomorrow." The

gut-level work required to support process analysis or process variability reduction is not easy and often is not pretty. Some of the things that must be considered are:

- Manning and Budget Restraints: With the DoD elements getting smaller, you must be willing to take resources out of your hide. Most organizations simply can't get new bodies these days. The same applies to funding, equipment, office, training, etc.

- Training and Skill Development: Most of us do not have people working for us with a Ph.D. in Statistics. To date, we have seen limited training opportunities available not only for our team, but our entire organization. We are finding that often we are learning techniques as we go along.

- Developing Statistical Analysis and Clean Data: This is a big concern. In the DoD, we have numerous data systems which do different things and don't talk to each other. This is further complicated by inaccurate or incomplete data from input errors.

- Reception by the Workforce of the Approach: Old paradigms die hard. People are naturally afraid anytime someone comes in and says "tell me what you are doing so I can help you do it better". We had to get an education and develop a cultural change. For the most part, we have had a fairly high level of success in assuring people that we are not there to "get them in trouble". It is a problem that must be dealt with before you will get anything of value.

- Reception by Senior Leadership: As the head of your organization, you must be willing to handle interaction and public relations with senior leadership. Most of us "want it good and want it now" without any costs. The fact is, it takes time. You will be using resources that will have down the road payoffs. You will have expanded your staff function in a decreasing resource environment. While this will not be a problem for your team, it will be a problem for your organization.

- Expanding Requirements: The work our team is doing is expanding geometrically. While this is good, it also puts a strain on the resources. From our perspective, more and more things will fall into process analysis (e.g., metric development, customer satisfaction surveys, developing measures, education and training).

Again, I would encourage you to move out with a process analysis shop. While we are still in the initial stages, this approach is the only way an organization can actually go after the real problems associated with the way we do business. Process analysis enables you to examine work from a macro and micro level. This allows you to see the step by step functions in how organizations do their work. With analytical data, you can conduct comparisons with other organizations' processes and determine "Benchmarking" opportunities. Results to date have been good for possible Benchmarking, not only for our immediate organization but our entire command. We have identified problems with our existing data bases and actual information that supports

current allocation of resources. With the use of statistical tools an organization can determine the greatest users of resources, the best method and how to benchmark that process, develop meaningful metrics, determine what is or is not value added, and ultimately, what satisfies the customer.

We are interested in discovering what other organizations are doing. Whenever possible, we are trying not to reinvent the wheel. Please write us at:

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If you would like to talk, please call (513) 255-4192/4886 or DSN 785-4192/4886.

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USE OF TQM METHODOLOGY FOR 20th MEDICAL GROUP MISSION TRANSITION WORKING GROUP

Maj Kathleen Waldrop

USE OF TQM METHODOLOGY FOR THE 20TH MEDICAL GROUP MISSION TRANSITION WORKING GROUP

BY: Kathleen G. Waldrop, Major, USAF, NC

In April 1992, the 20th Medical Group Executive Committee tasked a multidisciplinary group to plan for the smooth drawdown from a 30 bed hospital serving 15,000 beneficiaries, to clinic status, with a possibility for entire cessation of all medical services by 30 Jun 94. Initially titled a process action team, after three meetings, it rapidly became apparent that because there was no prior process established, there was no opportunity to improve a process. Subsequent to this, the group was renamed the Mission Transition Working Group (MTWG). The working group is comprised of a cross section of personnel throughout the hospital. The group is involved with plans and recommendations involving the drawdown to clinic status, the closure of all medical services at RAF Upper Heyford and the ramp-up of an operating location at RAF Croughton. Issues addressed by the MTWG are divided into five categories: Mission, Services, People, Facilities, and Things (Logistics). They are empowered by the Executive Committee to plan and make recommendations regarding any actions necessary for the smooth drawdown and subsequent closure of this facility. Executive Committee members make the final decisions on recommendations from the group, and these decisions are forwarded to the 20th Fighter Wing (FW) Mission Transition Office. Once recommendations are endorsed by the Executive Committee and the Wing Mission Transition Office, hospital staff members are briefed by the MTWG, thereby ensuring that all are aware of decisions to be adopted.

The MTWG leader was initially an administrative officer, also in charge of Plans/Programs for the 20th Medical Group. Three months later, upon his PCS, I was nominated and became the group leader, due to my leadership role in the organization and familiarity with TQM methodology. The Administrator, a member of the Executive Committee, is the group facilitator. As the group leader, initially, I did not have the "big picture" of the drawdown for the entire Wing. The facilitator, a member of most of the Mission Transition Working Groups for the 20th FW, remains knowledgeable of all Wing drawdown and closure objectives. In the beginning, the facilitator often "led" the working group, rather than acting to facilitate the group's activities and group dynamics. This created conflict in the group, making it difficult to follow TQM methods. As a result, the facilitator and I now meet regularly outside the working group to ensure the agenda is concrete and understandable for the entire working group to address issues at hand. Utilizing this tactic gives me the current issues the Wing is addressing, enables me to effectively direct the group, and allows the facilitator to observe and comment on group dynamics and TQM methods.

The use of TQM tools is varied and abundant. Many brainstorming sessions are conducted, allowing for free flow of ideas to consider all possibilities. Early lessons learned from brainstorming sessions are that these sessions can be more lengthy than the recommended time alloted. As a result, brainstorming, clarifying and combining are now broken out into separate timed segments, allowing for sufficient time to complete the brainstorming process. Additionally, multiple voting and rank ordering are conducted via electronic mail, reducing time used during working group meetings. Another valuable tool utilized was affinity sorting. During the first draft of determining timelines

for the drawdown and closure of services, the group struggled with dates for over two hours. When a subsequent off site was conducted, one member suggested utilizing the affinity sorting tool. This session took only thirty minutes for the group to come to consensus. More recently, we have begun to address "benefits and challenges" when addressing issues of concept of operations, ambulance response, etc. This allows the group to list the "pros and cons" of each and every recommendation made, thus ensuring that all issues of concern are addressed and weighted. Additionally, utilization of this technique significantly reduces re-work and allows the group to proactively address current issues. The working group developed many graphs to depict such things as the drawdown and closure of services, drawdown of people, status of accountable and expendable logistical assets, etc. An external customer survey was recently adopted to question the base population on their priorities and expectations of the Medical Group during the drawdown phase to closure, as well as questions to elicit input regarding clinic operating hours, publicity, transportation to local military facilities and processes for access to care in the local national health care system. Feedback generated from this survey will further assist the group in making recommendations as well as considering the ultimate customers, our patients, in our community. Subgroups were formed to address such issues as the Acute Care Clinic concept of operations, ambulance response, facility floor plan for both clinic status and consolidation of activities during closure phase, and external customer survey. These subgroups provide the group with their recommendations and allow the MTWG to focus on the entire picture of the hospital drawdown and closure plan. Additionally, it allows other hospital staff members, with respective expertise, the opportunity to provide their specialized input.

TQM style agendas are consistently followed. Much emphasis is placed on clarifying the objective at hand to ensure all group members are aware of the "order of business". Recording is performed by use of flip charts during the meetings. The leader then develops minutes from these flip charts, places in the storybook and also shares with the rest of group members via electronic mail. Timekeeping is accomplished with the aid of "flash cards" to assist all members with awareness of time. Use of a preestablished time bank has often been utilized to ensure adequate time, should time allotments be insufficient. This allows the entire group to more effectively manage time. Updates from Wing Transition Group meetings are included in each week's agenda. This provides us with updates on issues at wing level which may or may not impact the rest of the current or future meetings. Much emphasis is placed on lingering questions. We find this a useful "5 minutes" to discuss not only questions, but concerns, future agenda recommendations, minor items of business not included in the agenda, etc. Utilizing an established timeline of activities, the entire group plans each agenda. This allows us to prioritize activities at hand, and to collectively decide what content to cover. Additionally, it aids in better understanding our next objective. Finally, the entire working group is involved in the evaluation of each meeting. Areas that went well, need improvement, and lessons learned are addressed and agreed upon collectively. Lessons learned are compiled and entered both in the storybook as well as shared with the Wing Mission Transition Office. These lessons learned will hopefully assist other bases involved in a drawdown or closure process. The facilitator always provides valuable and objective input regarding the group's group dynamics.

Group dynamics have continually improved since the inception of the MTWG. The group is comprised of both officer and enlisted members of the hospital staff.

Nonattribution is a consistent and challenging goal. Even though some members' supervisors are members of the group as well as report directly to Executive Committee members, we are able to maintain this nonthreatening atmosphere. They meet weekly at a consistent time and place. To date, there have been five off-sites conducted to allow the group to address and plan broader issues at hand, i.e., entire plan for drawdown to clinic status, entire plan for complete closure of the MTF, plans for an operating location at a nearby base, Acute Care Clinic concept of operations, ambulance response after emergency room closure, etc. These off-sites generally last for six to eight hours. Membership has remained constant since early Fall 1992. Consequently, the group has achieved cohesiveness unmatched in any other Process Action Team or working group throughout the facility. Some members are persistently "quiet", while others are extremely agressive. However, superior group dynamics on the part of the group, with the assistance of the facilitator, ensure that all participate and contribute at each meeting. Conflict frequently arises, but any disagreements are resolved prior to proceeding with the meeting agenda or cessation of the meeting. Consensus is frequently achieved. When consensus cannot be achieved, the majority vote rules.

As previously stated, the Executive Committee empowered the MTWG to plan and make recommendations for the drawdown and eventual closure of the 20th Medical Group. During the weekly meetings, the group independently plans and recommends. Ideas generated from outside the group are incorporated into the agenda or during the lingering questions portion of the agenda. These ideas are either in the form of suspenses generated from the Wing Mission Transition Office or ideas or suggestions from the executives or any other members of the hospital staff. A very large risk was taken by the Executive Committee to empower our group. In the beginning of the MTWG activities, one or two of the executive members perceived us as a decision making body, however, frequent briefings given to the Executive Committee by myself as the leader of the group have thus far dispelled these misperceptions. To date, the Executive Committee has, with minor readjustments, adopted and endorsed all plans and recommendations put forth by the Mission Transition Working Group.

Use of a multidisciplinary group significantly aided in the "buy-in" by all parties concerned. The 20th Medical Group Executive Committee, as well as the MTWG, strongly feel that support and understanding of these final outcomes are largely due to a collective group effort rather that only a few key people making plans, recommendations, and decisions.

As of the date of this paper, the 20th Medical Group is now in the execution phase of drawdown and closure. All medical services will cease 1 April 94. This will allow the buildings to be released to the British Ministry of Defense no later than 30 June 94. RAF Upper Heyford, in its entirety, will be released to the Ministry of Defense no later than 30 September 94. In the interim period of time between April and September 94, the operating location at RAF Croughton will absorb medical care for the residual population. Currently, the Obstetrical Inpatient Unit, Obstetrical/Gynecology Clinic, Dermatology Clinic, Ear, Nose and Throat Clinic and Orthodontic Services have closed and transitioned to our Family Practice Clinic, RAF Lakenheath or local civilian referral agencies. Utilizing the plans and recommendations of the MTWG, all the above areas "closed up shop" well ahead of the preestablished 30 day period after cessation of services. We agree that execution of recommendations from the MTWG will allow our facility to accomplish in ten months what has taken others two years to accomplish. We at the 20th Medical Group firmly believe

that the success of this working group, coupled with extreme emphasis on our ultimate customers, our patients, is largely due to the use of TQM methods to achieve this very challenging task.

INSTRUMENT MAINTENANCE AND CALIBRATION TIMELINESS IMPROVEMENT

Paul Scharfenberger

INSTRUMENT MAINTENANCE AND CALIBRATION TIMELINESS IMPROVEMENT*

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ABSTRACT

A process improvement effort has produced substantial gains in timeliness for servicing instruments that support turbine engine and rocket motor simulated altitude testing. Before process improvements, approximately 17 percent of the service requests were completed outside the target service interval window. This created a backlog of service actions and jeopardized data quality. Utilizing a low-key approach and fine tuning the process produced a 15-percent improvement in timeliness with minimal resource expenditures. After 2 years, recall timeliness continues to be well above the established 95-percent service completion goal.

INTRODUCTION

Arnold Engineering Development Center (AEDC) is a U.S. Air Force aerospace ground test facility located in Middle Tennessee. Considered to be the free world's largest ground test installation, the Center operates 53 aerodynamics and propulsion test facilities in support of system development and research and development programs for the Air Force and other DoD agencies, NASA and industry. Although overall administrative responsibility for operation of the center is the Air Force's, Sverdrup Technology, Inc., operates the Engine Test Facility (ETF), which comprises 15 turbine engine and rocket motor test units.

Recent international events and our recessional economy have steadily eroded the defense budget over the past several years. Because capital investment funds have decreased, the need to maintain existing facilities without degrading the quality and integrity of our product is great. Knowledge is our product; data from the tests we perform is how we gain this knowledge. Ensuring data integrity is the driving force behind our process improvement. The purpose of this paper is to show how a low-key approach to process improvement in the ETF was cost effective and achieved significant results.

BACKGROUND

Our primary objective was to improve the instrument calibration and preventive maintenance service timeliness. A major goal in the ETF is to ensure a high degree of data integrity of our rocket motor and turbine engine test project data. Our goal for this process improvement must support the overall goal. Sverdrup's Instrumentation and Controls (I&C) Department is responsible for about 26,000 instruments. Of this

*The research reported herein was performed by the Arnold Engineering Development Center (AEDC), Air Force Materiel Command. Work and analysis for this research were done by personnel of Sverdrup Technology, Inc., AEDC Group, technical services contractor for the AEDC propulsion test facilities. Further reproduction is authorized to satisfy needs of the U. S. Government.

quantity, one-third of the instrument inventory is operationally checked before each test activity begins, one-third is covered by the recall maintenance process and the rest are instruments not requiring periodic service. The recall maintenance process is the total effort required to complete the periodic service of I&C instruments. This process includes scheduling, processing, and distributing service requests; completing the required service; and entering completed service information into the Instrument Management Information System (IMIS). The IMIS is a centrally located mainframe IBM computer database maintained by the support contractor. The IMIS is used as an inventory and scheduling system for maintaining instruments. The nature of development testing requires that instruments be moved whenever and wherever they are needed, sometimes without reporting location changes to the IMIS. Since there are more than 200 possible locations in the ETF, finding an instrument for service becomes difficult. Instruments past due for calibration can impact the credibility of the data obtained from the test article. Therefore, it is important to keep the IMIS records up to date.

Early in 1988 maintenance personnel pushed to increase the number of instruments serviced on time. Timeliness improved, but compliance was difficult to achieve without making needed changes to the process, and within six months the timeliness declined. Instrument service was managed by a reactive management philosophy. The attitudes of engineers, craft supervisors, and craft personnel were, in general, complacent. Instrument service was low on everyone's priority list even though they knew that the data obtained was only as good as the instrument used to obtain it.

In 1990 Total Quality Management (TQM) took AEDC by storm. We, as well as our customer, the Air Force, and the other on-base contractors started employing TQM techniques at AEDC. Sverdrup organized TQM management teams to investigate areas that could be improved. One such team, the I&C Maintenance Process Improvement Team, was composed of the I&C Department Director and his managers with input from all levels in the organization to identify several areas that needed improvement. In 1991, the team and the Air Force quality assurance evaluator established a 95-percent timeliness goal for instrument service completion each month. The 95-percent goal and management empowerment allowed the administrator of the recall maintenance program to proactively manage the instrument service. Normally, a TQM project team would be established at a lower level to carry out the process improvements. However, management decided that a team was unnecessary in this case because the problem was determined and a common goal was set. They were aiming toward worker self-control, essentially creating the atmosphere for all who are involved in the instrument service process to share in the responsibility for meeting the external customer's (Air Force) goal.

APPROACH

Our improvement method didn't follow the standard TQM methodology. We used a modified approach because the Maintenance Process Improvement Team had already identified the problem and the goal we were to satisfy. We had only to determine the necessary action. Instrument service completions were in the 80-percent range, with extreme swings of 15 to 20 percent each month. The swings indicated to us that we were under-controlling the process; in fact, we had no control. We knew that if we could establish more control, increase employee self-control, and make some minor corrections to the process, a more consistent instrument service completion record would be produced. Therefore, we set out to fine tune, not scrap, the existing recall maintenance process.

Initially, we looked at our performance and asked ourselves if we were providing our internal customers a quality product when they needed it. After our self-assessment, we looked at our internal customers' performance. Our basic strategy was to get the facts, analyze the information, determine the most appropriate course of action, and strike (implement) while the plan was still hot. Experience suggested that letting time pass causes indecision and rework. So we "just did it" by implementing several improvements at a time and fine tuning as we went along. This sounds impetuous, but we had confidence in the ability of the people involved to overcome difficulties as they arose.

First, we reviewed our internal process and decided that our process was part of the problem. We were inconsistently providing our internal customer with the service requests. We concluded that this factor was part of the reason why service timeliness fluctuated monthly. Therefore, we had to establish a schedule that we would consistently follow. This schedule made the process routine to our internal customers; they now knew when to expect the service requests and were even provided advance information which helped them do their jobs more efficiently. Another change we made to better service our internal customers was to improve the personal computer (PC)-generated service request sorts. These sorts were not always reliable. Service requests were often "put in the wrong pile" and sent to the wrong people. Sending the requests to the wrong people delays completion of the instrument service. Software changes were made to the monthly "due" and "past due" service request sorts to reflect a more standard approach. Standardizing the sort programs made possible the improvement in service request completion timeliness.

With our internal process assessment completed, we had to look at the internal customers' process. We intended to keep the process improvements as low key as possible to deemphasize the fact that we were changing the "established way of doing things." Internal customer involvement is essential to the success of the process improvement, but we didn't want to constrain ourselves by involving everyone. We talked to our key internal customers on a one-on-one basis, asking for inputs and educating them about the need for changes. After these individuals agreed, we analyzed the complete process from beginning to end by using readily available data.

We knew there was a bottleneck somewhere in the process and analysis of instrument service completion dates was a good place to start. Completion dates sorted by personal computer identified individuals or groups of internal customers failing to complete service on time. The results indicated that some test support engineers were not coordinating the requests with the craft supervisors early enough for timely completion of the required service. Based on the late service results, we determined that the test support engineers needed an advanced notice list of instruments due for service so they could decide to defer or accomplish service on their instruments.

Second, we sketched a simple process flow chart to see if there were any obvious improvements to the process. Figure 1 is a simple flow chart of the initial recall process. We developed the flow chart identifying the process name, organization involved, time, and the task to be accomplished. Figure 2 reflects the changes we made to the process. We determined that a single point contact in the craft organization was needed as a distribution and collection point for service requests. This person was already working as a planner/scheduler for the group. All service requests went through him, as an additional check, to ensure that the requests were given to the correct supervisor. In turn, he ensured that the service requests were properly completed before returning them to Maintenance Engineering for data entry. This

information check validated the integrity of the IMIS database. The flow charting and data analysis identified the need for a part-time data entry clerk because the completed service information feedback loop to the IMIS from the craftsmen was not effective. The data entry clerk is more efficient and cost effective. Information entered into the IMIS by the craft personnel completing the service contained many data entry errors. A data entry clerk was available, and arrangements were made for her services. Since she was familiar with the operation of the mainframe computer, only minor on-the-job training was needed for integration into the process.

Another improvement item that surfaced was the need for feedback to the craftsmen and their supervisors on work completed. Weekly and monthly status reports were instituted to inform the people that serviced the instruments on how well they were doing. This requirement involved writing a new program that took several weeks and many changes to satisfy our internal customers' needs. However, it does enable the craftsmen to complete the service requests on time.

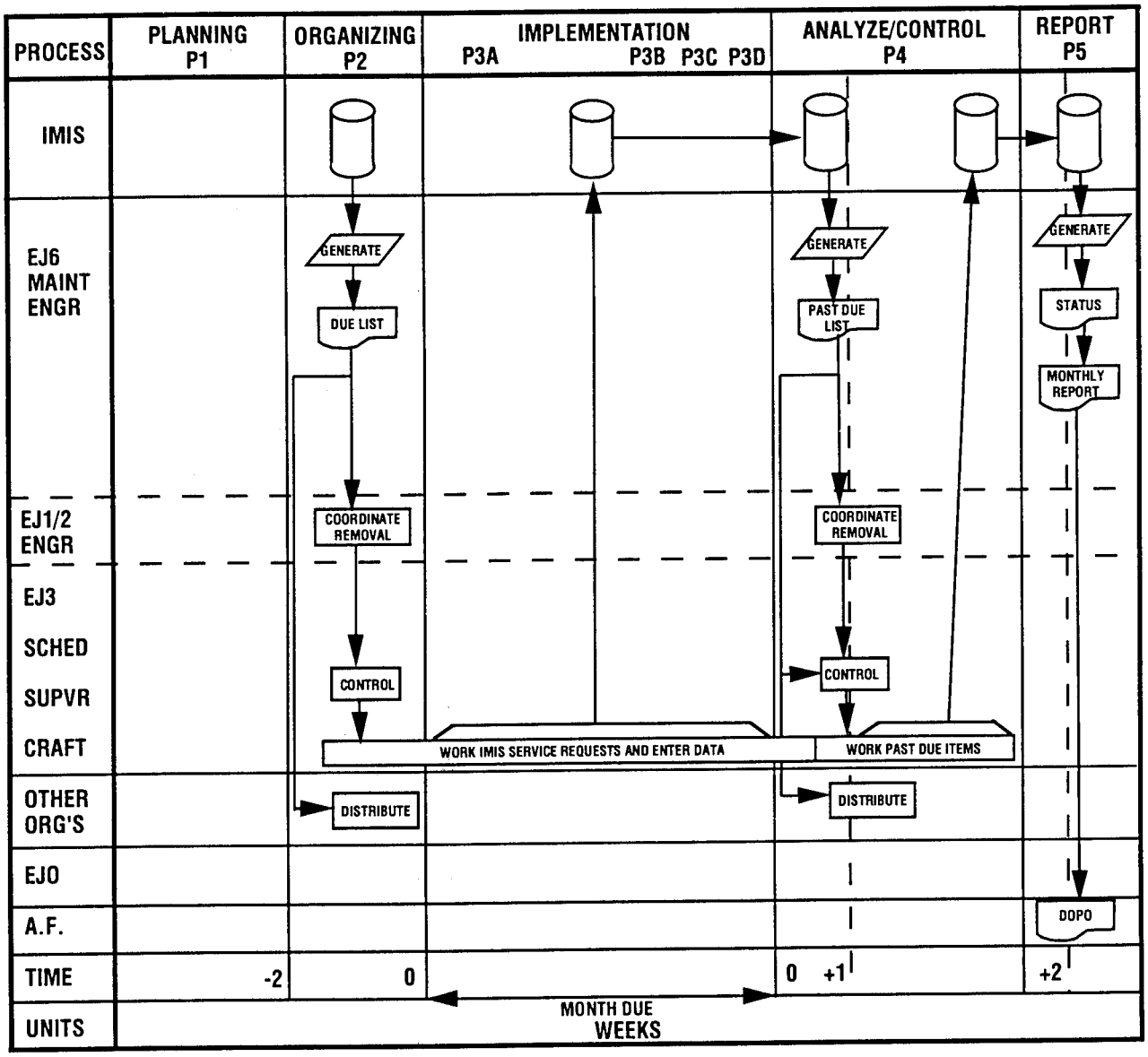

Fig. 1. I&C Recall Maintenance Process (Initial)

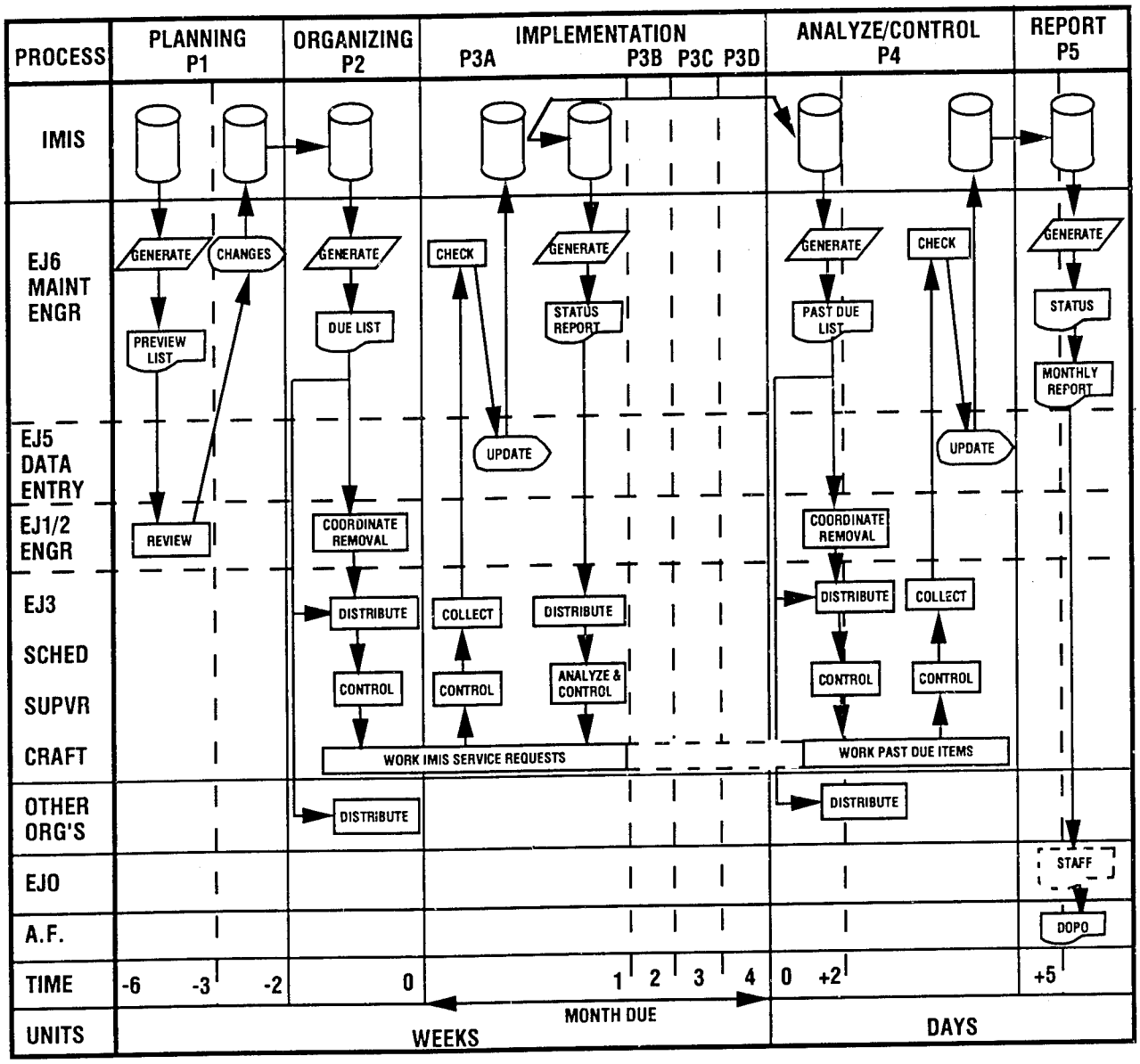

Fig. 2. I&C Recall Maintenance Process (Revised)

Our team also discovered that we were servicing instruments located in test units that were not in operation (no testing requirements) and wouldn't be active for some time. Man hours were being spent on test units that didn't need to be kept active. So we developed a procedure for deactivating and reactivating test units. The procedure allowed us to "turn off" the recall process in certain locations and save man hours while doing so. Previous instructions for an instrument to be "turned off" for service were to change the status in the IMIS and affix a green "Do Not Use" tag to each instrument. Since it is not uncommon to have 500 signal conditioners in a data conditioning room to support a rocket motor test, deactivating (turning off) the signal conditioners for service would mean a wall of green tags hanging from the instrument racks. The time spent filling out the tags and affixing them to the instruments was a major resource drain. We changed the procedure by printing a notice that delayed all instruments for service. This notice is approved by the test support engineer in charge of the test unit and placed on the entrance doors to the test unit. Then the IMIS records are changed to reflect the new status.

All these changes were implemented over a two-month period. No major glitches occurred, and we received very few complaints. We received many ideas on how to further improve the process. For example, one craftsman recommended that we improve the recall service requests. Both the due and past due service requests were being printed on standard 8 1/2 × 11-in. white paper; and past due service requests could not be differentiated, except for the title. The past due requests were printed on colored paper so the technicians could visually identify and respond in a timely manner. Several craft personnel made positive comments in response to this change. We also printed an "unable to locate" instrument list on red paper each month and distributed it with the due service list. Finding lost items is high on our priority list. Another improvement implemented during this phase was to maintain a schedule of active and inactive test units. This schedule ensures that everyone involved in the recall process is aware of which test units are to be serviced. Only minor changes were needed to improve the overall process of distributing, tracking, and reporting information needed to produce and maintain the quality product that the ETF is known for.

RESULTS

Management's primary goal of ensuring the integrity of our final product (test project data) had to be above question. An instrument out of calibration in a critical parameter could jeopardize the reliability of the data. Improved timeliness of instrument service was but one of the benefits achieved. Additional accomplishments improved the total recall process significantly. The following results are proof that our method of process improvement worked for us.

Timeliness improved: Before the recall maintenance process improvement was initiated, instrument service was averaging about 83-percent timely completion each month. When the goal was established (see Fig. 3), timeliness improved. More effort was expended to reach the goal during the transition from the old process to the new process. Meeting the goal was not an easy task to accomplish. Once the changes were implemented, the effort previously needed to satisfy the goal was reduced, and smoother operation began. By analogy, a TV repairman will normally fine-tune the horizontal deflection circuit on a television after he has made repairs to the circuit. Before he makes the coarse adjustment, the picture is unintelligible or out of synchronization (sync) with the rest of the tuned circuits in the TV. He first makes a coarse adjust to bring the horizontal circuit in sync, making the picture intelligible. Then he makes minor adjustments (tweaks) that "fine tune" the circuit to make the picture more pleasing to the viewer. This coarse adjustment is analogous to the oscillations in FY 90 and the first half of FY 91. The operation wasn't totally out of sync, but it wasn't functioning as expected. Implementation of the proposed improvements "fine tuned" the existing recall process, thus, smoothing out the overall operation. Over the course of the project, we "tweaked" the process to further synchronize the operation. Tweaking is a way to continuously improve the process for an optimum effect. After meeting the goal for about a year, complacency set in. We started to lose the gains we had established. An effort to recapture those gains was

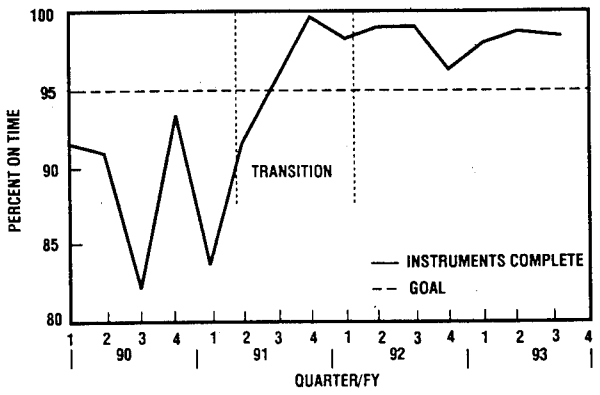

Fig. 3. Timeliness Improved

initiated once the downward trend was detected. We collected the data for evaluation, compared the data with the measurable goal and used the results to control the process. The appropriate engineers and supervisors were contacted to ensure that the downward trend was reversed. The controls that we established at the beginning of the process improvement were manipulated for immediate, positive results.

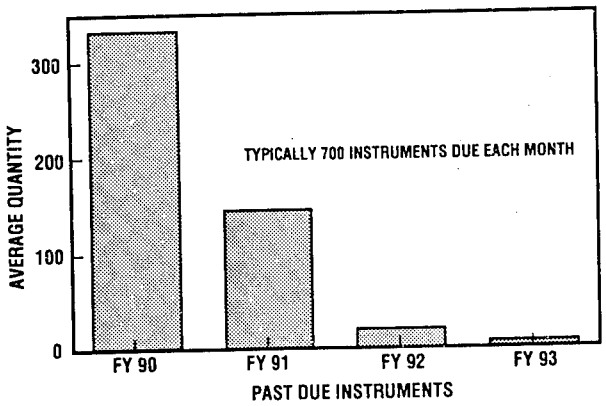

Fig. 4. Backlog Reduced

Reduced backlog: Normally, maintenance organizations prefer to maintain about a month's backlog of work, and our organization follows this general rule. However, maintaining our high-quality product (data) is a company objective, and a backlog of test-critical instruments requiring calibration is unacceptable. We strive to ensure that our data is not compromised by an instrument that is past due for calibration. The ultimate goal is completing 100-percent test-critical instrument service with no backlog, a nearly impossible task. A noncritical instrument service backlog is permissible. However, we try to keep the backlog to a minimum. A comparison of the instrument backlog graph (Fig. 4) with the timeliness graph demonstrates that the goal had an effect on the backlog.

Decreased "unable to locate" instruments: Locating instruments for service has been a problem in the past because our IMIS records weren't kept current. The emphasis on improving the overall process naturally carried over into records keeping. Improving our records keeping has made it easier to find the instruments needing service and has decreased the quantity of "unable to locate" instruments from typically greater than 30 to less than 5. As previously mentioned, we started printing an "unable to locate" listing on red paper to flag the importance of finding the items on the list.

Decrease extended service: Test projects often last for months at a time. Sometimes it is necessary to extend the service interval of an instrument that is located in a test unit, and we have a procedure for extending (wavering) that service. Normally, a 30-day extension is authorized to complete the test or phase of the test. Usually the instrument is a transducer or a load cell that is removed and transported to the Precision Measurements Equipment Laboratory (PMEL) for calibration. The lab technician records the readings while calibrating the instrument. These recorded readings are sent back to the test support engineer to correct (bias) the data if the instrument required adjustment. Why don't we extend all the instruments in these test units and calibrate them after the test project is complete? The problem is the duration of some turbine engine tests which accumulate mountains of data. Correction of data for instruments that have drifted out of calibration would take too long after a test. This would postpone important decisions needed to improve test article performance. For this reason, we provided an advance notice (preview) list about 6 weeks before the due month to the test support engineer. This allows time to decide whether to have the instrument serviced or to extend. Instrument service extensions have been significantly reduced (by about half) since we began the preview list.

Improve IMIS records integrity: Justifying this claim is simple - it's easier to find instruments requiring service. The increase in timeliness is one indicator. Another is the greater accuracy of the information on the service requests allowing craftsmen to locate the items more easily and without any major complaints. The service requests are completed by the servicing craftsmen. One question is, "Was the instrument found in the location as indicated on the service request?" Typically, the craftsmen report less than five per month that were not in the correct location.

Reduce resource consumption: An alternative procedure was developed for delaying noncritical instruments for service reducing the overall man hours consumed by about 10 percent last year. This savings helped to meet our restricted FY92 budget.

CONCLUSION

The results discussed in this paper show that the implemented improvements had an effect on our internal customers. I can truthfully say that if it weren't for the professional attitudes of all the people involved in this effort, the outcome wouldn't have been so positive. The present TQM atmosphere may have had something to do with breaking down the usual barriers to change. The TQM approach of starting change at the top and passing it downward to the worker gave us the opportunity to make this project successful. The maintenance process review teams' edict to improve the instrument timeliness and empowering the recall administrators to accomplish the job also helped. Stressing the importance of this fact, in 1988 the maintenance group tried to improve the instrument timeliness without much success. Working from the bottom up didn't work. Therefore, the Juran top-down approach is important for creating change. The internal self-assessment of our process for providing the service request to our internal customer was important. Doing some housecleaning before attempting to make improvements to a process involving your internal customer helps. It tends to show the customer that you're serious about improving the process and it also helps to eliminate any "finger pointing" when you start talking change.

The lack of a formal TQM team to improve the recall process was gratifying to the administrators of the process. This action signaled a "green light" for us, the informal team, that management had confidence in our abilities to find the cause and make the necessary corrections at our level. This decision provided us the self-assurance to follow through and improve as we saw fit. It also gave us the latitude to try things without the fear of repercussions.

The significance of the results has contributed greatly to the recall maintenance process. The fact that we have exceeded the 95-percent goal and sustained it for 2 years is without a doubt, a monumental accomplishment. Because of our success, we have reduced the number of instruments past due for service which has, in effect, eliminated our test-critical instrument backlog. Our instruments are well cared for at a reduced cost. Current records reduced the need to spend more time searching for instruments when service is needed. Our "unable to locate" instruments have decreased due to a list provided to our internal customers. We now have fewer extended service requests because we provide an advance notice for service to the test support engineers who, in past years, were unable to coordinate the instrument removal for service in sufficient time.

Basically, the desire to improve the maintenance process by all I&C department personnel has been the guiding force for its success. The ability to go from a low 80-percent timeliness completion rate to 98 percent testifies to the effort contributed by

everyone involved. The success or failure of any process improvement depends solely on the people involved. In our situation a conscientious work force working as a team made it happen. Our decision to keep the cause-and-effect phase low key did not affect the results. Our decision to maintain a low-key approach with our internal customers was beneficial in regard to time. Talking to key internal customers and asking for their input without involving all players made the implementation smoother. My past experience with group participation has been somewhat negative. There is usually a lot of disagreement among the members on how to approach the problem. This is not always the case, but we thought that the time spent would be mostly nonproductive. However, personalizing the effort with a one-on-one approach was beneficial, and asking for individuals' ideas made the job easier.

The fine tuning process, including good planning, flexibility, analysis of the facts, and immediate action to implement needed changes, has produced many improvements. Only by working as a team were we able to produce the results that we have obtained during this endeavor, and no one group can take credit for the outstanding results we have achieved. Our outstanding results verify Juran's prediction that fine tuning a process can achieve significant results with minimal capital investment.

Biography

Paul Scharfenberger is the Instrument Maintenance coordinator for Sverdrup Technology where he is responsible for improving the instrument maintenance process. He holds an Associate of Applied Science from Air Force Community College and a Bachelor of Science from Middle Tennessee State University.

IN SEARCH OF PROFOUND KNOWLEDGE

Capt C. Ted Barco

IN SEARCH OF PROFOUND KNOWLEDGE

By: Charles T. Barco

As the son of an entrepreneur, my journey into quality began almost as soon as I could walk. Whereas fighter pilots might raise their kids on vivid stories of flight, my dad and I would talk on lazy summer evenings about corporate America, and sooner or later our talks would always come back to quality. As the years passed, I chose not to follow in his footsteps, possibly because of the frustration I sensed in the world he had given so much of his life to make better. Yet, as a result of our dialogue, he engrained in me a philosophy of quality that today is inseparably entwined in my value system.

I had never realized how deeply he had planted the quality seeds, until the Air Force began its painful evolution into quality. This paper, though inspired by my dad, is really for the Air Force. It is no more formal than our lazy summer talks, but nevertheless, reflects a holistic philosophy that may shine some light on our quality movement and those charged with keeping it alive.

This paper specifically will address what I see as a weakness in our current quality movement, and propose the adaptation of a philosophical guide to strengthen, focus, and synthesize our efforts already initiated. A philosophy based loosely on Dr Deming's concept of profound knowledge. Yet, one that I see as potentially being the bedrock of all that we do today, and a springboard for the quality transformation of tomorrow.

To begin, our current approach to quality is already heavily tainted by what Dr Deming calls the Seven Deadly Sins, the five associated with the Air Force I've shown below:[1]

1. Lack of Constancy of Purpose.
2. Emphasis on Short-Term Profits.
3. Annual Performance Evaluation.
4. Job Hopping and Executive Mobility.
5. Decisions Based on Visible Figures Alone.

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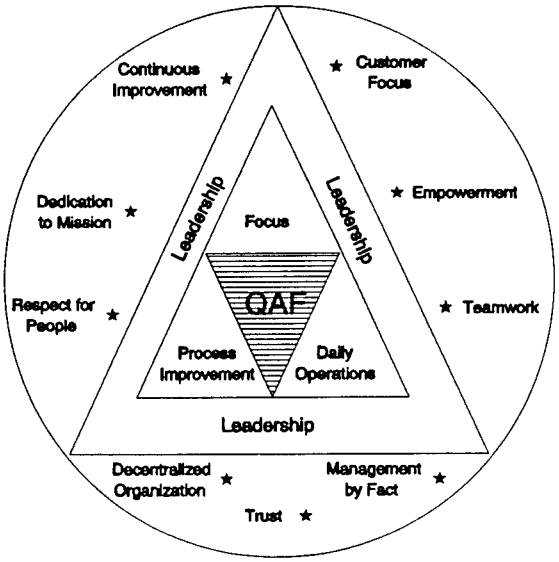
[1] Deming, W. Edwards. Out of Crisis. Cambridge, MA. MIT Center for Engineering Studies. 1992. pg 97.

With so many barriers to transformation, the Air Force quality movement is fighting an institutionalized battle that is further aggravated by a lack of an overarching quality philosophy. Unfortunately, many of our initial experiences with the Air Force quality movement were negative, as zealots of the movement anxious to demonstrate their new found tools and techniques experimented on the force in the name of quality. Quality has become what Masaaki Imai calls the "great leap forward."[2] Yet in making this leap we have placed the cart (implementation/application) far ahead of the work horse (education/comprehension). Such a fast-starting, result-oriented approach to quality lacks an educational/philosophical basis and is doomed to frustrating those who are honestly attempting to assimilate its message into their value system. Quality is first and foremost about integrating understanding with values, the two are inseparably joined at the hip. Yet, as we race to the quality altar with our Air Force model in hand,[3] we discover education is not even part of the model (see below).



We instead have what I'll call a superb implementation model which begs for a philosophical basis. The current model serves as a powerful beacon to guide us in our implementation efforts, but serves us poorly in getting the ship to the speed required to break away from the tides of complacency and ignorance which continually pull us back into the rocks. The key to our successful breakaway lies in education and

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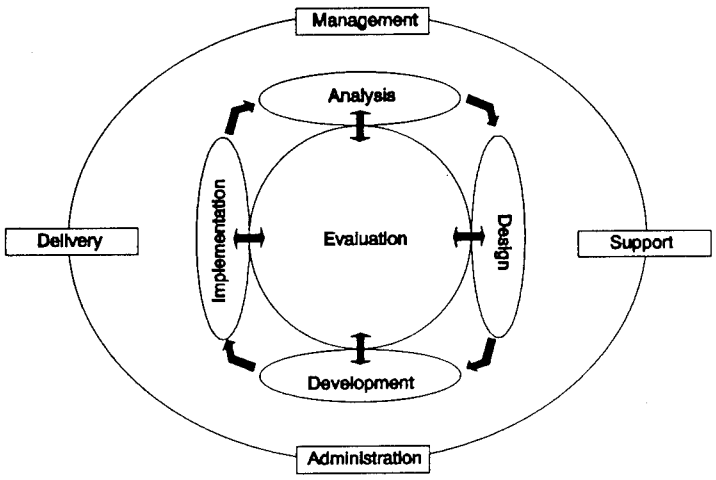
[2]Imai, Masaaki. Kaizen, The Key to Japan's Competitive Success. New York, NY. McGraw Hill Publishing. 1986. page 23.

[3]Air Force Quality Center. "Team Leader Course." Montgomery, AL. Air University Press. 1993. page 9.

transformation, both are precursors to implementation, both are critically linked to profound knowledge.

Quality is an awareness which grows from a gradual change in the way we see ourselves and the world around us. This change may arise from what Dr Deming calls the development of "profound knowledge."[4] Profound knowledge then becomes the catalyst of institutionalized quality transformation. Unfortunately, this author believes, the Air Force in its rush to implement quality and its associated tools, has in essence given a fishing rod to a hungry man who must eat, but may only have limited appreciation for the complexities of fishing. Without profound knowledge to guide him, nor adequate role models to mimic, his actions will be disjointed and short lived. With only superficial appreciation of the task he's been asked to do, he'll soon direct his labors elsewhere, or worse, reluctantly go through the motions of casting and reeling in without ever understanding their meaning, nor value the potential harvest that we had intrinsically intended for him to reap. And so I see the Air Force today, vigorously instructed on quality implementation, but never asked to simply understand and value the basic philosophical attributes of quality in relationship to its own institutional bias. Any proposed educational conscript takes time and should parallel Masaaki Imai's description of the "gradualist" approach to quality. This gradual approach, by regulation should be developed in accordance with our evolving quality-based Instructional System Development (ISD) model. This model, shown below, "reflects the movement away from rigorously applied procedures and emphasizes adaptability to ever-changing environments."[5]



[4]Deming, W. Edwards. "The New Economics for Industry, Education, and Government." Los Angeles, CA. Quality Enhancement Seminars. 1993. page 71.

ISD gives us the flexibility to build a simple, yet philosophically-based educational model for quality. To attempt quality implementation without a philosophical or educational basis in profound knowledge is fundamentally dangerous to any organization and conceptually violates the premise of ISD. Independent actions are taken without understanding their conceptual origins or their potential consequences, creating a system plagued by tampering and by what Dr Deming calls suboptimization.[6] Both have long been associated with the Air Force, yet only recently have they surfaced through the guise of quality. If quality is to succeed, it must be nurtured and gently raised as if it were a child. Institutions and people alike develop values slowly, and changing values in the Air Force will take time, as well as the thoughtful development of a fundamental philosophy on which to base our quality values. I argue this philosophy should be centered in profound knowledge, and our education and implementation objectives should radiate from its core.

Profound knowledge was conceptualized by Dr Barbara Lawton and Dr Edwards Deming.[7] It is a system of knowledge which includes the four elements noted below:

1. Appreciation for Systems/Processes.
2. Knowledge of Variation within Processes.
3. Incorporating the Theory of Knowledge in the Workplace.
4. Application of Psychology in the Workplace.

I thought long and hard over Lawton's and Deming's construct and finally decided it would not serve well in the Air Force. Yet, despite my rejection of their specific breakout of this system of knowledge, I do accept the overall premise of precursory profound knowledge leading to personal and institutional transformation. Based on that acceptance, I began a philosophical journey into the literature to find out how I could better package the critical elements of profound knowledge, as required in the Air Force. This journey took me through the classics, and inevitably back to my dad.

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[5]AFP 50-68, Information for Designers of Instructional Systems. HQ USAF. Washington D.C. Nov 92. pg 15.

[6]Ibid. pg 51.

[7]Ibid. pg 73.

Where at his desk, I scrawled what I envision to be the three missing supports to our triangular implementation model, and thus the philosophical basis of quality.

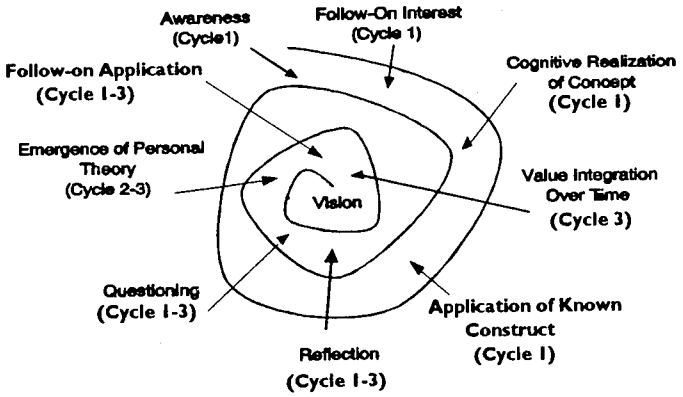
These legs are described as follows:

1. **Arete** - Greek word loosely translated to mean duty to oneself, seen by turning a philosophical vision into an action through personal leadership.[8]
2. **Systems** - Understanding the essence of Dr Deming's message on systems/processes and the variation associated with each.[9]
3. **Kaizen** - A Japanese term associated with gradual "improvement in the status quo...everything in life deserves to be constantly improved."[10]

* Acronym=**ASK**

Profound knowledge then is the catalyst of developmental growth, and as such its evolution begins, as does all knowledge, with initial awareness. My interpretation of this growth cycle is shown below:

SPIRAL DEVELOPMENT OF PROFOUND KNOWLEDGE



Though this paper will look generally at the philosophical basis of profound knowledge, it's of interest to briefly examine the developmental and resultant

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[8]Lessem, Ronnie. Total Quality Learning. Cambridge, MA. Basil Blackwell Ltd. 1991. page 7.

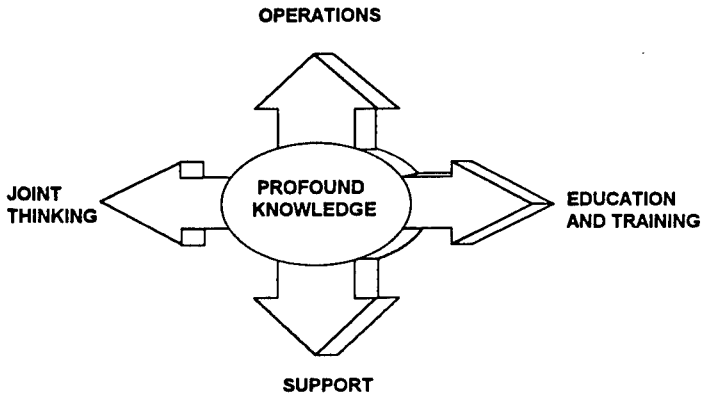
[9]Deming. "The New Economics." page 72.

[10]Imai. Kaizen. page 3.

employment pattern such a system would have. Its development is characterized by a spiraling series of interconnected concentric rings (whose numbers are unique to the individual) constantly narrowed by radial influences to a final focal point at its apex. The focal point represents the vision, the spiral track represents the journey one must embark on with Arete, the radial influences symbolize the educational exposure one receives during the journey, and the gradually diminishing circumference demonstrates the positive impact Kaizen has on the process.

In contrast, the employment pattern is not spiraled in nature, but radial.

RADIAL EMPLOYMENT OF PROFOUND KNOWLEDGE



With personal mastery and vision comes action or positive impact, and this radiates from a core of profound knowledge touching every Air Force system. Unfortunately this paper is too short to focus on developing or employing profound knowledge, but instead will examine only its philosophical basis. That basis involves philosophy from the East, the West and the Mediterranean world. Old and new philosophies alike with one thing in common--together they form the foundation of quality and hence provide a doctrinal springboard for practitioners armed with our superb model in one hand and a desire for a philosophical basis in the other.

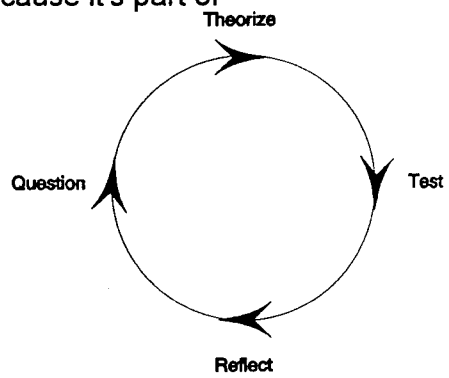
To begin, Imai defines Kaizen as improvement. Moreover, "Kaizen means ongoing improvement involving everyone, including managers and workers."[11] Kaizen is symbolized by slow, gradual, inch-by-inch change, over time, not radical, innovative leaps.[12] Further, like Dr Deming's philosophies, it stresses the requirement to implant

[11]Imai. Kaizen. page 3.

[12]Ibid. page 3.

quality in the process itself and where it's lacking to strive to improve it. Kaizen generates process oriented thinking, placing it at odds with the quick fix mentality of result-oriented western leadership.[13] Additionally, Kaizen views the development and improvement of self as critical precursors to improvements within the organization. Kaizen is a critical leg of our model then for two reasons. It is solidly focused on continuous improvement, and that improvement is framed by gradualism. These are absolutely critical precursory concepts in quality and should be firmly established before we plant the first seed. Now that we understand the fertile environment quality must operate in, let's look at what the initial seed will look like.

Arete represents the soft science or affective core of quality. It in essence means to turn vision into action.[14] It is a philosophy, like Imai's Kaizen and Deming's statistical thinking, which implies a respect for the oneness of life and the interaction of all things.[15] One doesn't accept quality because he has to, but because it's part of one's own intrinsic vision and way of thinking. Ronnie Lessem demonstrates the reasoning process involved in this component of transformation in his wheel of learning (shown to right) [16]. Conceptually similar to Ishakawa's now popular Plan/Do/Check/Act (PDCA) model in some ways, yet radically different in others. PDCA in comparison is almost robotic in nature, it implies a lock step process with little prerequisite profound thought. Lessem's wheel on the other hand demands critical thought and reflection. It screams out for *developing* intellect through its close linkage to the scientific problem solving process. In essence, Lessem has concisely meshed the development of critical thought/vision into the quality equation. The vision is not only a corporate vision, but a vision at the lowest level by the lowest airman, followed by action and reflection. During a discussion about employing this action Bill Geiger and I scrawled a representative sketch of the pathway for Arete on a napkin over lunch one day, I share a sanitized version of this drawing on the following page.



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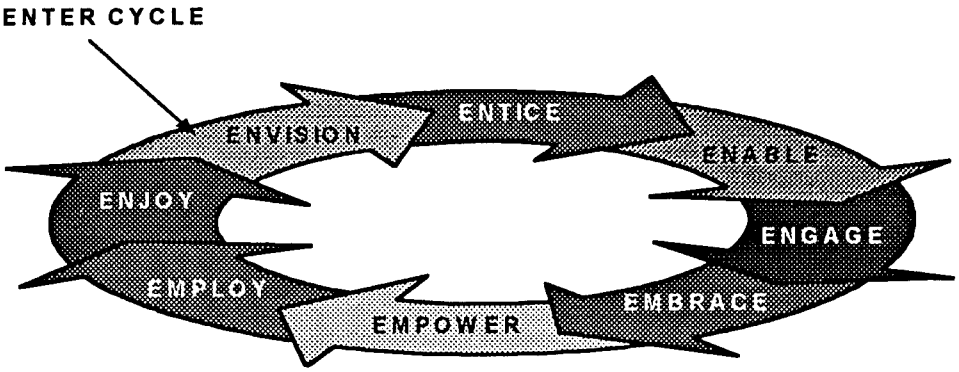
[13]Ibid. page 23.

[14]Lessem. page 6.

[15]Ibid. page 7.

[16]Ibid. page 27.

PATHWAY OF ARETE



1. Envision the Challenge
2. Entice Others to Become Interested in the Challenge
3. Enable Participants through Education and Understanding
4. Engage Participants to create Partnerships and Outside Alliances
5. Embrace the Cause as a Team
6. Empower the Team to Action
7. Employ the Team in Action
8. Enjoy the Rewards
9. Envision new Challenges

Quality action then becomes the initial result of leadership driven by an educated vision. If Arete provides us the motivation to envision our path, then, systems thinking gives us the skills to read the situations along our journey.

The Air Force is made up of literally thousands of systems, each unique and each requiring various degrees of improvement. Deming defines a system as a network of interdependent components that work together to try to accomplish the aim of the system.[17] Each system, in turn, has a finite number of processes or functions which transform an input into an output within a given system.[18] An Air Force intelligence squadron might be considered a system, the creation of an intelligence briefing might be but one process within that complex system. Regardless, most quality advocates

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[17]Deming. "The New Economics." page 37.

[18]Schodebek, Charles G. and Peter P., and Kefalas Asterios. Management Systems. Plano, TX. Business Publications Inc. 1985. page 373.

feel that an understanding of systems and processes is critical to incremental institutional change. Deming talks at great length on the desire of optimizing a system, or successfully orchestrating all of a systems components toward the achievement of the aim.[19] System optimization doesn't just happen, it requires a thorough understanding of the complex interactions of the components both within and outside the system, as well as the processes at work within it. Some call this the hard science of quality, and as such it must be nurtured only after an environment of Kaizen and the potential of Arete are established in the work place. Regardless, the ultimate goal of every leader searching for an improvement opportunity should be system/process optimization. The first step in this is to understand the system/process that we are striving to improve. Flow charting is an ideal way of determining the sequence of events/decisions which contribute to a specific process. Once a process is charted, one must statistically determine if it is stable or out of control.

Dr Deming says a process that is not in statistical control "has no definable capability...its performance is not predictable."[20] Control charts are marvelous tools to monitor processes, and detect changes, if they are worth detecting and evaluating.[21] The Air Force, like many large corporations, will be tempted to deal with its systems in sweeping generalities and unbridled intuition. But without solid statistical evidence we will not appreciate what the numbers mean and we will embark on a road of speculation and hunches.[22] Such hunches contribute to tampering with otherwise stable systems, as well as misdiagnosing unstable systems, both currently plague our quality movement. Conceptually, process monitoring is a radical way of thinking for warriors trained to immediately read situations and then act effectively and efficiently without hesitation. Literature from the Deming Scholar Program suggests a leader's job is to successfully predict. Prediction is in turn rooted in an understanding of profound knowledge. Despite ones initial distaste for systems, systems thinking is the primary means by which Kaizen makes its contributions, and proof of a warrior's evolution beyond the fog of the battlefield.

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[19]Deming. "The New Economics." page 39.

[20]Deming. "The New Economics". page 39.

[21]Deming, W. Edwards. Elementary Principles of Statistical Quality Control of Quality. Tokyo, Japan. Nippon Kagaku Gijutsu Remmei. 1951. page 54.

[22]Mann, Nancy. The Keys to Excellence, The Story of the Deming Philosophy. Los Angeles, CA. Prestwick Books. 1989. page 62.

Thus we have built a support system of three philosophical elements which together form the basis of profound knowledge. These elements; a desire for improvement (Kaizen), focused on systems and variation (Systems), motivated by a commitment to turn a quality vision into action (Arete), then become the seeds of personal and institutional transformation. Working in concert with leadership (a given attribute in the Air Force), I propose these three elements serve as the bedrock of our quality model, and once mastered, generate the philosophical equivalent of Clauswitz's coup d'oeil.

With profound knowledge now serving as our foundational basis, one might ask what value does this addition contribute to the quality movement. In terms of model design, nothing. Models are a dime a dozen, and given enough time we can attach enough appendages on our model to render it impotent. That is neither my desire nor intent. However, what is at issue is the value of the addition. Its value can be looked at along two concurrent educational veins; affective and cognitive growth.

In terms of cognitive growth, the philosophical basis I've outlined provides a reference point, or beginning in our quality journey. It defines our general philosophies, and their sources, thus enabling beginning practitioners to conceptualize the evolutionary direction we are moving in while making implementation decisions based on a cognitive foundation of quality. It also serves as a litmus test for quality decisions and timetables presented by senior leaders, i.e., are proposed command decisions consistent with our philosophical basis? If not, our foundation now provides a basis for them to be revisited. This concept is an absolutely critical point, which today one would argue can't be intellectually debated because we have no defined philosophical basis.

In essence, profound knowledge then creates an affective springboard and a cognitive roadmap for our quality journey which ensure we all start from the same focal point and value set. Though our paths and development may radiate across the spectrum of possibilities, as long as they have an intellectual basis in profound knowledge they can be educationally and professionally argued.

In terms of affective development, profound knowledge is the absolute catalyst to

igniting the quality movement. Deming suggests an individual once transformed will:[23]

1. Set the example.
2. Be a good listener, but not easily compromised.
3. Voluntarily and continually teach others.
4. Help people pull away from current inefficient practices.
5. Move into the new philosophy without guilt from the past.

The simplicity and logic found in any volume of profound knowledge by its nature draws interest and appreciation. Our three pillars will do no less. Instruction on profound knowledge will enable audiences to value its message long before they are cognitively able to apply the concepts. Quality will not be seen in terms of a particular command's focus, but in broad brushed strokes that the common person can value. Once valued, quality will be discussed in the workplace and the evolutionary demand for statistical tools and quality techniques will occur simultaneously from the top down and the bottom up. Free from lock step models, command-sponsored statistical square filling, and predetermined team building techniques, the Air Force can think, dream and build a quality organization based on the collective vision of the masses. Profound knowledge then, frees the movement to spread outside the institution which binds it and like wildfire ignites the hearts and minds of the men and women within it who want only to do what is right.

So then profound knowledge becomes inseparably woven into the fabric of our educational system. As such, it ensures education/comprehension drives implementation/application decisions and that both grow stronger rooted in a consistent philosophical basis. Such a simple fix to so complex a challenge. Yet, the evolution of quality values is no more difficult than teaching recruits respect for senior officers or NCOs. It's simply a matter of educational packaging, exposure, and time. Since we all bring different insights to the profession, it is education's primary responsibility to level the field by nurturing the seeds of transformation through what Senge calls the creation of a "value based vision-driven environment." [24]

I was lucky, I shared the evenings of my youth with a man who understood quality and its worth in our society. For others the transformation will be sporadic and

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[23]Deming, W. Edwards. The New Economics. MIT Center for Advanced Engineering Studies. 1993. page 95.

[24]Baggett, Mark and Harris, John. Quality Quest in the Academic Process. Birmingham, AL. Samford University Press. 1992. pg 128.

painful at best, yet, once quality values are established, a cascading effect will slowly ripple through an organization, that while focused from the heart, will radiate to its most distant limb, gradually improving every aspect of both the operation and those practitioners involved in it. Successful long-term implementation cannot forcibly be mandated via metrics, models, tools, or slogans, both Senge and Deming agree "people learn what they need to learn, not what someone else thinks they ought to learn."[25] As such, quality implementation must start with the first evolutionary ripple in the pond, and that ripple emerges only through the personal realization of profound knowledge.

NOTE: The views or opinions expressed in this article do not reflect official views or opinions of the United States Air Force. I wish to especially thank Lt Col Bill Geiger, Major Andy Stricker, Steve Harris, Capt Don Galarowicz, and Dianna Porter for their technical and/or philosophical contributions to this article.

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QUALITY LEARNING: MAKING IT FUN CAN ENHANCE LEARNING

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QUALITY TRAINING:
MAKING IT FUN ENHANCES LEARNING

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When we decided to submit an abstract for the '93 Quality Air Force Symposium, we looked at suggested topics and kicked around several ideas. But then we asked ourselves, "What is it we know now, we'd liked to have known when we first started?" The unanimous answer in the office was "training skills!" It's not that we weren't well trained in the different courses, or that we hadn't experienced Academic Instructor School; we possessed the essentials. But when the "rubber meets the road," teaching is a whole lot different than being taught.

We considered ourselves fortunate since the majority of our class critiques rated our instruction superb. But we knew we could do better by increasing class participation and by developing an atmosphere that would make our students want to attend our classes. Making class "fun" may sound frivolous--what we're really talking about is the joy of learning that takes place when students enjoy being in the classroom, and gain insight from active participation.

This paper is written with the assumption you already know the fundamentals of Total Quality Management and Quality Air Force (QAF). Much of our core academic material comes from the courses taught by the Quality Center at Maxwell AFB. What we want to offer are some techniques to enhance your classes, make your students more participative, and improve your ability to deal with the difficult student. We will also focus on the 20-25 student classroom environment with regular meetings for a few hours a day. The total hours may vary from eight to 40+. Everything we offer we experienced ourselves. We learned our techniques: a) through trial and error, b) from ideas offered by the Air Force Quality Center, and c) from ideas offered through Creative Training Techniques International Incorporated.(1)

There are four parts to training, and we've organized this paper accordingly. Each part flows into the next, and in a well-functioning class, the blending will be seamless. The four phases of training are: Introduction, Start-up, Heart-of-Training, and Wrap-up. Our goal is to give you specific training tips and ideas to enhance each area.

Introduction to Training

Chances are, no matter what kind of quality training you do, you're going to find a mixture of students--those who want to be there, those who are neutral, and those wanting to be

anywhere other than in your class! We found as our credibility increased, and our "graduates" began to report good things, we started seeing more positive students and fewer negative ones. We discovered negative students don't want to attend for one (or more) of several reasons: they're too busy, quality is just another program, they're already overwhelmed by organizational change, they "know" their bosses don't believe in quality, it will create more work...etc. We found up-front acknowledgment of these feelings, coupled with the opportunity to have a chance to discuss their concerns, disarms much of the potential negativism. We also have our quality champion, the commander, do the opening welcome. It's a lot harder to say no one really supports quality when the boss makes time in his schedule to welcome students--and then comes back for further discussion before class is over!

Before class starts, there are several things you can do to make the first day go easier. First, look at your classroom set up. Our initial classroom set up was a U-shape, so all the students could see each other. But we later learned that putting the students into small groups (4-5 to a table), led to quicker "bonding," and thus facilitated better overall classroom discussions and exercise participation. Next, be in the classroom fifteen minutes early. That way, you won't feel rushed, plus you'd be surprised at the number of questions and special needs students have before class starts.

We have always let the staff determine who needs training, so rank structure within each class varies. While we try to know ahead of time who is attending, last minute substitutions always happen. By being in the classroom early, substitutions are easier to handle, and you have the added advantage of influencing the seating arrangement. A useful tip we learned from Creative Trainers is to put your powerful people up front. Powerful is however you define it--it may be a strong personality you already know, or it may be someone of a higher rank. Because people tend to fill up the back of the room first, it is relatively easy to unobtrusively fill the front of the room with your "powerful people." The fact you're standing while they're seated, coupled with them being up front, makes them less intimidating to the students in the back of the room.

Another nice touch for at least the first day is to provide coffee, donuts and/or fruit. As you discuss group norms later in the day, you can determine whether or not to continue, but food always makes the students feel welcomed. We offer coffee and donuts/fruit every day, and pay for it by asking for a set fee, and having a class "slam bucket." A slam bucket is a bucket set up in the middle of the room that people pay a quarter into when they are late or "insult" another member of the class. The class votes on using the bucket. By now, our slam bucket is well known throughout the building, and is one of those "fun things" people hear about our classes. We display

happy/teardrop faces on butcher block paper encouraging the students to help themselves to the food--the friendly gesture helps to set the right tone. We also use background music because it helps indicate this is no ordinary class--we were pleasantly surprised at the difference music made!

Start-up

After the general's welcome comes the business of introducing everybody. A trick we learned from the Quality Center is to use flip chart paper, one per student, and have them introduce themselves by drawing a "life map." A life map is 5-10 pictorials of what is important in their life; personal or professional. Without exception, the first day critiques continue to show this to be popular with our students. First, it gets them involved in doing something right away and it steers them away from the usual "name,rank, and job description." We give the students about 15 minutes to draw their maps and ask them to hang them on the wall when they're finished. We then go around the room and ask people to introduce themselves using their maps. It's amazing how much people find they have in common with each other, plus it gives the instructors an idea of the different personality types in the class--the talkers and the quiet ones. This activity gives the student their first inkling this course is going to be fun.

Another tool we use to improve communication and self-awareness is the Myers-Briggs Type Indicator (MBTI).(2) The MBTI is a personal preference survey, that values all types and is non-judgmental in nature. Its value comes from helping an individual to understand why they prefer to do things a particular way, and why others do things differently. The MBTI requires specialized training to administer, but is worth the investment. We request students come to our office the week before class starts to take the MBTI. It takes about 30 minutes to take, and 20 minutes to score. We teach a two-hour block on the MBTI either the first or second day. Because of the self-awareness gained, along with several fun exercises demonstrating its accuracy, the class "bonds" and is off and running. We found not only does the class enjoy knowing different types, but they refer to them throughout the rest of class. We also ask they add their MBTI type to their life map which hangs on the wall throughout the class. Again, our critiques consistently show the students appreciate the personal insight gained, as well as a better understanding of why people are different, and how understanding themselves can improve their personal work environments.

The MBTI is not the only self-awareness tool available. There are many on the market, such as The Personal Profile System or The Brain Map.(3,4) If limited funding is a problem, we recommend you check out some type of self-administered

awareness tool. With rare exception, people, regardless of rank, enjoy learning about themselves. The personal insight gained, and the class discussion surrounding the awareness tool adds significantly to your class feeling comfortable with each other. This cohesion carries forward and leads to enhanced discussions in later lesson blocks.

While we also provide basic quality education in the start-up phase to ensure students possess the same level of understanding, our real goal during start-up is simply to get people familiar and comfortable with each other. By using the life maps, followed closely by MBTI, class participation develops very quickly, and students feel comfortable enough to discuss real issues. The difficult student often becomes less "hostile" and more willing to share his/her concerns about quality. These exercises do not take much time and are well worth the investment. The payoff lasts throughout the rest of your class.

Heart-of-Training

We emphasize from the beginning "it's okay to enjoy yourself" in our classes. Group norms, what is and is not acceptable to the group, are discussed and these become the ground rules for attendance, participation, and conduct. To encourage people to participate and reduce anxiety, we insure non-attribution is included.

We use an exercise or game to reinforce most of our lessons, but learned not all exercises are a hit. The way in which each is presented is crucial. Some older and more traditional managers find the idea of "games" disconcerting, but will willingly accept a "management exercise" aimed at demonstrating a particular point. Likewise, exercises and games must be anchored in learning points relevant to the course. However, when students learn other things and they emerge in the post-exercise discussion, don't hesitate to acknowledge it.

We make an effort to minimize lecture because we've found: a) adults learn better from hands-on experience, b) they don't argue with their own data and c) the more fun they experience, the easier our job is. Experience is the teacher and exercises and games are the vehicle for participants to obtain it. They learn from experience in the classroom without the consequences of wrong decisions in actual settings. All of us learn, not from being told, but by experiencing the consequences of our own actions. "People don't argue with their own data" is something we picked up from Creative Training Techniques and found very valuable. If we say something is true, you might say to yourself, "They've got to believe it, they're teaching it." But if you say it, to you it's true. For example, let's say we identified 15 characteristics of an effective leader. Rather than presenting them, we would ask our smaller groups to discuss

the most effective leader's they've known and identify their characteristics. Normally, the groups will come up with 80% of the characteristics, then it's easy for the instructor to fill in the other 20%--and the group is much more accepting. Encourage your participants to look for ideas, concepts and techniques to support your lessons.

Another lesson learned for us was DON'T start the morning with lecture! But if the first lesson absolutely has to contain lecture, start with an exercise to get the students energized and involved. We use numerous brainteasers or Wuzzles(5) (word puzzles) to get mental juices flowing. We also use them again after breaks and especially after lunch. Students are given 3-5 minutes to work alone, 3-5 minutes to work with their table partners, and then we finally solve it as a group, stressing the added benefits of synergy in teamwork.

We find brainteasers from a variety of sources: Games Magazine and The Best of Creative Training Techniques Newsletter.(6) Here is a quick brainteaser for you:

> 8, 11, 15, 5, 14, 1, 7, 6, 10, 13, 3, 12, 2
> You're seeing all the numbers from one to 15 with the exception of four and nine. Your task is to decide why the numbers are arranged in this sequence, then put the missing numbers in their proper places. (Answer on reference list)

To add variety and flexibility to our material we vary instructors. We try to limit an instructor to two consecutive hours on the podium, allowing us to maintain our energy level and provide the students a variety of faces and personalities. The students have commented on many occasions how well the instructors complement one another. Another technique we use is to team teach our more demanding lessons. This allows an inexperienced instructor to ease onto the podium. In addition to being less demanding on us, we find team teaching fun because it gives us an added opportunity to observe and interact with the class.

We also try hard to be unpredictable. We find it challenging to keep our classes guessing what we're going to do next. We want to keep them involved and here are some techniques we use:

- Appoint team leaders at each table and frequently change them. A team leader can be the most responsible looking (determined by the team), the person with the largest high school graduating class, the most letters in their name, the most children, the oldest car, the most expensive car. We use team leaders to pick up supplies and handouts--gets them moving and involved--and to help compile or record team discussions to contribute to the class. Students find it less intimidating to be responsible for one activity and then pass the baton.

- Change table partners. This is particularly helpful when a difficult student emerges--you always want them in the front of the class. If you have five tables, place five different colored markers on each table and ask each student to select a marker. Take note of the color marker your difficult student selected and move everyone with matching markers to the front table. Then determine where to sit the other colors. It is important you do some sort of a quick icebreaker once you've changed tables to help the students get to know their new partners. For example, consider having the students draw a pictorial on the back of their name plate depicting their favorite past time and sharing it with their new partners.

- Music can set a mood to learn by. Consider making a variety of tapes and have an uncomplicated, reliable tape recorder available for students to listen to during breaks. We also use the music during individual and group activities--it helps to create an environment conducive to learning--something upbeat for an opening, suspenseful for an exercise. Music is also an effective time management tool. You can condition the students that when the music stops, the lesson begins.

- Another effective time management tool is to give breaks at odd intervals, such as 13 or 17 minutes. This forces the students to look at their watches and consciously determine when to return. Group pressure to pay into the slam bucket also "encourages" students to return on time.

Wrap-up

At the end of a power-packed day if you want to reinforce the lessons, ask students to stand, then throw a koosh ball into the audience. Whoever is holding the ball states what they learned, or something they can use, and then throws the ball to another class member until everyone has had an opportunity to talk. Point out no one can repeat what's already been said.

Once our training is completed, we have the students role play members of a manufacturing company where they apply the tools and techniques taught to improve the efficiency and effectiveness of their company. This exercise clearly demonstrates the benefits of using a structured approach to analyzing processes, and most students are surprised at the unconscious tendency to resort to old ways of doing business when the pressure is on. The exercise give us an opportunity to pull together a hands-on experience for most of our lessons.

We follow role playing with students doing a "hands-on" personal action plan. The students begin by identifying how to begin a quality journey and what kinds of barriers to implementing quality they can expect. They then become members of "fictitious companies," some doing well, some in trouble, and are asked how they would apply quality to running their company. Finally, the Quality Center's "What am I going to do on Monday?"

focuses them on what they are personally going to do to make quality a viable asset within their own sphere of influence. This gives them a realistic hands-on plan they can refer to as they make improvements in their work areas. We wrap-up with a stirring video by Joel Barker on The Power of Vision. It's a thoughtful, uplifting video that consistently receives high marks from students. On the last day, we invite the commander back to discuss with the students what barriers exist to implementing quality at AFMPC. The students are comfortable enough at this time to make it an honest exchange. The commander gets direct feedback on his organization and reinforces his belief in the need for quality. This too, receives high marks from the students on their critiques. Finally, we close with an exchange of critique forms for certificates and discuss a class reunion.

Ninety days later we invite the whole class back for a reunion and ask them to bring their Monday morning to-do list. This is a very informal session of crosstalk--how much were they able to accomplish; what worked and what did not work; what were some barriers they encountered; was there a particular lesson of special benefit or one that needs more emphasis; is there anything we can do to facilitate progress on their journey? The class reunions provide very valuable feedback, but more importantly it allows students to strengthen their network. Having an opportunity to openly discuss what's working and what's not, is a powerful vehicle that reenergizes our students.

Feedback from students allows us to continually improve our classes and we work to stay in-tune with what they are saying. We use an individual lesson/instructor critique to specifically target where improvements can be made. A student-identified opportunity for improvement is not viewed as a negative, but rather a challenge for our team to pool its resources for better ideas to present material or help out the instructor. Often our students attend other courses and provide us fresh approaches to lessons and exercises.

We have come a long way in improving our classes since we first started. We have minimized lectures and maximized student participation. Each class develops its own personality, and we have learned to be flexible to meet their needs. As we've adapted and learned to have fun ourselves, our students have surprised us with their willingness to join in. What we've succeeded in doing, is turning our students on to believing in quality, with a willingness to employ it within their organization. We've significantly decreased the number of students who don't want to attend our classes, and we've even developed a waiting list for volunteers wanting to be in class! Quality is an on-going journey--making it an enjoyable one has only reinforced it's importance and it's timeliness within the Air Force community.

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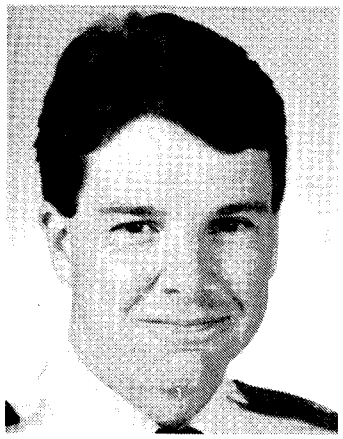
We're on the Same Team, Remember? CRM Films, 2215 Faraday Ave, Carlsbad CA 92008-7295, 1-800-421-0833.

Why Quality, John Guaspari, American Management Assoc., Nine Galen Street, Watertown MA 02172, 1-800-225-3215.

Brainteaser solution: The numbers are listed alphabetically. Therefore, four goes after five and nine follows 14.

QUALITY IN AIR FORCE EDUCATION & TRAINING



Maj R. Steve Woodsmall

Quality in Air Force Education & Training

by Major R. Steve Woodsmall

The concepts associated with Total Quality Management should be nothing new to anyone associated with education and training. Although different organizations have used many different models for course development throughout the years, all the effective models share basically the same fundamentals. Since the mid-1950's, the model for Air Force training has been Instructional System Development (ISD). ISD is a five-step process for developing education/training programs which ensure that graduates meet the needs of the system they're being trained to support. By analyzing this model step-by-step, it is apparent that TQM in the training arena has been around for a long time under the name ISD (or by various other names). However, the results of this systematic approach to curriculum development have not been totally successful -- not because the ISD process doesn't work, but because it has rarely been correctly or completely applied. Total quality training can be achieved if the existing process is used as it should be.

First, let's compare the ISD model to the concepts of TQM. The ISD model (Fig 1) is a process which can be used to develop new training or modify existing training. Each step of this process is designed to meet one or more of the facets of quality:

STEP 1: Analyze System Requirements: What does the system (customer) require? What skills, knowledge, and abilities must your product (student) possess in order to meet these requirements?

STEP 2: Define Education/Training Requirements: Which of the above skills, knowledge, and abilities does your student (input) already possess, and which must you improve or develop (value-adding)?

STEP 3: Develop Objectives & Tests: What are the specific learning objectives (goals) and how will sucess be determined (measurement)?

STEP 4: Plan, Develop, and Validate Instruction: What is the most effective/efficient sequencing and methodology (process) to meet the objectives? How will the process be validated (tested prior to implementation) to insure you do it right the first time?

STEP 5: Conduct and Evaluate Instruction: How well did the process work (measurement)? Do the graduates (output) possess the required competencies? Are the needs of the system (customer) being met?

FEEDBACK: Are all the people involved in the process (internal customers/suppliers) talking to each other (alignment)? Is the process constantly analyzed to insure continuous improvement toward meeting internal and external customer expectations? Do your suppliers understand your requirements? The feedback loop is especially important in systems where the various steps in the ISD process are performed by different people and often in different places.

CONSTRAINTS: What are the systematic limitations on your ability to perform at maximum effectiveness? Have you prioritized these constraints relative to their impact on performance? Does leadership elevate problems caused by constraints imposed by higher levels? (i.e., funding limitations, personnel resources, policies/regulations, facilities, etc.).

This is a very simplistic comparison, but the similarities are obvious. Why, then, have we not always seen quality results from the ISD process? In my experience, there are several major reasons:

1. Failure to identify the true customer. The front-end analysis (steps 1 and 2) is typically the most difficult aspect of the process to accomplish. As a result, many training managers take the easy way out and concentrate on meeting student expectations -- while this is certainly important in facilitating a positive learning environment (not to mention the great student critiques), the primary customer (that student's employer) can't be forgotten. Students may think you have the best program going, but if they can't do the job upon graduation you've wasted everyone's time and resources. Time and energy spent up front to accurately determine the needs of the system will make the rest of the job much easier -- when you know exactly what has to be done, you're in a good position to get it done. NOTE: The real customer in some adult education programs may in fact be the student who is enrolled for self-improvement and is paying the bill for the training. However, by knowing the needs of the system in which that student will perform, you can tailor instruction, show greater relevance of the training, and market your program more effectively. In either case, quality is defined by the customer.

2. Failure to constantly communicate with the customer. Even good front-end analysis can become obsolete as system requirements change. Constant communication with the user is critical to maintaining an effective training program. How many times have you seen things taught one way but performed in the field entirely differently? If we teach it one way but do it another, the process is broken. The key to ISD is continous application of the process -- not "do it once and forget about it."

3. Ineffective measurement. The success of any process depends on the use of measurement to determine performance. Common problems include:

--Not measuring student performance against learning objectives. We often test only the areas which are easy to test. Some grade "on the curve" to avoid negative feedback. This results in a pilot, for example, getting the highest score on a flight test because he landed closest to the runway -- not because he met a standard. (This is a primary reason that our high school graduates can't read or write). These actions merely treat symptoms and do not identify the need for remediation nor insure graduates possess the required competency.

--Placing too much emphasis on student feedback and not enough on graduate/employer feedback (see #1). This is one example of driving the process to get numbers that look good rather than establishing measurements which will drive improvements to the process.

--Incomplete data. For example, class averages on tests tell you something about the course, but scores stratified by instructor, curriculum area, student demographics, etc. will allow greater focus on specific improvement efforts. Data collection should be carefully planned to facilitate easier identification of root causes. If a high proportion of students are perfroming poorly, is it due to poor instruction, poor evaluation techniques, inadequate front-end analysis, unclear objectives, etc., or some combination thereof? Or do you just happen to have a group of weak students? The real cause can only be determined through process analysis using the appropriate data and problem-solving methods. A related problem is measuring only the results versus measuring the process -- for example, looking only at graduation rates and GPAs to evaluate program effectiveness. This approach often alleviates the symptom (which is usually only temporary) and the problem manifests itself in another way. In other words, aspirin will stop a headache temporarily,but if the headache is caused by a brain tumor the patient will die if the diagnosis is incomplete. Again, if you use a process approach to measurement, you're able to examine the specific areas where the cause may exist. Improving the process will then, by definition, improve the results of the process.

--Misuse of data. The climate in the training organization must be one of a common focus on continually improving the quality of graduates. Schools should use test scores and student feedback for that purpose and not as tools to punish instructors.

4. Inadequate faculty development programs. Any process is only as effective as the people who perform it. Even the best curriculum will fall short without instructors who have been trained in teaching skills, subject matter, and the actual curriculum they're responsible for. As the curriculum changes in response to user needs, upgraded technology, etc., in-service training is needed to keep the instructors abreast of changes. Also, periodic sessions for instructors to share success stories, different approaches to given subjects, or ways of creating a better learning environment (all examples of a team approach to improvement) are invaluable toward improving the quality of instruction and promoting a team philosophy among the faculty -- both critical factors in continuous improvement of training. Even more importantly, by hiring qualified instructors and helping them improve their qualifications the tendency to address symptoms by overstandardizing instruction through strict use of prescribed methods and materials can be avoided -- instructors can be truly empowered to meet the specific needs of their students.

5. Lack of organizational vision. Not unique to training organizations, but particularly damaging in a learning environment where several instructors may operate independently with their student groups. If the entire faculty and staff of the organization are not "heading in the same direction," then students will see this and lose faith; moreover, the frustration and confusion experienced by the staff will carry over into the classroom and student services. Everyone in the organization must have a clear picture of purpose and direction.

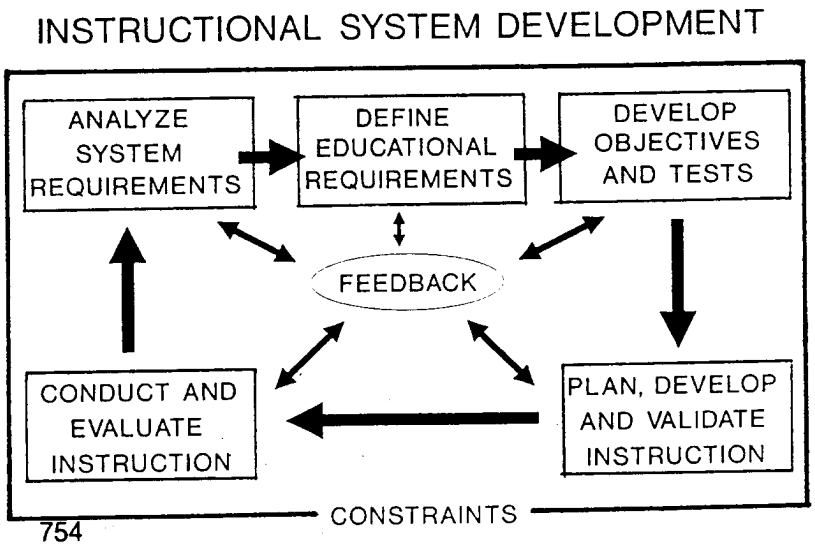
When one looks at successful training organizations, use of a systematic approach is the common denominator. Whether it's the Air Force ISD model or one of the numerous other similar models, the bottom line is that the focus on the process is the key to getting the best results possible while constantly working to improve. Effective trainers use this approach not because it's TQM or ISD or QAF, but because there really is no other way -- it just makes sense to do the right things the right way. So for you trainers who think TQM is a passing fad, or doesn't apply to education and training programs, guess what -- if you've used ISD or another systematic curriculum development model as it should be used, you've also used the concepts of TQM. Whatever you call it, the fundamentals and the results are the same -- quality training produces quality performers, and when that happens everybody wins.

INSTRUCTIONAL SYSTEM DEVELOPMENT

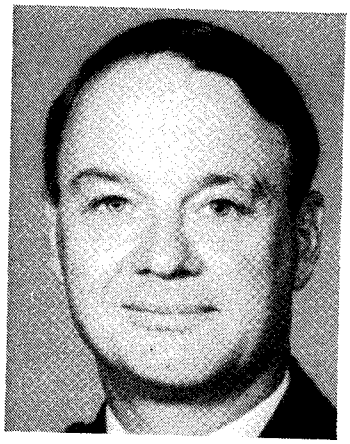
1. **Analyze system requirements**
   - Assess operational system
   - Determine operational activities and responsibilities
   - Identify required attitudes, knowledge, and skills
2. **Define education / training requirements**
   - Identify overall purpose of instruction
   - Assess student needs
   - Determine domains of learning
3. **Develop objectives and tests**
   - Determine level of learning objectives
   - Identify samples of behavior
   - Select test item descriptions
   - Construct test items
4. **Plan, develop, and validate instruction**
   - Prepare instructional plans
   - Organize objectives and content
   - Select methods, media, and materials
   - Validate instruction
5. **Conduct and evaluate instruction**
   - Conduct instruction
   - Evaluate instruction

Feedback and Interaction

Constraints



ROLES AND RESPONSIBILITIES: A PROCESS/SYSTEMS MODEL OF QUALITY



Lt Col Michael Meyer

ROLES AND RESPONSIBILITIES: A PROCESS/SYSTEMS MODEL OF QUALITY

by

Michael D. Meyer

One of the hardest points to understand in the transformation to a quality culture is answering the question ' What am I supposed to do?'. A cultural change affects everyone's role in the organization. Just as there is a need for a disciplined approach to continuous process improvement, there is a need for discipline in roles for quality for the successful transformation of the organization. There are numerous books and articles on roles and responsibilities in the quality organization but most are explanations of pieces of the puzzle and do not give a holistic view of the organization and it's people. This model attempts to bridge that gap by giving an outside observer's view.

KNOWLEDGE AND POSITION IN THE ORGANIZATION

When an individual first comes into an organization their knowledge of the organization and the processes they are responsible for is low. Their immediate focus is on becoming experts on the particular processes they perceive their boss and the organization deem important. Assuming the organization is supportive of its people and management sets expectations with their subordinates, the individual soon has a greater understanding of work and becomes a process expert. Even without management setting expectations or organizational support, the individual becomes the process expert, however it takes longer and proper focus on the organizational goals is more doubtful.

In most organizations that promote from within, process experts are given increased responsibilities and, after a while, separated from the actual hands on tasks. While continuous process improvement is an objective of the quality culture, continuous process change is not confined to any organizational culture. In fact, due to policy changes, technology changes and general organizational tampering, processes are always changing at a rapid rate. Therefore, once an individual is separated from the process for any length of time, their knowledge of that process as it is actually accomplished diminishes rapidly and then levels off at the core purposes and products. The graph at figure one depicts this process knowledge curve.

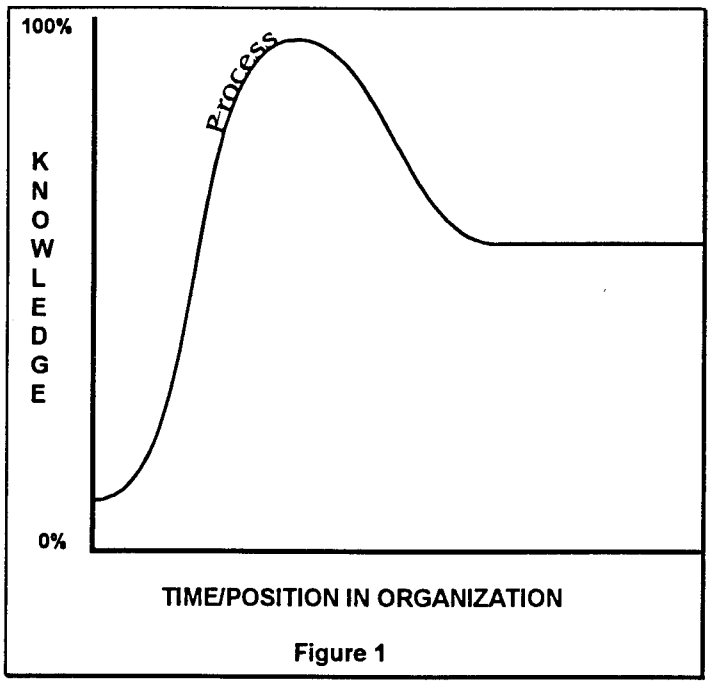


Figure 1

During this same time the individual is also learning the organizational system. That is, how all the various departments and divisions relate to one another. The rate of understanding the system is slower than the immediate increase in knowledge of the process because the initial focus is to become an expert in the work the individual actually does. However, over time and as responsibilities increase, people network with other process experts in other functions and this results in an increased knowledge of the system: Who does what and how does that contribute to getting a product out to the customer, both internal and external.

As job promotions continue, the individual is put into positions that focus more on the system and much less on the processes. This results in the individual working to understand the system and allowing the processes to work themselves. Normal work related stress dictates that if the management requires knowledge of the system then the more time working system issues the better. But since processes are continuously changing, this new focus results in a continued rapid decrease in knowledge of the process as it is currently done. Usually though, management is still expecting this mid-level manager to also be the process expert and since the individual still believes they truly understand the process they readily offer advice and consul on it. The effects of this paradox will be discussed later. This growth in systems knowledge continues up the organizational ladder to executive leadership. Figure two depicts this systems knowledge curve.

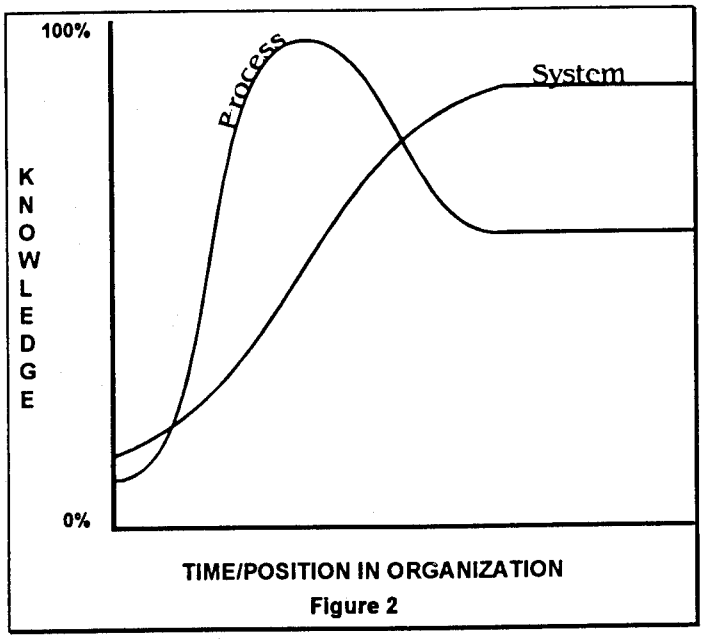


Figure 2

It is the author's contention that these knowledge curves are true in any organization and not limited to organization undergoing a quality culture transformation. The remainder of this article, however, will take a look at the roles and responsibilities in a quality culture and explain why this transformation is a cultural change and answers the question for many 'what am I supposed to be doing?'

SENIOR LEADERSHIP (Environmentalists)

Senior leadership is responsible for the strategic direction and vision of the organization. Because of their systems knowledge and understanding of the critical environmental influences on the organization, they are the only individuals in the organization capable of creating the strategic plan and mission. To accomplish this task requires time, focus, and hard work. It is a non-delegatable task of leadership. Unfortunately, many senior leaders are distracted by the day-to-day operations of their organization or respond to very short term results, such as production interruptions or special events. Too often leaders still see themselves as process experts and make changes to process in response to the above pressures with no regard to normal variation or the facts surrounding the problem. This lack of fact based decision making with no long term focus results in the tampering Dr. Deming writes about.

Leadership should spend 60-70 percent of their time developing the long range focus of the organization. The remainder of their time spent in "Leadership By Wandering Around," learning what people do and how they do it without tampering or interjecting in the process. Long range planning is done as a team with the senior leader and all direct reports. Their work starts with a complete analysis of customer requirements, organizational values and mission. These are then linked together in a vivid description of a future state of the organization or vision. A comprehensive gap analysis and the development of strategic goals and objectives are then possible. This work will identify the critical processes that contribute to the success of the strategic plan. A focus that ensures the quality efforts are linked to the objectives of the organization. This policy management creates the environment for quality to flourish (Fig 3)

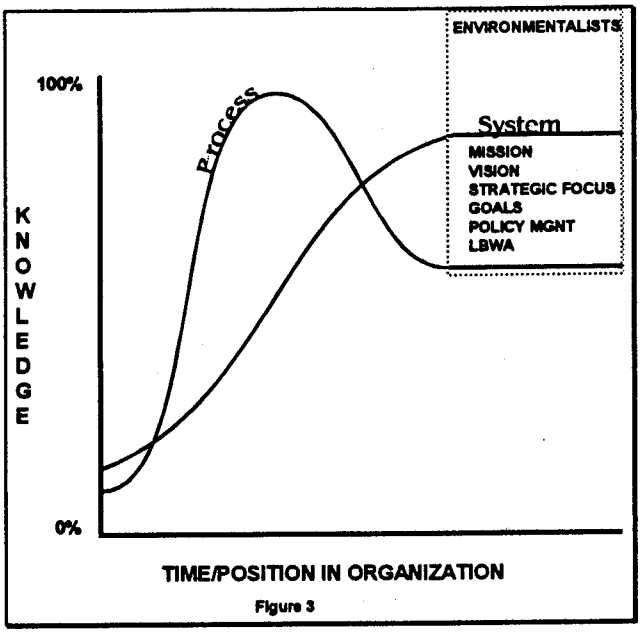


Figure 3

Senior leadership is also responsible for deploying and implementing the quality focus. This includes active participation in the quality council, membership on improvement teams and allocation of resources required for facilitation, and administration of the quality effort. Further, leadership must actively seek opportunities to get out and communicate the strategic plan and vision. It is imperative senior leaders communicate the goals of the organization and create a picture so all understand their new roles. Critical to success in this effort, senior leaders must ensure middle leaders get trained in the skills required to accomplish the transformation task with special emphasis on communication.

Finally, leaders must role model the values of the quality organization by ensuring every decision is tested against customer requirements and strategic plan. This task is the 'make or break' of the transformation because people within the organization will base their decisions on what the boss does not what he says. Leaders must personally encourage teamwork through public recognition of team accomplishments and tie organizational rewards to the practice of innovation and focus on customer satisfaction. These actions are essential to the tranformation because they address the cultural aspects of attitude and behavior. These cultural skills being different than the skills normally emphasized in corporate management training.

INDIVIDUAL WORKERS (Operators)

The role of the worker in the quality culture is to be the process expert. Their understanding of the process and how it is currently accomplished is vital to the continuous improvement process (CIP). Individuals must seek out opportunities to learn the strategic goals of the organization and determine what processes best support them. They need to focus their efforts on the parts of the processes that contribute the most to satisfaction of customer requirements.

The front-line workers are in the enviable position of dealing directly with the customer. Thus their understanding of customer satisfaction is better than anyone else in the organization. Their understanding of the process coupled with their knowledge of the customer makes them crucial to being involved in developing metrics and estimating process capability. Only the process worker is capable of determining the required training, skills and resources necessary for effective execution of the company plans. Through catch ball techniques with leadership the vision, mission, and strategic plan evolve into living documents that are tied directly to customer and process requirements.

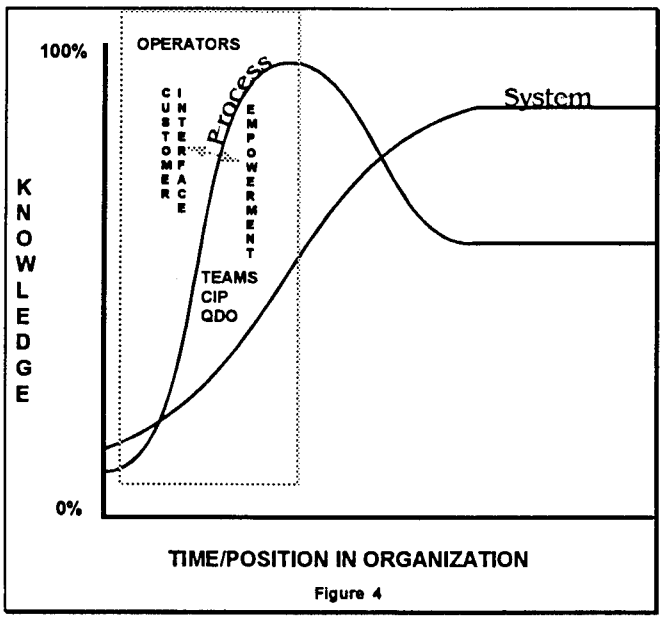


Figure 4

Through empowerment, the operators accomplish their own process management. Further, they partner with their suppliers and customers to make the organization successful (Fig 4). These practices are part of Quality in Daily Operations (QDO).

As workers are enabled by

supervisors, teams can aggressively address process issues and improve customer satisfaction immediately. For more complex problems that involve cross functional processes, individuals as members of process action teams can cut to the root cause of problems and implement lasting solutions. Eventually, the voice of the customer and expert will be included in all products and services, ensuring the best use of organizational resources and people.

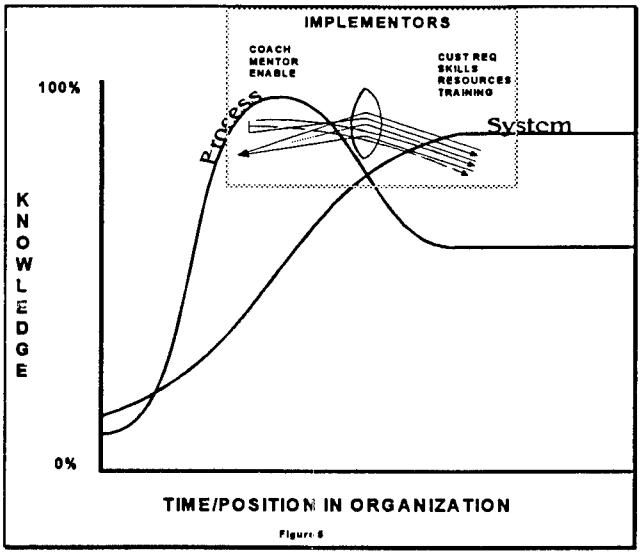
MIDDLE LEADERS (Implementors)

The group of leaders between the senior leadership and the front line workers are the most threatened by the advent of the quality culture. Their lack of understanding of terms such as empowerment, mentor ship, coaching and enabling are roles they did not expect. or prepare for. The rules of engagement on how to handle people and processes in a quality culture are unfamiliar. Some large corporations have even eliminated these critical leaders in the initial stages of the quality transformation thinking it was a key part of the savings of quality. Action like this has proven to be costly in that many very good people are let go prematurely and those remaining may not have been retained for the right reasons. Many American organizations promote talents entirely contrary to the tenants of quality and teams. Further, most evaluation systems do not recognize or highlight the individuals who exhibit these new skills.

The middle leader's primary role is to act as a lens to the worker from the organizational plan. First, they take their understanding of the organizational mission, vision and goals and interpret them for their subordinates. This links every production effort to some long term goal, making effective use of limited resources. Supervisors indicate which processes are critical to the organizational goals and help the workers understand their role in

achieving them. This increased understanding by the worker gives increased ownership in the end result. Ultimately, the better the supervisor does the job the more focused the organization becomes and more thorough the customer focus (Fig 5).

Another role is the enabling of the work force. Supervisors with the help of subordinates need to identify the means to accomplish goals and translate this information into skills and resources required by the work force. Implementors communicate these requirements to the senior leaders. In this way, they act as a lens in the reverse direction indicating training and resource requirements back to the planning process. Thus with the proper means to accomplish the goal the supervisor has the ability to empower the work force to take control of the processes under their control.



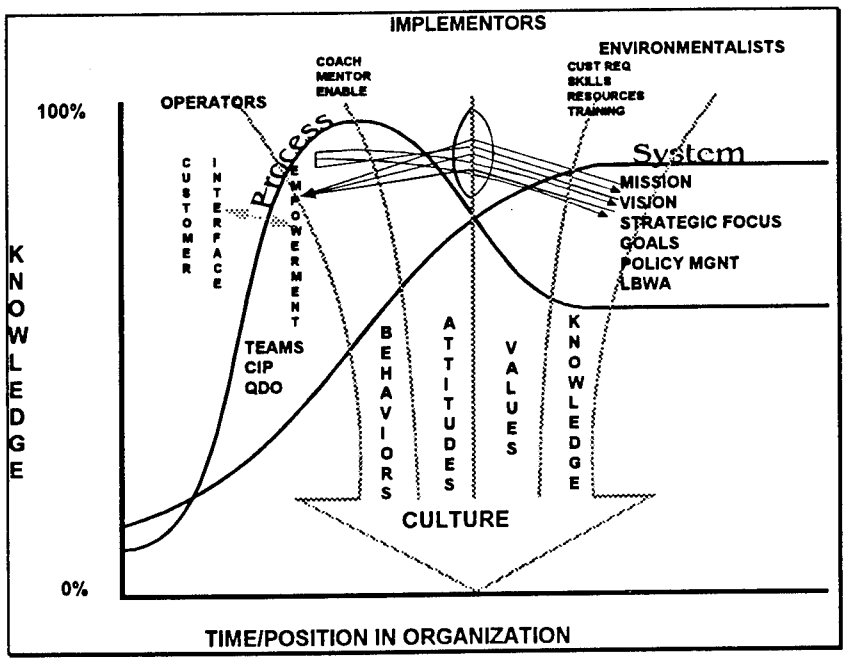
Supervisors also serve as the link between the planners and the customers The people closest to the customer work for the supervisors who are in position to interpret customer feedback into process requirements. This understanding gives insight to future directions and shortfalls in the current organization. By effectively communicating these data to the senior leadership continuous improvement is incorporated in the strategic plan

Finally, coaching and mentoring replace the traditional directing and controlling functions of middle leadership. Supervisors must learn the art of influencing people through value based assistance. It is a high risk environment where subordinates are allowed to fail and

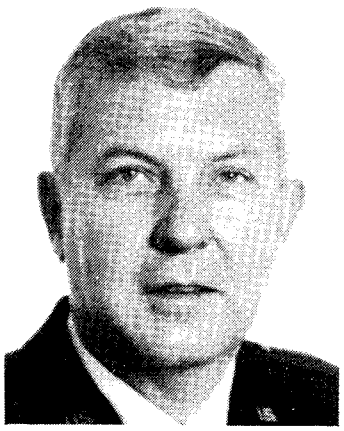
learn from their mistakes. Workers must understand the limits of their empowerment and stand accountable for their actions. Supervisors are responsible for communicating these limits, holding their people accountable and recognizing the efforts of their people when they are customer focused and aligned with the organizational goals. In this manner, quality values spread through out the organization.

The more adept the middle leadership becomes in defining their roles and communicating both up and down the chain the more effective they become. Eventually these same skills will give them a better systems perspective preparing them for senior leadership positions and a continuation of the quality culture.

In summary, understanding the role in the quality organization and modeling the proper behaviors will change the culture of the organization. Leaders, who own the culture, create quality values based on their knowledge of the philosophy. Implementors enforce the new culture through coaching and mentoring. Operators respond to these inputs with the customer and reflect the the organizations commitment to them. Discipline in these roles is crucial to the success of the transformation.



USING SUBORDINATE LEADERSHIP TO IMPROVE SUPERVISORY TQM PERFORMANCE



Dr. Gerard Tuttle

USING SUBORDINATE LEADERSHIP TO IMPROVE SUPERVISORY TQM PERFORMANCE

BY
GERARD R. TUTTLE, PhD,
Colonel, USAF
and
RICHARD I. LESTER, PhD

Invariably, students in Total Quality Management (TQM) training express their concern that their particular manager will not accept or implement the principles of TQM. They are concerned that untrained or newly trained managers may not, cannot or will not understand, accept, and implement TQM. In some cases, these concerned students want the instructor to give this feedback to their manager's boss to ensure compliance with the training they are receiving.

This student response has merit. After all, quality efforts at all organizational levels have to be actively and consistently endorsed from the top down. Senior management understanding and support is absolutely critical to the successful implementation of the TQM process. But, as the students have recognized there is one aspect of quality training for managers that is particularly deficient: the value and application of "feedback" within the work situation.

In the traditional setting, "feedback" is usually from the manager to the employee, that is, hierarchical, downward, related to personal performance and usually one way. In an ideal TQM culture setting, the manager will receive feedback from the employees who are considered as much a part of the continuous improvement of the process as are middle and top managers.

While continuous process improvement depends on feedback, the current literature and therefore, training, is too narrowly focused. In support of the students mentioned above, the authors of this presentation contend feedback should include review of a manager's TQM leadership skills. To assist in this feedback, the *Supervisor's TQM Behaviors Evaluation Instrument* was developed.

Within a TQM oriented work culture, there should be a way of allowing the employees to identify the TQM areas of strength and weaknesses in a manager's personal performance. In this setting, the employee becomes the customer and the manager a supplier who should adjust and/or improve specific TQM skills as part of his or her personal input into continuous process improvement. In this situation, the employee is in a position of subordinate leadership, a term coined to identify the leadership position an employee can assume in process improvement.

Modification of The Johari Window to
Facilitate Use of the Supervisor's
TQM Behaviors Evaluation Instrument

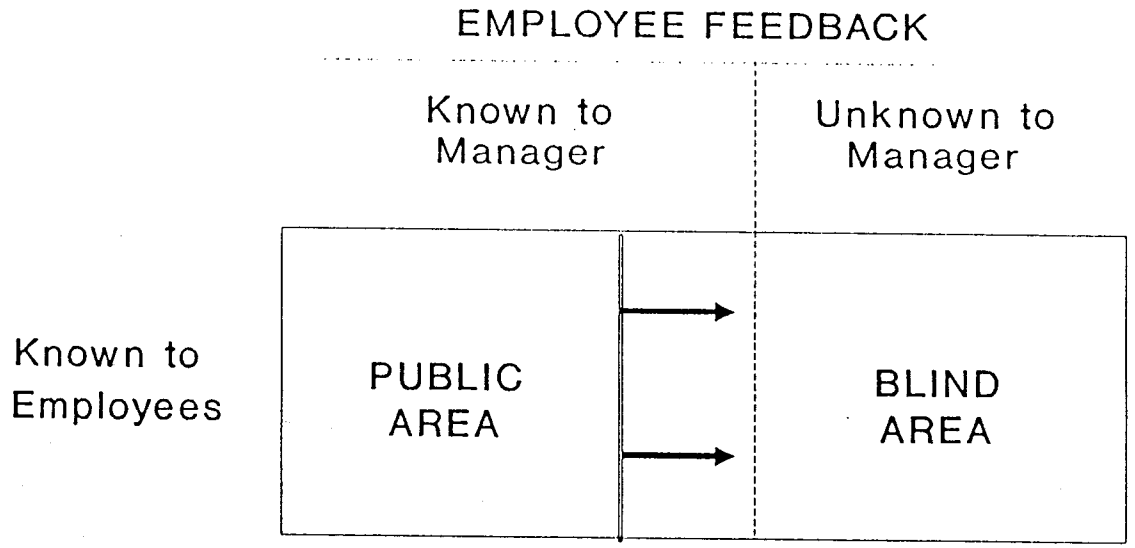


FIGURE 1

The concept of subordinate leadership can be linked to more traditional concepts in Air Force leadership training. In 1955, Joseph Luft and Harry Ingham developed a framework for personal improvement known as the *JOHARI WINDOW.* Taught for years across the Air Force, to enhance leadership skills, it encourages individuals to first obtain information about one's self or one's behaviors which is known to others but unknown to us and then to use that information to improve one's relationships with others (Figure 1). In other words, clear out the blind spots one has about oneself that everyone else sees clearly.

Using this principle, The *Supervisor's TQM Behaviors Evaluation Instrument* was developed (Figure 2) to assist a neophyte TQM manager, to identify behaviors needing improvement. It was developed using exemplary behaviors identified in the *Supervisory Code of Professionalism* which had been developed jointly by managers, employees and union representatives at the Sacramento Air Logistics Center, California, in 1989. The consensus developed code identifies those behaviors an effective TQM manager should demonstrate.

With this list of behaviors as a guide, any manager could ask for employee feedback directly and simply by having persons they supervise rate them using a five point, Lykert-type scale. With ratings of (1) Never Applies, (2) Rarely Applies, (3) Sometimes Applies, (4) Usually Applies, and (5) Always Applies, the manager's perceived behavior could be graded in terms of the desired effective TQM behavior.

But, how would a manager know if the persons he or she supervises are willing to provide honest reflections. We are all familiar with the fable of *The Emperor's New Clothes,* but more specifically for TQM we are aware of the price of fear in the workplace. Realistically, in the absence of a TQM culture in a given work setting, without demonstrated safeguards, employees will hesitate to be candid in their appraisal of their supervisor. They need to be assured that what ever the boss is told regarding the collective findings, their individual responses will never be seen or made public.

To initiate a program of such risk, it is necessary to first have a manager who will accept review by his subordinates and secondly, a process that will only report group findings. Working under the principle of group consensus, an individual selected by the subordinates can administer, collect and aggregate the data. Individual responses should then be discarded and the manager provided only a simple, scored sheet presenting the median response for each item of the instrument. Lowest scores indicate the areas most in need of improvement.

Since continuous improvement should be based upon planned change, the descriptive feedback data is now available for managers to develop their own plan for self improvement. Armed with this consensus developed information the manager can then ask the question "What should I do to improve my TQM management skills in these areas?". What measurement should be used to judge actual improvement? How can that measurement be part of the review process?

FIGURE 2

Supervisor's TQM Behaviors
Evaluation Instrument

You have been asked to assist your supervisor in the continuous improvement of his/her TQM management skills. Your supervisor will receive only aggregate data so there is no danger of your being identified by your responses. There are 21 items to rate. Please rank your supervisor in regard to the following point/value scale:

1 = Never Applies
2 = Rarely Applies
3 = Sometimes Applies
4 = Usually Applies
5 = Always Applies

1. What is your supervisor's name? _____

2. Provides effective TQM management
   - 2a. Focuses on mission needs _____
   - 2b. Exercises vision _____
   - 2c. Defines objectives to develop and execute planning _____
   - 2d. Fosters trust up and down by exercising loyalty to people _____
   - 2e. Encourages people to take smart risks _____
   - 2f. Fosters positive labor-management climate _____

3. Demonstrates followership
   - 3a. Is willing to speak up -or- speaks up when playing role of follower _____
   - 3b. Runs the play the team has called _____
   - 3c. Follows through until job is complete _____

4. Communicates understanding
   - 4a. Fosters open lines of communication to keep information flowing _____
   - 4b. Encourages constructive question/feedback _____
   - 4c. Listens without stereotyping _____

5. Demonstrates integrity
   - 5a. Is honest _____
   - 5b. Keeps word _____
   - 5c. Accepts responsibility for success/failure _____

6. Fosters team participation
   - 6a. Is committed to team success _____
   - 6b. Sets and works goals together _____
   - 6c. Compromises _____
   - 6d. Is willing to accept consensus _____

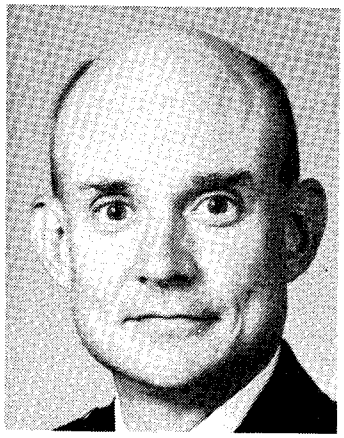
7. Technical competence/commitment
   - 7a. Has technical TQM competence _____
   - 7b. Demonstrates commitment to TQM principles _____

Again, subordinate leadership can provide input into the process with the additional opportunity to provide guidelines specific to the manager being evaluated. After reviewing their consensus ratings, a panel of employees, using a non-attribution policy, can suggest specific actions, behaviors and units of measurement which would indicate progress or improvement in the managers' TQM skills or behaviors.

There are two TQM tools or methods that can be used by the subordinates to obtain these indices, both designed to maintain anonymity of the respondents. The Crawford Slip method allows each respondent to provide a suggested action to their representative for presentation as a group list of feedback comments. If the subordinates feel more comfortable, face-to-face brainstorming as a group can be an alternative option. Again the principle of non-attribution is essential to ensure full member participation.

Does this system undermine the manager-subordinate relationship? Not in the case where a manager is interested in improvement. Not even in the case where a manager is not "liked" by the subordinates. If the consensus report indicates poor or few TQM skills, there will still be some that are rated lower than others. In this case, the same rule applies. For maximum growth work on the behaviors or skills with the lowest rating. A win-win situation in the true sense of continuous process improvement.

ADVANCING ON THE FUTURE: THE DANGER OF PARADIGMS IN MILITARY THINKING



Maj John Orndorff

ADVANCING ON THE FUTURE:
THE DANGER OF PARADIGMS IN MILITARY THINKING

by Major John C. Orndorff, USAF

Our most formidable enemy in future conflicts could be our views on conducting operations or, to use another term, our paradigms. Paradigms are sets of rules we consciously or unconsciously use to determine what we can and cannot do.[1] In this regard, it is helpful to recall the words of the ancient Chinese General Sun Tzu, "Know the enemy and know yourself; in a hundred battles you will never be in peril."[2] However, "knowing yourself" is precisely where professional soldiers often fail - they don't recognize when their views are obsolete. Marshal Ferdinand Foch recognized this when he said "The military mind imagines that the next war will be on the same lines as the last. That has never been the case and never will be."[3] For this reason I propose to further define paradigms and explain how we can overcome this mind set. Then I will use historic examples to illustrate how armies, throughout history, were defeated because they failed to recognize the obsolecence of their paradigms. Furthermore, a review of our own history will demonstrate, through the experiences of Billy Mitchell and Dwight Eisenhower, the military establishment's resistance to changing accepted procedures. These examples may be of value to make us aware of our own paradigms, and provide an understanding of how we can shift them to our advantage as we advance on the future.

According to Joel Barker in his book Discovering the Future: The Business of Paradigms, "A paradigm is a set of rules and regulations that: 1) defines boundaries; and 2) tells you what to do to be successful within those boundaries."[4] These rules then act as a filter of information determining how we see things.[5] Barker goes on to explain how paradigms shift when we discover new ways of conducting business, which results in a change in the rules governing that activity.[6] The concept of paradigm shifts is particularly applicable to our own age. For this is a time in which we see an acceleration in the number of changes to the world, bringing with them the possibility of doing things previously thought impossible. Change of this kind exemplifies a paradigm shift, i.e. the game changes and we must learn new rules. At this point, according to Barker, new paradigms run into resistance. Since people are comfortable with the old tried and proven ways, they are naturally reluctant to risk trying something new.[7] So how do we overcome our paradigms?

Barker notes we need to change our attitudes about what we consider impossible, and find ways to stimulate people to be more flexible. Through changing attitudes and flexibility we can break through our paradigms and purposefully seek out new ways of doing things. He goes on to say one must ask "What do I believe is impossible to do in my field but, if it could be done, would fundamentally change my business?"[8] Questions like this can help us to break out of old paradigms. Once we achieve this break, the game and the rules change and we are forced to "go back to zero." For professional military persons going back to

zero can be a painful experience, especially if they learn such lessons on the battlefield.

There are many examples in military history of armies defeated because of paradigms. For example, in Ancient Rome the foot soldier in the legion conquered most of the known world. Yet in AD 378, Gothic horsemen defeated the Emperor Valens and 60,000 troops. Valens was unable to anticipate the cavalry defeating his infantry because, for him, the effectiveness of the infantry was his paradigm. Moreover, Valens' defeat was the beginning of another paradigm in which cavalry would dominate the battlefields of Europe for about 1,000 years.[9]

Yet, even this paradigm met disaster with the introduction of the Swiss Phalanx in the thirteenth century. Drawing up ranks in a block formation, the Swiss created a wall of long pikes, which stopped the horsemen, allowing the infantry to unhorse and kill the knights.[10] Thus, the medieval knights, holding to a form of warfare they considered invincible, were defeated by a new form of combat.

A more recent example of paradigms in warfare is the use of Napoleonic offensive tactics against the machine gun in World War I. The machine gun proved deadly and illustrates how we become locked into certain ways of doing things. When introduced in the late nineteenth century military leaders did not quickly accept the machine gun. For, as Robert O'Connell notes in his book Of Arms and Men, "They [military leaders] were rooted in the traditions of an anachronistic officer corps whose conceptions of combat still centered around notions of hand to hand combat and

individual heroism."[11] The idea of an automatic weapon like the machine gun just didn't fit into their way of thinking. The German army, however, perfected the use of this new instrument when they dug in and used it to fire on charging French troops during the Battle of the Marne. The result was unheard-of carnage, for that time, and four years of trench warfare.[12] Trench warfare in turn became a paradigm which, again, the Germans exploited in the Second World War.

In World War II the Germans resorted to maneuver and speed rather than static trenches and frontal assaults. The French on the other hand, based on their experiences in World War I, built the Maginot Line to guard against another German attack. The Germans however chose not to fight according to the old rules and attacked the French through the Ardennes, thought to be impassable, thereby defeating the French.[13] Again we see an example of how holding on to an old paradigm can result in disaster. In our own military history General Billy Mitchell, like the German army, also pioneered a paradigm shift in warfare.

Based on his experiences in the First World War, Mitchell foresaw the value of the airplane in combat, a concept not quickly accepted by the War Department. He understood problems associated with defense against attacking aircraft and worked to warn the establishment against neglecting the airplane. Even after demonstrating the airplane's ability to sink ships, the Navy Department largely ignored his warnings.[14] General Mitchell went as far as to predict the Japanese attack on Pearl Harbor because he realized other nations were exploiting the use

of aircraft.[15] He stated, "The nation that hangs it's destiny on a false preparation will find itself hopelessly outclassed from the beginning."[16] Though Mitchell paid for his outspokenness with a court-martial, the War Department finally adopted some of his ideas, preventing the United States from being "outclassed" when the war broke out. General Mitchell was not the only professional officer to pioneer a new paradigm during this period; for General Dwight Eisenhower, based on lessons learned from World War I, was also thinking about the future.

Following the World War, then Captain Eisenhower and Colonel George Patton studied the usefulness of tanks in warfare. At that time, Army doctrine held the tank's value was in supporting the infantry and thus, should move at the infantry's pace. Based on their studies, Eisenhower wrote an article for The Infantry Journal, proposing the value of armor was in speed and surprise, contrary to standard doctrine. The US Army Chief of Infantry responded to Eisenhower's ideas saying they were "not only wrong but dangerous." The Chief of the Infantry further told Eisenhower his writing must be compatible with official doctrine.[17] History later vindicated Eisenhower when the Germans used armor this way during their Blitzkrieg.

Mitchell's and Eisenhower's experiences serve as excellent examples of how paradigms blind leaders to new possibilities for the future. In both examples they ran into resistance because their ideas were contrary to the conduct of warfare at that time. The military leadership of their day felt comfortable with the tried and proven methods they were used to, and were resistant to

a new set of rules in which they would have to "go back to zero." Though we can look back on historical examples and commend persons like Mitchell and Eisenhower, it is imperative we examine our own tactics and doctrine lest we find ourselves resisting the future.

To avoid being blinded by our paradigms and stumbling shortsightedly into the future, we must learn to anticipate events.[18] Unfortunately, we live in an age where world events are changing at an ever increasing rate which makes anticipating the future difficult. For example, who, in 1990, would have anticipated the breakup of the Soviet Union in 1992? There are clearly some things we cannot anticipate, but perhaps we can learn to use such events to our advantage. Gary Kissler in his book The Change Riders: Managing the Power of Change, compared dealing with change to riding a horse. The objective of riding a horse, he noted, is not to master the animal, but to exploit its strength to achieve our goal. We should exploit change in the same way.[19] In the case of the armed forces, it is imperative we keep an open mind to new ways of doing things, rather than holding on to old, comfortable techniques. For example, would the French have conducted their tactics any differently had they honestly been open to the possibility of a German attack through the Ardennes? I suspect so. Moreover, as history demonstrates, paradigms will shift. The only question is "Who will be the one to change the paradigm?"

Since paradigms will change, we must constantly look for better equipment and methods, as well as new tactics for the

current equipment we have. James P. Pinkerton pointed out an example of this in his article "General Schwarzkopf's New Paradigm," as he noted the Pentagon learned from experiences in Vietnam and Just Cause, essentially breaking through their paradigms on how to conduct war.[20] This idea is especially poignant in Richard P. Hallion's book Storm Over Iraq, as he states "...it confirmed a major transformation in the nature of warfare: the dominance of air power."[21] Thus, the United States' and our coalition's ability to break through old paradigms resulted in our success in the gulf war, and we are justified in our euphoria over this victory. However, it should be clear changes will not stop or slow down. Our task now is to be proactive, examining the way we see ourselves and others.[22] Essentially, we need to know our potential enemies, who they may be and how they may fight, and know ourselves, with what and how we're likely to respond. We must also constantly seek and be open to new weapon systems and new ways of using old systems, as we did with the B-52 in Desert Storm by using it in a tactical role. Furthermore, though we may think some options are impossible, it may still be helpful to ask, "Have we tried it?" The victors of military history were commonly those who tried and did what others thought impossible. Like many who have gone before us, we may not be able to predict the future exactly as it will occur, but we can exploit it.

The challenge of exploiting the future will require flexibility and changes in our attitudes. However, before we can do this we must learn to understand what paradigms are and how

they affect us. Examining historical examples of how paradigms contributed to disaster on the field of battle may be helpful in this endeavor. Nevertheless, our responsibility is to learn from pioneers like General Mitchell and General Eisenhower, to see the future's potential, and have the courage to shift our paradigms. If we do so, we will fulfill our defensive role and, as General Mitchell said, we will never be "outclassed."

NOTES

1. Joel Arthur Barker, Discovering the Future: The Business of Paradigms. St Paul: ILI Press, 1989, p. 14.

2. Sun Tzu, The Art of War. Translated by Samuel B. Griffith, NY: Oxford University Press, 1971, p. 84.

3. Air Force Manual 1-1, Vol. II, Basic Aerospace Doctrine of the United States Air Force, March 1992, p. 37. This quote was originally found in Foch's Precepts and Judgements.

4. Barker, p. 14.

5. Ibid., p. 42.

6. Ibid., p. 15.

7. Ibid., p. 31.

8. Ibid., p. 73 - 74.

9. David H. Zook, Jr and Robin Higham, A Short History of Warfare. NY: Twayne Publishers, 1966, p. 55 - 56.

10. Robert L. O'Connell, Of Arms and Men. NY: Oxford University Press, 1989, p. 102.

11. Ibid., p. 233.

12. Ibid., p. 245 - 246.

13. Barker, p. 60 - 61; James P. Pinkerton, "General Schwarzkopf's New Paradigm." Policy Review. (Summer 1991), p. 25.

14. Russell F. Weigley, The American Way of War. Bloomington, IN: Indiana University Press, 1977, p. 128.

15. Ibid., p. 230.

16. William Mitchell, Winged Defense. NY: Dover Publications, Inc., 1988, p. XV.

17. E.K.G. Sixsmith, Eisenhower as Military Commander. NY: Stein & Day Publishers, 1972, p. 6.

18. Barker, p. 7 - 8.

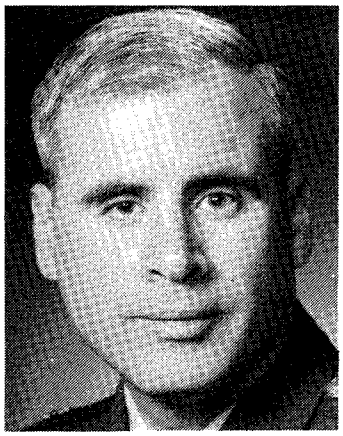
19. Gary D. Kissler, The Change Riders: Managing the Power of Change. Reading, MA: Addison-Wesley Publishing Co. Inc., 1991, p. xviii.

20. Pinkerton, p. 25.

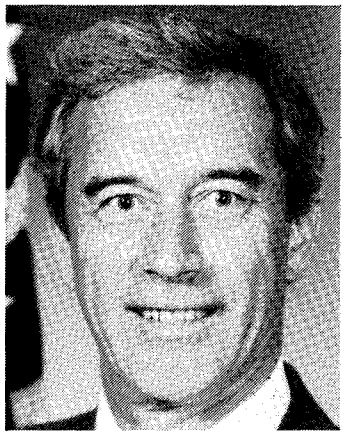
21. Richard P. Hallion, Storm Over Iraq, Washington & London: Smithsonian Institution Press, 1992, p. 1.

22. Kerry Rottenberger, "It's the Principle of the Thing." Sales and Marketing. (Oct 1991), p. 77.

THE MYSTERIOUS ORIGIN OF THE "SHEWHART CYCLE"



Maj Andrew Stricker, Ph.D.



Bill Ratcliff

Lt Col Ralph Hartman

The Mysterious Origin of the "Shewhart Cycle"

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Abstract

This article presents a synopsis of the evolution of the scientific method in the Shewhart cycle. It traces the beginning of the Shewhart cycle back to Frederick Taylor and outlines the changes to the cycle as described by Shewhart and later modified extensively by Ishikawa. A review of Shewhart's scientific method is provided with current recommendations for continuous process improvement teams. It is the view of the authors that Shewhart's scientific method is often misused or misunderstood in quality control activities.

Introduction

Recently one of the authors had the privilege to attend a Deming seminar. At one point Deming mentioned that the PDCA (Plan-Do-Check-Act) cycle should be changed to PDSA (Plan-Do-Study-Act) because the term Study captures Shewhart's intent better than Check (See Figure 1). In fact, Deming's latest book published in 1993 does change Check to Study (p. 135). We had always assumed the PDCA cycle belonged to Shewhart and wondered why Deming was now making a change. Consequently, we decided to read Shewhart's books and find out the origin of the model and discover why Deming made the change. Very soon into our preliminary investigation we realized the PDCA cycle acronym didn't actually exist in its current form in the writings of Shewhart. We formulated this investigative question: "Who actually penned the PDCA cycle acronym commonly attributed to Shewhart?" We started our quest all in good fun. Later, we began to question whether the true significance of Shewhart's work had been properly reflected in modern models of the scientific process as applied to the more recent total quality movement. This paper outlines our response to the investigative question and revisits Shewhart's contribution to total quality.

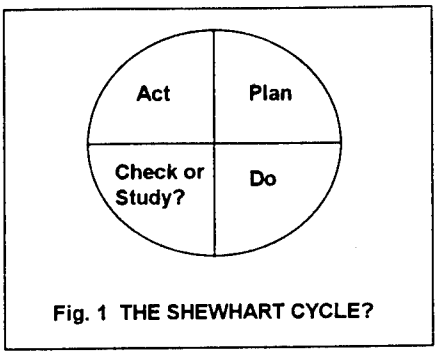

Fig. 1 THE SHEWHART CYCLE?

Shewhart's Scientific Method

The earliest source usually quoted to reference the Shewhart cycle is his now classic work, *Economic Control of Quality of Manufactured Product*, published in 1931. On page 354 he outlined as a scientific approach: 1. Study, 2. Apply, 3. Produce, 4. Test, and 5. Develop. Clearly Shewhart outlined a scientific method, but we couldn't find any reference to the modern version of: Plan-Do-Check-Act.

In sequence of publication dates we delved into Shewhart's book, *Statistical Method From the Viewpoint of Quality Control*, published in 1939. The book provides the first visual model (See Figure 2) of Shewhart's scientific method or cycle (p. 45). The method had been condensed to three steps for a "dynamic scientific process of acquiring knowledge: "1) Specification, 2) Production, and 3) Inspection. Not quite the PDCA version but the cycle concept is clearly evident as a major contribution by Shewhart. This book by Shewhart is the most frequently quoted source by American authors for the "Shewhart Cycle."

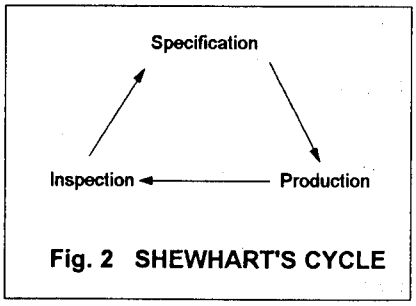

Fig. 2 SHEWHART'S CYCLE

Deming's Adaptation of Shewhart's Method

W. Edwards Deming, more than anyone else, helped to spread the popularity of Shewhart's work by attributing to him a cycle depicting a scientific method. Over the years Deming has continued to give credit to Shewhart for the experimental cycle printed in his books and described by him in his lectures. The earliest known printed source of Deming's pictorial display of "Shewhart's cycle" is found in Deming's book, *Elementary Principles of The Statistical Control of Quality*, published in 1951. On page 9 Deming depicts a five-step cycle: 1) Design the product, 2) Make it, test it, 3) Put it on the market, 4) Test it in service, and 5) Re-design the product. There were some modifications to Shewhart's scientific method but Deming's adaptation was fairly close. The same model found in Deming's 1951 publication was, in fact, the model he used for his July, 1950, 8-day course in Japan (Koyanagi, 1960). Minor modifications to the "Shewhart cycle" continued over the years. In Deming's 1986 book, *Out of the Crisis*, he depicts a six step model which he attributed to Shewhart (See Figure 3) and which roughly translates into: 1) Plan a change or test, 2) Carry out the change or test, 3) Observe the effects, 4) Study the results, 5) Repeat Step 1 with knowledge, and 6) Repeat Step 2 and onward (p. 88). The footnote at the bottom reads:

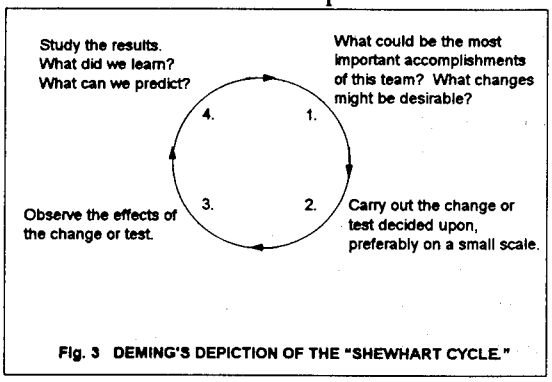

Fig. 3 DEMING'S DEPICTION OF THE "SHEWHART CYCLE."

"The perception of the cycle shown in Fig. 5 came from Walter A. Shewhart, Statistical Method from the Viewpoint of Quality Control (Graduate School, Department of Agriculture, Washington, 1939; Dover, 1986), p. 45. I called it in Japan in 1950 and onward the Shewhart cycle. It went into immediate use in Japan under the name of the Deming cycle, and so it has been called there ever since."

As mentioned above, the latest Deming change to the "Shewhart cycle" is found in his recently published 1993 book, *The New Economics for Industry, Government, Education.* On page 135, Deming now refers to the Plan, Do, Study, Act or PDCA model (Note: Check was changed to Study by Deming) as the "Shewhart cycle." This marks the first published Deming reference to the classical PDCA version of the model as specifically belonging to Shewhart and represents a significant modification of the cycle which is found in his earlier publications.

It seemed to us that, over the years, Deming has modified and extended Shewhart's scientific method into a more descriptive model which highlighted the importance of Shewhart's emphasis on careful experimentation. At this point, however, we had not located an explicit reference for PDCA which preceded Deming's latest change and depiction of "Shewhart's cycle."

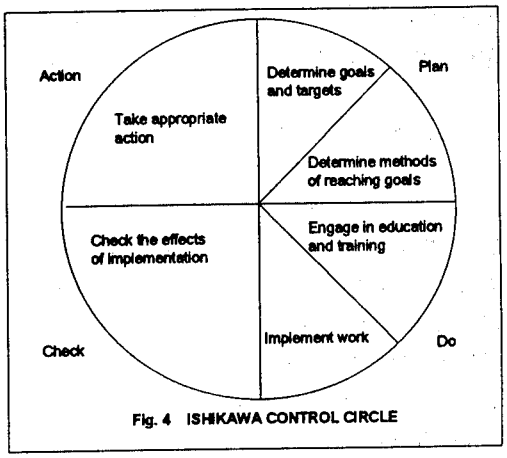

Fig. 4 ISHIKAWA CONTROL CIRCLE

Ishikawa: The Japanese Connection

We decided to examine the writings of Japanese who were influenced by Deming's visits to Japan. We found numerous illustrations of the PDCA cycle, but oddly, no mention of Shewhart as the author.

Ishikawa Control Circle. We eventually came across Kaoru Ishikawa's work, *What Is Quality Control? The Japanese Way.* On page 59 we found the "Control Circle," which parallels the American version of the PDCA cycle except Action is used instead of Act, which may be an issue of translation from Japanese to English (See Figure 4). The description of the PDCA cycle in the book suggests that Ishikawa had a hand in the final form of the modern version of the PDCA cycle. Interestingly, Ishikawa references F. W. Taylor's influence in the creation of the PDCA cycle by claiming Taylor suggested a scientific method of "Plan-Do-See." There's no mention of Deming being associated with the PDCA cycle except on page 17, Ishikawa mentions that Deming's seminar emphasized how to use the cycle of Plan, Do, Check, Action (PDCA, the so-called Deming cycle, relating to design, production, sales, survey, and redesign) to enhance quality. Clearly, Ishikawa attributes some credit to Deming, but the cycle described and first-hand accounts of seminar participants suggests that the cycle was more like Deming's version which is found in his 1986 book on page 88 (See Figure 3). It

began to look to us as if Ishikawa had actually penned the PDCA acronym, and rightly credits Deming with the initial concept extracted from the works of Shewhart.

To help clarify the Japanese connection we decided to write to the Union of Japanese Scientists and Engineers (JUSE) because they initially sponsored Deming to Japan in 1950 and published his lectures. We were pleased to receive a letter from Mr. Junji Noguchi, the Executive Director of JUSE (Noguchi, 1993). In his reply, he also provided a JUSE newsletter article written by Kozo Koura from the Aoyama Gakuin University (Koura, 1991). The article outlined the relationship of the Deming Cycle to the Management Cycle. Mr. Koura claimed that Deming initially taught the "Wheel of Quality Control" or the Deming Cycle in the form of eight fans and later in his "To Executives" lectures to Japanese leaders in industry, reduced the eight fans to four (See Figures 5 and 6). The initial eight-fan model, which was labeled by Deming as the "Wheel of Quality Control," had these components: 1) Idea of placing importance on quality, 2) Responsibility for quality, 3) Research, 4) Standards for designing and improving products and for quality, 5) Economy of manufacturing, 6) Inspection of products, 7) Improvement, and 8) Expansion of sales channels (See Figure 5). Those eight fans were reduced by Deming into four: 1) Designing, 2) Manufacturing, 3) Sales, and 4) Research and services (See Figure 6). Deming might have thought that the eight-fan model was too cumbersome or that he could easily speak to the issues using only the four-fans. Koura further claims that Ishikawa began introducing the Deming Cycle with these fans: 1) Designing, 2) Production, 3) Sales, and 4) Research and services. As can be seen, Manufacturing was changed to Production. Also, Ishikawa renamed the cycle to "Principle of Quality Control." And, in specifying the seven steps of management, Ishikawa included a cycle of four fans: 1) Planning, 2) Doing, 3) Checking Results, and 4) Action. In January 1959, *Quality Control* magazine started to publish lectures on control charts as a series and offered two versions of the cycle, one labeled the Deming Cycle and the other as the Management Cycle (the Management Cycle published in the magazine listed "Reflection" instead of "Checking Results") (see Koura, 1991 and Figure 7). The Deming Cycle remained the same but the Management Cycle over time became known as the "PDCA Cycle" in Japan.

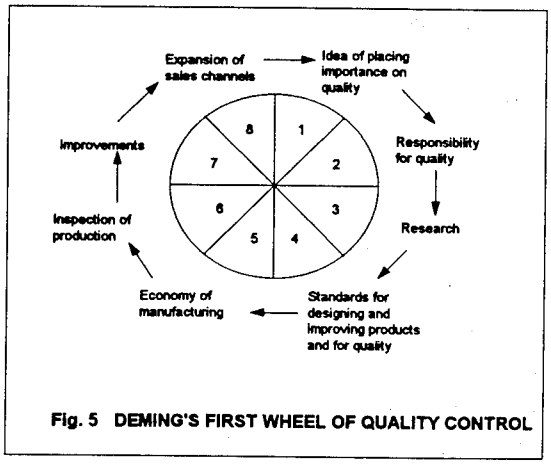

Fig. 5 DEMING'S FIRST WHEEL OF QUALITY CONTROL

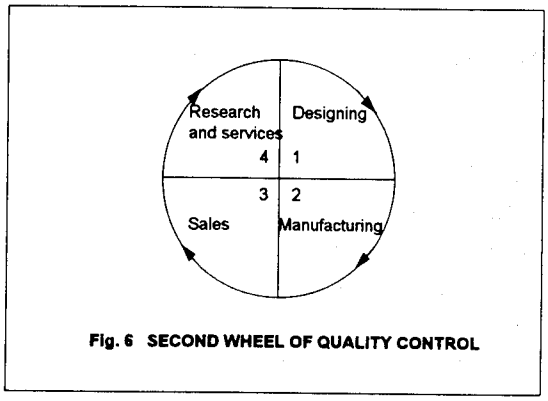

Fig. 6 SECOND WHEEL OF QUALITY CONTROL

We were still confused, however, with the issue of Taylor's influence and the fact that the PDCA cycle as we know of it today is commonly attributed to Shewhart by American authors and was traced back to Taylor by a Japanese. Further, it appeared to us, from Koura's article, that the Deming Cycle underwent profound changes in Japan. Over the years, the Management Cycle (or PDCA cycle) was adopted and used by Americans, who still associated it with Shewhart. Was there an earlier PDCA version of the cycle which existed independently of the Japanese modifications to Deming's Wheel?

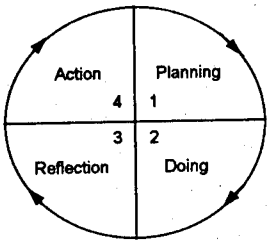

Fig. 7 MANAGEMENT CYCLE

Taylor's Scientific Management

To track the influence of Taylor, we examined his description of time study found in a 1912 book, *Transactions of the A.S.M.E.*, (Vol 34, pp. 1197-1198), and found the model: 1) Pick, 2) Study, and 3) Describe. Not quite the same model Ishikawa attributes to Taylor but we noticed the similarities. We could clearly appreciate the influence. We wondered whether Ishikawa was suggesting that Taylor influenced him or that Taylor influenced Shewhart and subsequently Deming? Along about this time one of our colleagues suggested we investigate John Dewey's works since he was the one who actually first penned the cycle. We were surprised to hear this but figured it was worth the investigative effort even if it was a long shot.

Dewey's Model of Control

After extensive review (Dewey was a proliferate author) we located Dewey's scientific model, in *How We Think*, dated 1933, pages 165-178. Interestingly, Dewey referred to his model as a "method of control" (p. 169). His model, as briefly outlined, was: 1) Thoughtful observation which leads to multiple hypotheses, 2) Collection of sufficient instances, and 3) Experimental variation of conditions. In all, we found Dewey's model to be a variation of Taylor's, albeit, a better described model. Nonetheless, we were still left with Ishikawa's book as the primary reference.

Whither PDCA?

At this point in our search we began to lose hope in locating a direct supporting reference for a PDCA cycle before Deming's latest publication, other than the explicit early reference found in Ishikawa's book. All other references were in support of a scientific model which indirectly could be traced as far back as John Stuart Mill's hypothetical-deductive reasoning work and even further to sources from classical Greece.

As is true for all great concepts, the experimental method and associated models have undergone a metamorphoses over the years. Clear demarcations, however, may be

found in history as models undergo change. It's not that Shewhart "created" the PDCA cycle, or that he "created" the experimental method found in his books. On the contrary, his fame rests with associating the classical experimental method, with accompanied concepts of variation, with his development of control charts for use in industrial processes. As Taylor before him, the application of a scientific model to industry has revolutionized the world of production and has gradually been linked to the more recent movement of total quality.

Unless further evidence becomes available, we believe Ishikawa deserves some credit for the PDCA acronym. And as Ishikawa claims, further credit should be given to Frederick Taylor for initially seeing the linkage between the classical scientific method and industry. This shift in attributing and sharing credit for the modern PDCA cycle acronym doesn't minimize Shewhart's contribution in the development of applying the scientific method in industry or Deming's initial expansion of Shewhart's three-step cycle. A possible impetus for Ishikawa, who was influenced as a colleague of Deming in the 1950s, was indeed a version of the Deming wheel: 1) Design, 2) Test, 3) Market, and 4) Test it in service. Examination of the Deming wheel reveals the close similarities to Shewhart's model. The expansion of the wheel concept, however, we believe, was enhanced by Deming who was influenced not only by Shewhart, but also by Clarence Irving Lewis and his book, *Mind and the World Order*. In his book, Lewis, makes an eloquent argument for the importance of making decisions on the basis of numerical knowledge and resisting the common tendency to rely on experiential knowledge solely since we can be fooled by our senses. The influence of Lewis might have led Deming to place greater value on the use of a scientific method for making changes in production settings, particularly for the need to rely on theory as an overarching guide. Deming, to this day, continues to stress the importance of the Lewis book to his seminar participants. At any rate, perhaps Deming's wheel served to turn the gears in Ishikawa's mind in the formulation of the PDCA cycle acronym.

As can be seen, tracing the origin of the Shewhart cycle has highlighted many sources of influence and modifications. Nonetheless, it may be time to give some credit for the modern PDCA acronym to Ishikawa. We now want to turn towards a discussion regarding what we believe to be Shewhart's greatest contribution to the total quality movement, which in our minds has greater significance than who should be credited for the actual PDCA acronym.

Shewhart's Greatest Contribution

Shewhart's Method Revisited. The aim of initial experimentation on processes is directed towards the attainment of a state of statistical control or stability. Statistical control, however, is not a finite state. Instead, statistical control for each process must be modeled over time and indefinitely. The concept of variation is critical to understanding what Shewhart meant by statistical control. Fundamentally, a process is closer to statistical control when all special or assignable causes of variation have been removed. Often Shewhart's control chart tool is presented as if it were an optional choice to process

improvement teams. Quite the contrary; a control chart is essential in the attempt to create a model for the process under study and to evaluate the state of statistical control. A control chart helps to remind us that random data can and does appear in perceived non-random order. Choosing not to use a control chart, the unwary will misinterpret hastily collected data as indicative of an assignable cause of variation of a process and inadvertently tamper with the system by attempting to fix a truly random occurrence or treat a common cause of variation as special.

Definitions of Causes of Variation. Shewhart defined assignable cause as an element in the process which produces increased variation and unstableness. Deming (1986) preferred the term special instead of assignable, in the attempt to represent a cause which is specific to some group of workers, or to a particular production worker, or to a specific machine, or to a specific local condition (p. 310). Furthermore, Deming believed that it is our tendency to attribute a defect, mistake or accident to someone or a special event instead of looking for the trouble in the system. For other system variations Deming preferred the term common cause variation.

Consequences of Misidentification. Deming's definitions helped to decipher the confusion which arises when common causes and special causes of variability are inappropriately identified. For instance, if control charts are not used or are wrongly interpreted, a common cause might be mistakenly identified as a special cause. Consequently, an attempt to "improve the process" might mistakenly target a person or special event as the culprit. This is likely to happen when a process improvement effort is hurriedly approached and not viewed as an on-going process. In such circumstances, efforts will center on cross-sectional one-time sampling of data or careless sampling over time. The end result is the likely production of non-random order of data and associated misinterpretation of causes of variation.

Shewhart's Work Applied Today

Moving from hard-like or industrial manufacturing systems, from which Shewhart and Deming drew their early examples, to soft-like systems with emphasis on services and information products presents unique challenges when applying Shewhart's scientific method. The challenges, however, are not insurmountable. The contributions of Checkland (1981) and Senge (1990) have helped considerably in past efforts to apply systems thinking and the scientific approach to soft-like human activities (Stricker & McCloy, 1992). A major step in this effort has been the willingness by some to identify the differences and similarities between problem-solving and continuous process improvement efforts in scientific methods. Time-sensitive issues may be served by a cross-sectional problem-solving perspective, while long-term sustained learning about a system is served by continuous process improvement efforts. Of course these efforts are sustained by human problem-solving skills. For an excellent discussion on problem solving as a key skill in the quality movement we recommend the book by Hughes, Ginnett, and Curphy, *Leadership: Enhancing the Lessons of Experience*, recently published. More recently, there has been awareness that quality is sustained by team

efforts using scientific methods and the secret to releasing their contributions lies in tapping into personal continuous improvement efforts of individual team members. If we were to fully define personal continuous improvement the definition would have to account for the individual's awareness of their cognitive and metacognitive abilities, particularly as related to team efforts. We would suggest that part of the difficulty of applying Shewhart's method, or for that matter, any scientific method, in soft systems lies in not fully appreciating the power of a problem-solving analogy. By this we mean, that a Newtonian, or mechanical view of problem-solving, doesn't fit as nicely to human-activity systems as say a Bertalanffy (1940, 1968), or biological view. If the problem-solving approach is not flexible in that it can accommodate a longitudinal study of a system, then issues which can only be identified by careful examination of trends or growth patterns will be possibly overlooked. The careful collection of data over time and the use of data for prediction is one approach to modeling the system or process. Once a model of a system is developed, then "what-ifs" can be addressed from both a quantitative and qualitative basis. Such action is part of what we refer to as taking a "systems approach" to quality.

A Continuous Process Improvement Strategy. By taking a systems approach, a continuous process improvement strategy by a team may work like this:

1) Adequately model the process over time through careful random sampling of data;
2) Identify assignable or special causes of variation (those elements which fall outside of the control limits and are worth the cost to fix) and remove them;
3) Study to ensure the process is under greater statistical control for the time being through the removal of special causes of variation;
4) Tackle common causes of variation to tighten statistical control of the process; and
5) Organize knowledge about the process so that valid inferences and reliable predictions concerning future data may be made.

When a special or common cause is manipulated it should be done experimentally. By this we mean that proper care should be exercised to establish evidence for control and there should be small-scale tests of proposed hypotheses before large-scale implementation of action steps. In Shewhart's own words:

> "It may be helpful to think of the three steps in the mass production process as steps in the scientific method. In this sense, specification, production, and inspection correspond respectively to making a hypothesis, carrying out an experiment, and testing the hypothesis. The three steps constitute a dynamic scientific process of acquiring knowledge." (pp. 44-45, 1939)

We believe it is worthwhile to remind contemporary users of Shewhart's scientific method that the overt experimentation mentioned above is part of a larger model for quality control initially outlined by Shewhart and later modified by Deming. There might be considerable misuse of Shewhart's production stage if it is misinterpreted and used in isolation or apart from his larger quality strategy.

The Fundamental Necessity. Again, we believe most of the special causes of variation in a process must be removed and some evidence of statistical control present before Shewhart's "production stage" is applied to tighten common or system causes of variation. Conducting an experiment on a process not in control would yield noninterpretable data. The necessity of control in all science is no less true when attempting to improve a process which exists outside of a laboratory. If evidence for control cannot be found, there are no reliable indicators for consistency and magnitude of change. Or as Shewhart has said, "There will be no reasonable assurance that predictions about the process will be found valid" (p. 48).

Guidelines for Continuous Process Improvement Teams. In practice then what does our review of Shewhart's work suggest for continuous process improvement teams? We believe Shewhart's work offers two broad guidelines. First, once the system has been adequately modeled, work to establish statistical control of the process by removing assignable or special causes of variation. Second, work to attain maximum quality assurance in the process by addressing common causes using Shewhart's scientific method. We fear the first guideline is often ignored by followers of Shewhart's method if only because Shewhart's thesis has been diluted over time with overly simplistic interpretative models of the method or isolated applications of control charts.

Illustrative Case Study. A fictitious case study is offered to illustrate our proposed continuous process improvement strategy which is built from our interpretation of Shewhart's scientific method. We offer an environmental scenario involving a soft-system continuous improvement effort on the basis of customer feedback. In many aspects, our case is contrived but the intent is to illustrate the complexity of modeling soft-systems and the subsequent care needed when interpreting complex data.

Let's suppose Maxwell Air Force Base, located in Montgomery, Alabama, operates a water-treatment facility and recently began to survey customers on perceived quality of taste every two months (see Figure 8). Eighteen months of data were collected and control charts were created (Note: for brevity purposes, we've omitted a technical discussion of control charts). Many questions may be asked of the Maxwell water purification process action team at this first step of the process improvement strategy. A few come to mind: Did the team properly sample customers? Did the team properly sample water specimens for purification and subsequently used by customers? Multiple control charts could be used to track perceived quality of taste over time by location of water sample. Imagine the impact on the accuracy of the model if the team sampled at only one location, for example, above the insecticide location. Or imagine the impact if the team failed to obtain a randomly representative sample of customers. Admittedly,

there are ways to improve an unpleasant aftertaste of water from within the plant, but let's assume that every known technical purification and taste improvement process is being used to treat the incoming water and there is still a perceived unpleasant aftertaste (Note: the water passes all current health standards). At this point, there should be considerable evidence that the internal water purification processes are under statistical control before any effort is made to examine potential external causes of variation.

The team advances to step two to identify and remove special causes of variation. Using the map provided in Figure 8, which potential cause of variation in the aftertaste of water, for time measurement 9, might be a special cause? One approach is to base the decision on time. For instance, how long has the exposed land fill site been present? Also, the erosion phenomenon might be considered part of the overall river system. It might be readily remedied using concrete levies and thus in the near future be less a part of the system, but generally, erosion is an ongoing part of most river systems. On the other hand, the erosion has exposed an old land fill site which is not a natural part of river systems. What about the sunken barge? Doesn't seem to be immediately relevant since its location is down stream. It might, however, present a problem for the Montgomery plant. Should the team consider the Prattville plant as a potential cause? Is the Prattville plant doing something to the water? For that matter, is the Maxwell plant doing something wrong with applying the purification techniques and chemicals? Along the same line, a closer look at the metric might be necessary: is measuring customer perceived taste of water suitable? Is the survey instrument both valid and reliable? As can be seen, the complexities of this scenario point to the confusion that may arise when determining special and common causes of variation. The most readily apparent special cause in this scenario might be the insecticide. The team ought to ensure the insecticide is no longer dumped into the river and collect samples of water after river clean up. As part of the third step, survey data would continued to be charted to find evidence for reduced variation. The fourth step would only come when there existed some degree of confidence that special causes had been adequately addressed. The fifth step presents some unique challenges as well. The intent with this step is to build an internal corporate learning system. By this we mean that procedures used to collect, store, organize, and display data should become routine. External and internal inputs which feed data into the system should be diligently

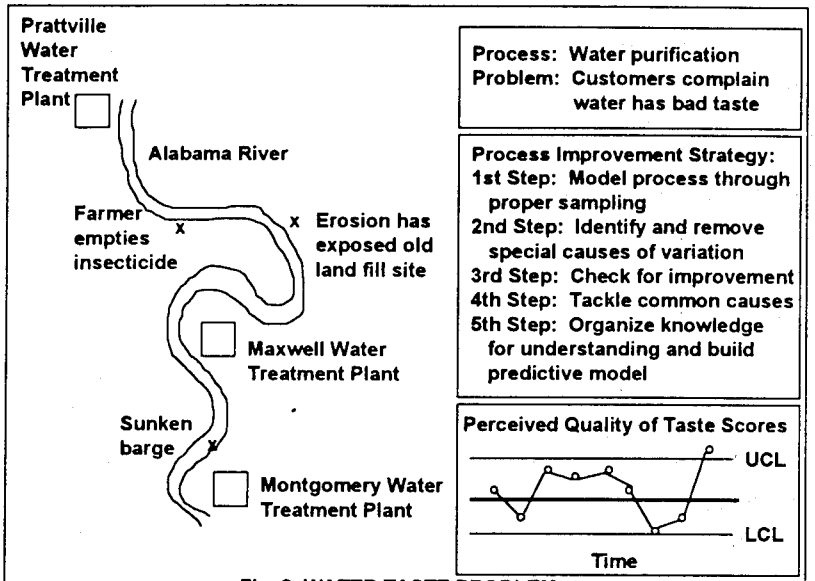

Fig. 8 WATER TASTE PROBLEM

maintained. Predictive models built from the data should undergo routine validity checks using newly collected data. And lessons learned should be corporately understood and retained for future use. The importance of these efforts becomes self-evident when we consider the dynamic ever-changing nature of human-activity systems.

The Enormity of Applying Shewhart's Scientific Method

Modern renditions of the scientific method such as Plan-Do-Check-Act, with accompanied continuous process improvement approaches, tend to downplay the difficulties encountered when attempting to use them. Particularly, there are significant problems to overcome that are tied closely with individual skills and preferences.

Skills. Ishikawa, who modified the modern PDCA cycle, speaks of the hardships encountered in Japan when early attempts were made to have workers use statistics on the job. He explains:

> "It is true that statistical methods are effective, but we overemphasized their importance. As a result, people either feared or disliked quality control as something very difficult. We overeducated people by giving them sophisticated methods where, at that stage, simple methods would have sufficed" (p. 18, 1981).

Ishikawa has a valid point. At certain stages of implementing quality initiatives there are appropriate numerical or enumeration skills. In early stages of implementing a quality approach, the challenges of changing the culture and encouraging people to rely more on data in decision making, may seem overwhelming for most organizational education and training programs. The danger in responding to such challenges is overreaction at the early stages. People need time to absorb new enumeration skills. On the one hand, the declarative knowledge and specific skills presented in early stages of quality education and training, the teaching of which seems to tolerate less preparation, is helping people to become increasingly literate. On the other hand, during later stages when we attempt to address the procedural knowledge of quality (e.g. the "how to" when faced with ambiguity or complex work systems), the teaching will be considerably more difficult in our attempts to help people become increasingly numerate. What the teaching or education effort will have to address, using a very thoughtful pedagogy, is the purposeful development of critical thinking skills. Why is this important? The importance stands out when we contrast the difference between training and education. Porter (1991) offers an in-depth and eloquent discussion of the differences, but essentially he defines training as the acquisition of specific skills through instruction and practice. The goal of training is to reduce variance from "the one best way" to perform a task. Whereas, education shifts the emphasis from learning answers to learning how to ask questions (pp. 11-4 - 11-5). Clearly in our minds, effective team efforts in continuous process improvement is dependent to a large extent, on the ability to ask the "right" questions, or to critically think. We cannot imagine a more challenging task, even if "the problem" is given to a team, or someone else actually conducts a designed experiment (DOE) and

analysis. There is no substitute for the team's ability to recognize when collected data doesn't fit the issue at hand or is inappropriately interpreted. The reliance on enumeration experts once or twice removed from data collection and interpretation only brings about increased risk that the "right" questions are not being asked at the "right" time. So, for us, traditional training approaches to quality, which have a role to play in early stages, will not bring about the same gains in those later stages on our quality journey. Now, more than ever, instructional systems design, which can anticipate learning needs, must become fully integrated into organizations.

Preferences. Another challenge we face is our preferences for what a quality approach should look like or actually do. For instance, "Is quality a quest or a journey?" Recently, there have been suggestions that part of the problem of "doing" quality may be found in a quality archetype which places greater value on the desire to be a champion after having "persevere against all odds" (Zuckerman & Hatala, 1992). Such an "archetype," if it truly exists, would suggest an individual preference for approaching the ambiguous or morphistic qualities of soft-like systems as a problem requiring a triumphant solution. Consequently, on some occasions, there might be a sense of victory that comes from improvement efforts gained from failures culminating in a success. An archetype of this nature might work against the long-term patience needed for modeling systems. There is much discussion now about "breakthrough" approaches to quality. And, it may very well explain a tendency by some to prefer short-term problem-solving approaches to quality over long-term continuous process improvement efforts. To effectively use this archetype to our advantage we will have to learn to recognize it when it appears and understand how it hinders and contributes to our scientific method.

Given the difficulties associated with applying the scientific method in an organization, particularly as related to individual skills and preferences, it seems natural to us that efforts would be underway to address them. One such effort concerns the management of the scientific method.

Hoshin Kanri: Continually Performing PDCA. The Japanese have been struggling with managing the scientific method. The struggle seems to be one of integrating homunculurized or autonomous continuous process improvement efforts along with a guiding unified policy and plan. Since their journey with formal approaches to quality started earlier, their lessons learned are valuable for us. In the early 1980s the Japanese began to discuss a concept they labeled Hoshin Kanri (or policy deployment). The concept dealt with a system for quality control and continuous improvement activities (Akao, 1991). Hoshin Kanri is tied directly to the PDCA cycle. The Japanese early on recognized that the scientific method for continuous process improvement had to be tied to overall organizational strategic objectives. Further, with Hoshin Kanri, the attempt is to not only promote organizational-wide quality control and continuous process improvement but along with those efforts comes the realization that environmental conditions play a vital role. Fundamentally, Hoshin Kanri is the Japanese effort to band together an entire organization for long-term continuous process improvement and to retain lessons learned over time in a fluid-like or changing environment. In our view, they

have attempted to build organizational learning systems modeled very much from what is known in cognitive science. They have recognized that a rich knowledge base, obtained from such learning systems, leads to greater accuracy in predicting events of the organization. Moreover, they appear to have maintained a scientific method as they have come to appreciate the further gains of focusing their attention to soft-like aspects of systems involving the management and leadership of people. This seems quite natural to us: once you've seen the gains that can be obtained by concentrating on production systems using the scientific method in quality, it begs the exploratory nature within us as to whether similar gains might be realized if applied to the soft-like side of our organizations.

Summary

Clearly, at this point in the quality journey, there is a growing awareness of the enormity of the challenges ahead of us. We close this discussion on the contribution and our rediscovery of Shewhart with the desire to share with the reader our sensitivity to the fact that "doing quality" better is not quite as simple as being more scientific or adopting the use of control charts. Over the years, however, we believe there has been a tendency to minimize the importance of Shewhart's overall strategy for quality out of which grew the basis for his scientific method, the PDCA cycle and more recent policy deployment models.

What Have We Learned? At the start of our curious investigation into the origin of the PDCA cycle we did not anticipate how much we would learn in the process. As a result, our investigation turned out to be very different from what we had initially envisioned. We had thought the investigation would be simply historical in nature. As it turned out, we have rediscovered the importance of system modeling uniquely expressed by Shewhart. This seems appropriate since changing through learning is the purpose behind it all. To summarize, we have learned the following:

(1) The scientific method comes in many forms. The uniqueness of the PDCA cycle can be traced back to a number of contributors. Some of them stand out: Shewhart, Deming, and Ishikawa. It is difficult to give complete credit for the creation of the PDCA cycle to just one of them. We recognize that the current form of the cycle is the direct result of the colleagueship between Shewhart and Deming and later between Deming and Ishikawa.

(2) It is nonsensical to use continuous process improvement tools apart from a corporate effort to satisfactorily model the system such that there are reliable and interpretable data from which to measure and predict change. The challenges associated with using Shewhart's scientific method should not lead to a minified approach with regard to its' difficult quantitative aspects.

(3) Greater effort is needed to build learning systems within organizations and to properly prepare people to enumerate effectively when faced with ambiguous and complex

situations. To this end, emphasis is needed on managing the scientific method in organizations which would include the full integration of instructional systems design to meet the challenges of training and education in quality.

We are challenged by the difficulty that lies ahead in the quality movement, but also, we are renewed by the solid foundation provided to us by such pioneers as Shewhart, Deming, and Ishikawa. A review of their contributions leads us to approach our quality efforts with greater hope and solemnity.

Note: Views expressed in this paper are those of the authors and do not necessarily represent the views of any government agency. Major Andrew Stricker is the Deputy Director for Education at the Air Force Quality Center, Maxwell Air Force Base, Montgomery, Alabama. Mr. Bill Ratcliff is Special Assistant for Total Quality Management at Headquarters United States Air Force, Washington, District of Columbia. LtCol Ralph Hartman is the Director for Education at the Air Force Quality Center, Maxwell Air Force Base, Montgomery, Alabama. We wish to especially thank LtCol Jerry Snow, Mr. Steve Harris and Capt Ted Barko for their helpful commentaries during our investigation.

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THE CURRENT REALITY TREE - A FACILITATOR'S TOOL TO BREAK MEETING "GRIDLOCK"

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THE CURRENT REALITY TREE
A FACILITATOR'S TOOL TO BREAK MEETING "GRIDLOCK"

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INTRODUCTION:

The recent trend toward widespread use of teams to resolve problems and toward continuous process improvement has surfaced a group situation that facilitators should be aware of and be prepared to deal with when working with teams. This condition is referred to in this paper as GRIDLOCK, defined as "the stage reached by a team or group where no genuine movement toward it's objective(s) is being made." This condition may be fairly common but not readily apparent because some teams continue toward some solution to avoid the "failure" tag. Based on conversations with facilitators and process action teams, occasions where teams become bogged down or overwhelmed by the scope of the process, do happen. When this occurs teams lose momentum, or reach an impasse where further progress appears impossible. This is especially common if the teams are working on comprehensive and difficult tasks, as normally faced by cross functional or integrated product teams.

This paper is not based on any actual case study, but is presented as an alternative for facilitators who are engaged with a team in this situation, and may need an additional tool to refocus and move the team forward. It is in this light that the Current Reality Tree, a tool used in the Theory of Constraints "thinking process" can be adapted for use by the facilitator.

GRIDLOCK:

A problem facilitators of Process Action Teams or other problem solving teams face, is what to do when teams are at an impasse or do not know what to do to progress further. The team has become gridlocked, momentum is lost; teams may give up or disband. Facilitators do not want the team to arrive at a sub-optimum solution because of their anxiety and frustration. In most cases a gridlocked team will not implement the best possible or desired solution. It is too easy to make the trip to Abilene [1]when obstacles are present, the sense of focus is cloudy or the team is mired in the mud of indecisiveness. The facilitator needs to be aware of this state, since it is possible that the team might take the facilitator to Abilene with them. Conflict begins to show its ugly head and fingerpointing is evident. Is it the fault of the facilitator, the team leader, or the team members? No matter who is at fault it is the facilitator's responsibility to get the team jump started out of the mud and pointed in the right direction. This of course, is easier said than done. The team leader, in most cases,is depending on the facilitator for team guidance when the road gets rough. The team members are looking at the team leader with some disdain for hesitating or not knowing what to do, and the camaraderie is slowly deteriorating back toward the Storming stage of team development.[2] Discussions take on a win-lose preference, and dialogue is stifled. The facilitator needs a gridlock breaking tool.

An ideal tool for this situation is the Current Reality Tree, an Effect-Cause-Effect thinking technique referred to and used by Dr. Eliyahu M. Goldratt, developer of the Theory of Constraints. [3] Although developed as a technique to enable management to identify the system's constraint, (to pin-point the core problem), this paper expands its use as a focus tool. To truly refocus the team, we need to identify the constraint or core problem hindering the performance of the team.

How did the team get into this position? In most cases, the team is probably at gridlock because it has lost focus of its goal. Consensus has taken a backseat and is now difficult to obtain. Some of the members may feel they have a solution and are now in a win-lose frame of mind. "Look no further than me, for I have the answer and we are wasting time." The discussion is probably adversarial, since those members who think they have the only answer are probably not willing to accept the views of other team members. Some team members have no idea where to go from this point, and realize that the team is stuck. Without a doubt, some members are seeing the original problem differently, the team is fragmenting and the synergy is dissipating.

The facilitator must take control of the situation, guide the discussion and bring the team back to the goal, without hidden agendas or personal preferences. Maybe at this point, a short team building exercise that the facilitator has confidence in may be used to uplift the team spirit. Remember, that at gridlock, the team is disheartened, and it feels like all roads will lead to an empty room.

THE TREE

The reality tree may be introduced by the facilitator as a tool to help move the team out of the mud, into an open dialogue, and assist the team in uncovering the reason for their gridlock. The reality tree is a diagraming tool used to connect effect-cause-effect relationship. It is easy to understand and use. However, if it is introduced merely as a "cause and effect tool", its impact may be diminished or confused with the more common Ishikawa cause and effect diagram [4] frequently used by teams. The team needs to find out why it is in gridlock. The facilitator, using the current reality tree as the roadmap, can help find the core cause by developing logical links between entities; entity is defined here as "those reasons perceived by team members as impacting negatively the state of the current situation." The tree is made from those entities or undesirable effects.

The reality tree is a powerful tool for organizing thoughts, and forcing group communications on the undesirable effects that exist in the current process, and to validate the cause-effect relationships between the undesirable effects. Since each member will probably perceive the current reasons of gridlock differently; the power of making the tree allows those perceptions to be put into written thoughts and examined for logical validity in an open forum. This logical building approach is based on the Effect-Cause-Effect (ECE)[5] relationship advanced by Dr. Goldratt in his book Theory of Constraints. He explains it as "the process of speculating a cause for a given effect and then predicting another effect stemming from the same cause." [6] Those of you familiar with Regression Analysis would find some similarity in that each entity is treated as an effect produced by another cause in a chain of effect-cause-effect links. However, unlike regression analysis, ECE does not

end at this point, you continue to try and develop more links of effects from the same cause. This is important for the facilitator to explain because in building the tree, every undesirable effect (entity) is both a Cause of Something Else and the Effect of Something Else. The point is not to get hung up on viewing entities as exclusively a cause or an effect.

Let us look at our Gridlock situation. The team is not making progress, and one of the entities proposed by the team is 'There is no agenda at our meetings', if this was viewed as a cause, then a possible effect of not having an agenda could be, 'Members are not aware of what is to be discussed at the meeting'. This effect would then become the cause for the entity 'Members are not prepared to actively participate in the meeting'. In this manner you can see how entities are both causes and effects. You would also look back from an entity and ask "What is causing this effect?" For example, a member may ask "Why is there no agenda?. The reason accepted would then be a cause for the effect entity 'There is no agenda', or there may be multiple causes if more than one valid entity is given and it makes the effect more plausible. It is through this method of building cause-and-effect relationship that the team can isolate the core problem and through it find a solution. After the above introduction, the facilitator should discuss briefly on the topic of intuition. The point here is that intuitively each team member has a gut feeling about why the team is in gridlock. That they may not have to look any further than themselves to find out what is the problem; then, by resolving that, the team can move forward. An example of intuitiveness the facilitator could use is: we all know how it feels to be a customer, we don't have to go to school to learn how to behave as a customer. A customer knows good service from bad service, and when expectations are not met or intuition is not satisfied, the customer feels it. The same analogy applies to the team meeting. The members intuitively know the meeting is not progressing and have internalized the reasons. The facilitator explains that the team needs to capture those thoughts and diagram them on paper, so that they will force dialogue, and identify common ground. The benefit of this is a meeting of the minds where ownership of the problem is known to the team as a whole, and a common focus is generated.

MAKING THE TREE

The team now has the basic understanding needed to construct the tree. The facilitator ask each member to make a individual list of five or six negative effects (entities) that they intuitively feel related to why the team is bogged down. Ask the members to make the effects negative and in complete statements. For example, "Present policy is too restrictive," or "Members are not attending all meetings," or "We are not in agreement on our purpose," or "There are too many legal requirements in our way." These statements are all written in the negative. The facilitator then ask each member to try to connect their list of entities in an effect-cause relationship with arrows, the base of the arrow connecting the cause and the tip of the arrow the effect. Make the members aware that they should read the arrow at the base as IF and the tip of the arrowhead as THEN. For example, IF **(cause)** "we are not in agreement on our purpose," THEN **(effect)** "members are not attending all meetings". Continue to connect the entities in this manner, until you have connected as many of the original list of negative entities as possible. Other entities that surface during this exercise can be added after you have connected the original negative effects. Be mindful that effects may have more than one cause and that causes may result in more than one effect. For certain, the tree will not be a

very good tree, but the thinking process is engaged and is what is needed at this time. (See example tree, attach 1)

The facilitator ask members to present their trees by briefing to the entire team. Questioning the trees entities is encouraged and the dialogue is engaged. After all trees have been presented, they are collected by the facilitator, and team members are asked to re-do their trees and bring them back to the next meeting. This serves several purposes;

1. Since all members have seen each others' trees, and have discussed many of the entities, they have a broader perspective of the tree diagram and its use.

2. They have made a tree on their own, so their second tree will be more comprehensive and logical because of the learning curve.

At the next meeting, the trees are collected by the facilitator, placed in a pile, and the team is informed that only one of the trees will be used at this meeting. One of the trees is selected randomly from the pile and posted. The owner of that tree then briefs the team, reading the tree from the bottom up using the IF, THEN, technique mentioned above. This tree is thoroughly scrutinized, questions are asked as to the validity of cause-effect relationships, some items need more clarity, some effects are not identified, some causes make little sense and need clarification or more amplification. The team has many ideas now of how the entities are connected. Entities are added and some are deleted. By this time the tree looks very little like the original reality tree randomly selected. This is an important point; for the ownership of the tree has now changed from the individual to the team. It becomes their tree. The team is beginning to focus on the reasons for gridlock.

With the team back on track, the reality tree has identified the core problem for gridlock, an entry point of the reality tree diagram. An entry point is the entity that has no arrow heads pointed to it but it has arrows leaving it. There may be several entry points but one of the entry points will impact more entities than the others. This will be the core problem. The others will be addressed as root causes. Our core problem is stated as a negative, because that is how we made our tree. To correct the core problem, we need to turn it into a positive. For example, if the entity "we are not in agreement on the purpose of this team." is the core problem, then corrective action would require a solution that ensures members are in agreement on the purpose of the team. The facilitator has achieved the objective of moving the team out of gridlock, and identified why. The reason may or may not be within the capability of the team to resolve, but once identified the resolution should be easy to obtain.

SUMMARY:

With the trend toward team approach problem solving, there is increasing potential for process action teams to arrive at gridlock. Facilitators will be challenged to adapt to the complex environment where some of these teams operate with out a model or precedence to follow. Open and consistent communications will be a demand that teams need to be effective. The Current Reality Tree is that versatile tool that can work in this environment. It is

an excellent focusing tool and its logical approach using the intuition of the people involved at the point of work gets to the core problem very quickly. Although this paper was aimed at facilitators, the ECE Current Reality Tree is extremely powerful in identifying constraints, both physical and non-physical for managers and Process Action Teams. Dr. Goldratt claims "it is the only feasible technique that we know of to identify constraints, especially if it's a policy constraint that doesn't give rise to permanent physical constraints, but only to temporary or wandering ones." [7] He defines constraint as "anything that limits a system from achieving higher performance versus its goal." [8]

Facilitators who want in-depth training in the trees used in the Theory of Constraints, should acquire these skills through their training coordinators.

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5. Theory of Constraints, pg 32
6. Ibid, pg 32
7. Ibid, pg 32
8. Ibid, pg 35

Attch. 1 Current Reality Tree Example