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THE NATIONAL SHIPBUILDING RESEARCH PROGRAM

Leading and Sustaining Multi-Skilled Work Groups

U.S. DEPARTMENT OF THE NAVY
CARDEROCK DIVISION,
NAVAL SURFACE WARFARE CENTER

in cooperation with
National Steel and Shipbuilding Company
San Diego, California

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NSRP Project 9-98-1

Leading and Sustaining Multi-Skilled Work Groups

DELIVERABLE 5

FINAL REPORT

Submitted on:

December 20, 2000

For:

The NSRP-ASE Crosscut Initiatives Panel

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FINAL REPORT

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Project 9-98-1

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- Don Bewley of Jeffboat
- Joe Jarvis of Litton, Avondale

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ABSTRACT

This report describes the results of a 24-month project to improve the competitiveness of U.S. shipyards through the development of effective production leadership and multi-skilled work groups. The project was divided into five tasks:

- (1) Identification of the types of workgroups and workgroup leadership applicable to production activities in shipbuilding and ship repairs;
- (2) Definition of the competencies needed for both group leaders and group members to perform successfully in selected workgroup environments;
- (3) Selection of the assessment methodologies needed to measure the skills of perspective workgroup members relative to the identified competencies;
- (4) Identification of training to be used to instill or reinforce the identified competencies;
- (5) Demonstration of the whole process by assessing and training pilot groups to the selected competencies, and then monitoring and evaluating, over time, the functioning of the groups.

These tasks are consistent with a training approach based on a process of assessment and then training by exception described in NSRP Project 9-96 1&2¹. Tasks 3, 4, and 5 were worked at National Steel and Shipbuilding Company (NASSCO) in San Diego, CA.

The project produced four reports in addition to this final report. These report on:

- (1) A literature search and survey – conducted to gather information on current practice and experience with leading and sustaining multi-skilled work groups in the U.S. shipbuilding and ship repair industry and in broader industrial applications.
- (2) The identification of multi-skilled workgroup and leader types and their applications to shipbuilding, and the identification of the elements and characteristics necessary to sustain successful multi-skilled groups,
- (3) The processes used to identify the competencies needed by workgroup leaders and workgroup members to perform in a team environment and on the selection of a methodology for assessing these competencies,
- (4) The assessment of leadership and team member competencies conducted by NASSCO in association with this project and on the selection of training materials to support the assessments.

These reports are posted on the World Wide Web at <http://www.nsnet.com/docctr>

¹ NSRP Project 9-96-1&2 Assist U.S. Shipyards to Develop and Maintain a Skilled Trades and Workforce

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INTRODUCTION

Production work groups occur in many forms and many degrees of self-direction or management. In the most basic form a work group is the traditional small “gang” directed by a foreman. The term “team,” when applied to a work group, at a minimum implies some level of mutual support initiated by the members. From that point, work groups can accept more and more responsibility until they become nearly autonomous entities within a parent organization, responsible for both work completion and support functions. As a general maxim, the greater the autonomy of the work group the greater the benefit to the sponsoring organization. That statement, however, is bounded by a near endless array of “if’s” and conditions. No two circumstances are quite the same and there is no team organization or degree of autonomy that is best for all situations.

The transition of gangs to teams is normally a phased effort with degrees of self-management being sought and achieved in defined steps. The role of the leader mutates as the work group accepts more and more responsibility for its own functions. Ultimately responsibilities of the hierarchical first line supervisor become dispersed within the team and supervision over the team occurs at a higher management level.

Production work groups (or teams) have been in limited use in shipyards and progressive manufacturing organizations for years. The work groups have been introduced with the general purpose of improving productivity but with a variety of approaches as to the specific mechanisms by which the improvements are to take place. Related to the work group initiatives are issues with respect to the multi-skilling of workers and the use of more than one trade in a work group. The implementation of work formats other than the single trade hierarchically led “gang” has met with only limited success in U.S. shipyards and has more often been characterized by repetitive failures and renewals. In contrast, shipyards in both Asia and Europe have met with success using work group team formats. So much so, that Kavaerner stipulated in negotiations for opening their yard in Philadelphia that the acceptance of production teams was a precondition to establishing the shipyard.

U.S shipyards, in reviewing their efforts with work group formats, identified two areas of specific concern: one was the competencies required of leaders who were to work in multi-skilled, multi-trade work groups and work groups with worker participation in decision making. The second was an identification of the processes needed to sustain a work group once it had been put in place. This project was initiated to address these two issues.

OBJECTIVES

The primary objective of this project is to improve the competitiveness of U.S. shipyards through the development of effective production leadership and multi-skilled work groups. Subsidiary project objectives were to:

- Describe types of production work groups applicable to shipbuilding and ship repair.
- Describe attributes needed to lead the several types of production work groups.
- Identify impediments to sustaining multi-skill and multi-trade work groups.
- Identify suitable processes for assessing team competencies in work group leaders and work group members.
- Develop a training program to improve team performance in work groups.

SCOPE

THE PROJECT

Production work groups are defined for this project as groups or teams (terms are used synonymously) of two or more workers that function on the job to carry out production activities. Multi-skilled groups are composed of members that possess journey-level technical skills in more than one trade. Self-directed teams are led by one of the members (as opposed to outside supervision) and possess some degree of autonomy.

Conceptually the project consisted of five tasks performed in three phases:

Phase One

1. Identification of the types of work groups and work group leadership applicable to production activities in shipbuilding and ship repair.
2. Definition of the competencies needed for both group leaders and group members to perform successfully in selected work group environments.

Phase Two

3. Selection of the assessment methodologies needed to measure the skills of perspective work group members relative to the identified competencies.
4. Identification of training to be used to instill or reinforce the identified competencies.

Phase Three

5. Demonstration of the whole process by assessing and training pilot groups to the selected competencies, and then monitoring and evaluating, over time, the functioning of the groups.

These phases are consistent with a training approach based on a process of assessment and then training by exception described in NSRP Project 9-96-1&2². Tasks 3, 4, and 5 were worked at National Steel and Shipbuilding Company (NASSCO) in San Diego, CA.

NASSCO PROJECT ACTIVITIES

The work at NASSCO was centered on two existing multi-trade teams working on erecting steel blocks (ship sections). Twenty-nine workers with individuals from five trades were involved. Each team had a designated leader and the line workers were about evenly divided between the teams. The trades represented were:

- welders
- pipe welders
- shipfitters
- shipbuilders
- chippers

Plans to involve teams from other construction activities were not realized. The identification of assessment methodologies and the actual assessment and training of team members were limited to specific team and leadership related skills and did not extend to the technical skills identified for multi-trade and multi-skill work groups.

² NSRP Project 9-96-1&2: Assist U.S. Shipyards to Develop and Maintain a Skilled Trades Workforce

PREVIOUS DELIVERABLES

Information developed as the project progressed was disseminated through four separate reports or “deliverables.” This report contains synopses of the previous deliverables, however, it differs in format and does not repeat all the previous information.

Deliverable 1: Literature Search and Survey of Production Work groups

Deliverable 1 reported on two activities – a literature search and survey – conducted to gather information on current practice and experience with leading and sustaining multi-skilled work groups in the U.S. shipbuilding and ship repair industry, and in broader industrial applications. The literature search was used to provide insight into developing theory and the current research on forming, leading and sustaining multi-skilled work groups. The survey was based on the information and concepts developed by the literature search. Shipyards, and other industries with success using work groups or teams, were included in the survey.

Deliverable 2: Phase One Report, Gather Relevant Information

Deliverable 2 reported on two activities:

- Identification of multi-skilled work group and leader types and their applications to shipbuilding.
- Identification of the elements and characteristics necessary to sustain successful multi-skilled groups.

Both of these activities based their conclusions on the data reported in Deliverable 1.

Deliverable 3: Competency Identification and Assessment Selection

Deliverable 3 reported on the processes used to identify the competencies needed by work group leaders and work group members to perform in a team environment and on the selection of a methodology for assessing these competencies.

Deliverable 4: Phase 2 Report, Develop Production Work group Leaders and Members

Deliverable 4 reported on the assessment of leadership and team member competencies conducted by NASSCO in association with this project and on the selection of training materials to support the assessments.

PROJECT WORKSHOP

A workshop presenting the final project results was conducted during the “HR at the Summit” conference in Seattle, Washington on November 9, 2000. The objectives of the workshop were to:

- Present findings from the NSRP project
- Provide a process for leading and sustaining multi-skilled work groups
- Share tools for assessing, measuring and training work team effectiveness

A synopsis of the workshop is included in **Appendix A**.

METHODOLOGY

OVERVIEW OF METHODOLOGY

Each of the three phases of the project used its own methodology. These methodologies have been described in detail in the previous reports associated with the project and only synopses of the activities are provided with this report. An exception to this is the third or “demonstration” phase, which has not been previously described.

WORK GROUPS AND WORK GROUP LEADERS

The identification of types of work groups and the leadership elements related to those work groups was accomplished by the analysis of data gathered through a literature search and a survey of shipyards and other industries.

Literature Search

The focus of the literature search was on production teams, leadership and supervision in a team environment, and multi-skilling. The search was conducted electronically using the internal and web-search resources of the University of Virginia and on site at the library of the Darden Graduate School of Business Administration at the University of Virginia. Psychological, engineering, economic, education and human resource databases were accessed. In addition to these resources, the National Shipbuilding Research Program (NSRP) reports were accessed electronically through the NSNet documentation center at the University of Michigan Transportation Research Institute (UMTRI).

Shipyard Survey

Seven shipyards and five representatives of other industries completed the survey. Although numerically the shipyard participation represents a very small segment of the total number of shipbuilding and ship repair yards in the country, the respondents include five of the six largest yards and represent a very large proportion of the total workforce employed in the industry. The information was further rounded out by discussions with personnel from three government yards and visits to several smaller yards engaged primarily in commercial work. The industries responding represented a diversity of applications; all have successful self-directed production work teams.

Appendix B lists the survey respondents and other contacts.

COMPETENCY IDENTIFICATION

The approach to the competency identification for leaders and members of multi-skilled work groups looked separately at technical competencies and foundation competencies. Both analyses used data collected in the literature search, survey, and information from an earlier NSRP Project³. In addition, the foundation competency identification used a commercial competency-ranking tool for leaders and group members.

Technical Competencies

The technical competency analysis was limited to identification of general types of skills that were needed to perform in various multi-trade, multi-skilled environments. The analysis was accomplished in conjunction with the analysis of the literature search and survey.

³ NSRP Project 9-96-1&2: Assist U.S. Shipyards to Develop and Maintain a Skilled Trades Workforce

Foundation Competencies

The foundation competencies were identified at NASSCO using six members and three leaders of existing multi-skilled work groups. A patented process called Competency-Based Position Analysis was used to identify the “DNA” structure of a set of 20 non-technical competencies that are highly compatible with the competencies identified by research in Phase One. These 20 competencies are shown in Table 1. The term “DNA” is used to describe competencies that are determined by the process to be “hardwired” to the position. The process had two steps.

Step One – Completing the Questionnaire

The work group members and leaders individually completed a paper and pencil questionnaire. The contractor then used a proprietary program to prioritize the 20 competencies with respect to the specific leader and member positions.

Step Two – Clarifying Issues and Validating Performance

In a facilitated process, the group operationally described the top five competencies to personalize them to the position and the organization. The description included a one-sentence definition and several bulleted points to clarify an operational description of the position.

Table 1. DNA Competencies

Presenting*	Creativity/Innovation
Political Adeptness	Written Communication*
Persuasion	Negotiation
Customer Service*	Futuristic Thinking
Leadership/Management*	Problem Solving/Decision Making*
Flexibility*	Empathy
Interpersonal Skills*	Conflict Management*
Employee Development/Coaching*	Goal Orientation*
Planning/Organizing*	Continuous Learning*
Teamwork*	Personal Effectiveness*

* Competency included in either the Project 9-96 foundation competencies or the 9-98 project training survey

ASSESSMENT INSTRUMENT SELECTION

Two instruments were used for assessment of foundation skills, one was a commercial 360° evaluation used with team leaders, and the other was a locally developed instrument used with team members. No assessment method was selected (or used) for technical competencies.

360° Feedback

The project initially selected 360° feedback as the assessment method to be used for all project participants. The primary reason for this decision was that an assessment tool was available from the company⁴ that had supplied the competency analysis instruments. This was an attractive option due to the cohesiveness between the two tools. The 360° approach allows the employee to assess him or herself and to be able to compare that data to the anonymous feedback received from their direct boss, direct

⁴ Target Training International (TTI)

reports and peers. However, the logistical difficulty in administering the 360° feedback to all 29 team members and time constraints on project completion prohibited the use of this method for all team members. Because of this, a decision was made to use 360° feedback only for the two team leaders and use a performance review process for the other team members.

Performance Review

An assessment tool (**Appendix C**) was developed by the project coordinator to determine current performance of team member on the five competencies identified as most important to successful performance. The instrument used a scaled response:

One = Always Exhibits;

Two = Often Exhibits;

Three = Rarely Exhibits;

Four = Never Exhibits

The assessment was to be completed on each team member by the team leaders. In addition to the scale response, space was provided for written comment. Performance assessment results were conveyed in an interview.

TRAINING MATERIAL SELECTION

The selection of training materials was done after team member and team leader competencies had been assessed. This approach avoided resource expenditures on developing training on competencies that might not need additional or specific training. Consideration of remedial materials was effectively limited to existing NASSCO course materials largely because these materials were readily available and were appropriate to the needs identified by the assessments.

DEMONSTRATION PROJECT

The demonstration project plan consisted of three steps:

1. Assessment of project participants for foundation competencies
2. Training of project participants to address foundation competency weaknesses identified by the assessment
3. An evaluation of the training.

Two teams working in steel block erection at NASSCO participated in the demonstration project. These teams were already in operation at the time the project began and their work was an integrated part of the shipyard production plan. Appropriately, shipbuilding priorities took precedence over project priorities and a closing assessment of skills gained was not performed.

Assessment

The two team leaders and 25 of the team members participated in an assessment process to determine their training needs with respect to the six team leader and five team member foundation competencies that had been identified as most important to successful team performance.

Team Leaders

The 360° Discovery tool was administered to the team leaders. The instrument was customized by the supplier⁵ and the feedback forms included five questions for each of the top six competencies. Each team leader received feedback from the other, their supervisors, peers, and 5 team members. Each person providing feedback responded to the same set of thirty questions and the feedback from peers and subordinates was anonymous. Once all the forms were completed, they were mailed to TTI for scoring

⁵ Target Training International (TTI)

and analysis. TTI provided a comprehensive report for each team leader as well as a booklet to assist in the interpretation of results. The project coordinator met with the leaders individually and reviewed the results with them in a private session. Three peer assessments were required by the process in order to insure the anonymity of the assessors. Only two were received on each team leaders so this part of the process was not used in evaluating the results.

Team Members

An error took place in the duplication of the assessment forms and two of the five competencies, conflict management and planning/organizing, were not assessed using the tool. The team leaders assessed and gave feedback to each of the team members on their respective teams on the remaining three competencies. After the team leaders completed the written feedback they reviewed their feedback with each team member. The project manager collected anecdotal information from the team leaders with respect to team member performance on conflict management and planning/organizing.

Training

The foundation skill training used existing NASSCO training courses. There were five courses, each two hours in length. The courses were given over a period of three days. No formal technical training was associated with the project.

Pre and Post Assessments

Pre and post-testing was used with each course. Participants were given assessments on each of the competencies prior to attending the courses. The assessments were developed for the sole purpose of determining a baseline for each participant and measured their knowledge of the competency based on the operational definition. The tests had six to ten true/false or multiple-choice items. The same questions were used for the pre and post-test, however the post questions were grouped together and did not refer to a specific topic. **Appendix D** shows the test questions.

DISCUSSION OF RESULTS AND ANALYSIS OF DATA

WORK GROUPS AND LEADERS

Threads

There are three separate threads in the introduction of multi-skilled self-directed work teams. Each pursued separately has tangible benefit. The threads are multi-trade work groups, multi-skilled individuals and self-direction within the group

Multi-Trade Work Groups

Multi-trade work groups have workers from more than one trade under the direction of a single supervisor who organizes and directs the work. Each worker performs the conventional duties of his trade. Efficiency is gained by a reduction in the external inter-trade coordination needed for a given process, with the often-associated dead time in getting workers on or off the job. The supervisor is stretched in this arrangement by responsibilities outside of his or her trade.

Multi-Skilled Individuals

Multi-skilling occurs when an individual has skills that permit him or her to perform work of more than one trade. The skills for the second trade may be limited to supporting specific processes or may be a full set. By itself, multi-skilling benefits both the worker and the shipyard by allowing work assignments that better adjust to cyclic demand for skills. These skills can be exercised in a traditional line management context. Placed in the context of a multi-trade work group, multi-skilling permits a worker to provide support for other trades within the group or to work across trade requirements for the assigned work.

Self-Direction

Self-direction is an issue of control and can be associated with either single trade or multi-trade work groups. Self-direction implies participation of the work group members in decisions affecting the group and its assigned work. The scope of the decisions varies from those affecting minor aspects of group operations to near autonomous action within a larger production unit. Associated benefits are a flattening of the control hierarchy resulting in a need for fewer managers, and a more direct access to, and better use of, the collective experience of line workers.

Weaving the Threads

U.S. shipyards have been pursuing three activities for many years that are conducive to the development of self-direction in work groups. However, each of the activities seem to be undertaken for business reasons other than achieving the benefits of self-direction. These are:

Changing the ratio of first line supervisors to line workers

Ratios of 5 or 6 to 1 that were once common are now more likely to be around 15 to 1. Although done primarily to reduce the number of management personnel being supported, this move has the effect of reducing the closeness of supervision and frequency of direction for the individual worker. As a consequence, the worker is placed in a situation where greater self-reliance is necessary on the job.

Encouraging multi-skilling in individual workers

Multi-skilled workers can be more flexibly assigned and can adapt to cyclic peaks and valleys in the need for specific skills. This adaptability means that a worker's time can be more efficiently used,

that the shipyard can keep fewer total workers on the rolls, and that there is less need for layoff and rehire cycles with the associated continuing loss to the industry of skilled workers.

Forming multi-trade work groups

Multi-trade work groups are used as a means of reducing the upper level inter-trade coordination needed to get the right mix of skills in place at the right time to carry out a process or group of processes. The benefits are a reduction in non-productive time while waiting for the proper skills to assemble and fewer inter-trade coordination meetings among mid and upper level managers.

Taken together these activities provide an excellent environment for moving toward self-directed multi-skilled work groups. In multi-trade work groups, opportunities abound for the worker to both observe and practice new skills. A worker can begin on the new skill set as a helper or “second set of hands,” and progress to full performance. Supervisors in multi-trade work groups will not normally be equally proficient in all the supervised trades and will need to rely on journey workers for technical information. This is a beginning step in an exchange of technical responsibility from the supervisor to the line worker, a necessary condition to achieve any level of self-direction. The lower ratio of supervisor to worker, as noted above, means the worker must exercise more self-reliance on the job, another condition conducive to self-direction.

Changes to Organizational Elements

The introduction of multi-trade work groups and a move toward self-directed teams have implications for workers, supervisors, work management and support functions. Adjustments are required in all four of these areas if change is to be successful and sustained. The adjustments are discussed in detail in Deliverable one to this project and summarized in Table 2.

Application of Work Group Formats to Shipbuilding and Ship Repair Activities

In addressing applicability of the several work group formats, it is important to consider the separate elements of multi-trade, multi-skill and self-direction.

Multi-Trade Work Groups

Multi-trade work groups are used to simplify the supervisory coordination needed to reduce interference, or facilitate cooperation, between or among trades working in the same space or on the same project. An example of cooperation is the installation of a large machine, and an example of interference is repairs within a machinery space. Multi-trade work groups will not generally be associated with the fabrication area but may be formed for assembly, installation, test or repair.

Multi-Skilling

Multi-skilling serves two purposes. One is to improve workforce stability by providing skills that will bridge slack times by some means other than layoffs or busy work.⁶ The other is to enable workers to do simple tasks, frequently of short duration, that would otherwise require an additional worker with the associated costs and problems of coordination, timing, and travel. Skills that bridge slack times can be employed in traditional hierarchical organizations and can be employed in any of the areas of fabrication, assembly, installation, test or repair.

⁶ *Model Training Plan for Shipbuilding and Ship Repair*, National Steel and Shipbuilding Company, National Shipbuilding Research Program Project 9-96-1&2, San Diego, CA, 1998

Table 2. Changes to Organizational Elements

	Multi-Trade Work groups	Multi-Trade, Multi-Skilled Work Groups(with worker participation)	Self-Directed, Multi-Skilled Teams
Management Structure	• Single upper-level manager • Trade group-related manager (structural, mechanical) • Project or zone manager	• Single upper level manager • Trade group related manager (structural, mechanical) • Project or zone manager	• Single upper level manager • Trade group related manager (structural, mechanical) • Project or zone manager • Supervises team activities
1 st Line Supervision	• 1st line supervisor from one of the component trades • Primary responsibilities are: - safety - coordination • In zone or project management, technical support may be limited. • Dependent on line workers for technical support	• 1st line supervisor may be multi-skilled • Primary responsibilities are: - safety - coordination • Performs coaching role as workers accept responsibility for selected group activities	• 1st line supervision rests with team members • For previous supervisors: - Coaching activity extends to more than one work group - May perform inter-team coordination in selected support areas
Line Workers	• Technical expert on job • Can not rely on the supervisor to catch errors • Responsible to provide technical support	• Share responsibility for selected group activities: - work assignment - work process selection	• Assume leadership roles within work group • Participate in decision making and in process improvement • Interface with support functions and other work groups
Support Functions	• Changes in support are driven more by project management than by shift to multi-trade work	• Support interfaces configured to accommodate self-directed functions • HR functions including compensation and performance review adjusted to accommodate multi-skilling	• Support functions configured to interface with team leader • HR functions adjusted to teams • Compensation and performance review incorporate team performance
Benefits	• Improved coordination of trades in multi-trade process	• Better use of personnel resources • Fewer supervisors	• Improvement in process and productivity through worker participation • Better work environment

The assist-work skills are by their nature applicable to multi-trade groups. Multi-skilled workers can permit the work group to function with fewer total members. They can also extend the effectiveness of the group by permitting it to work on sequential tasks with the technical lead shifting as required by the work. Assist-work skills have the same general area applicability as multi-trade work groups.

Self-Direction

Self-direction is applicable to a wide variety of work formats. It can be used for such things as job assignment and process improvement on tasks where group members perform essentially independently, such as machine shop operations. It can also occur in groups where the members perform in close coordination, such as a test group.

1st Line Supervision

The 1st line supervisor plays a pivotal role in work force organizational changes that incorporate any aspect of multi-trades, multi-skills, or self-direction. As the organization changes toward self-direction, the role of the supervisor changes, becoming more and more subtle until the position goes away. If the organization transitions are properly planned and executed, there are no distinct breakpoints in the supervisor's role. Competencies are gained by the supervisor, applied for a time and then passed on to the work group. In many ways the process is not unlike raising children where the parent first gains skills, passes them on to the child but maintains control. Then, at some point, the parent backs out of the controlling role without ever really disappearing as a resource. Continuing the analogy, the parent and supervisor share two distinct challenges: one is gaining the technical skills to stay ahead in the development stage and the second is gracefully letting go when it is time.

Gaining Competencies

The 1st line supervisor uses competencies related to the product and to the people being supervised. The move into multi-trade work groups initially requires an increase in product related skills without any diminishment in the people-related skills. These are the product skills needed to ensure safety and proper sequencing of process and to build and maintain credibility with the work group. Although the product skills are in theory available to the work group from other members, anecdotal evidence from shipyards and survey data from other industrial activities⁷ indicates that the 1st line supervisor must have broad product related skills in the area being supervised.

Changing Emphasis on Selected Competencies

The people-related competencies used in the transition to multi-trade work groups and to self-directed work teams are not unique and should also be present in supervisors of small hierarchical single trade gangs. The difference is partly a matter of emphasis on certain competencies and partly a change in which competencies are critical for success. A supervisor whose principal skill is hounding a job to on-time completion will need to develop other competencies to succeed in the changing organization. Delegation and coaching increase in importance, as do planning and logistics. Communication skills, including listening, become essential as line workers take a greater role in process direction. Well-conducted personal interactions replace a regime of threat and promise.⁸ Managing training and worker development is also a critical role for leaders in a team environment.⁹

⁷ *Employee Opinion Survey, 1996*, Pacific Gas and Electric Company, San Francisco CA, Not Published

⁸ *Critical success factors for creating superb self-managing teams*, Wageman, Ruth; Organizational Dynamics, v26 Summer '97, p49-60

⁹ *Plan now for workforce 2000*, Material Handling Engineering, 10/01/95, p 113

Changing Workforce Organization and Span of Control

Increasing the number of people supervised increases the amount of time the 1st line supervisor must spend on personnel administration. Traditional supervisors are frustrated by being squeezed for time on the technical aspects of the work. If the increased span of control occurs in conjunction with multi-trade or multi-skill organizational changes, the supervisor finds him or herself tight on time, short on technical expertise, and consequently overloaded and very frustrated.¹⁰ Time management and delegation skills can be of some help here, but only when accompanied by recognition that the job has changed.

Within the changing work force environment, 1st line supervisor leadership must have a clear understanding of how the supervisor's role has changed. The supervisor must also know what is expected of the incumbent and, of possibly greater importance, what is not expected. This role change must be initiated, understood, and accepted by upper management. Upper management must create for the supervisor, and permit the supervisor to create for the work group, an atmosphere that "... supports risk taking, tolerates occasional failures, and enables all individuals to learn from failure."¹¹ Although the needed competencies to facilitate the transition are inherent in any line leadership position, they lie dormant in many leaders and training for the supervisor is appropriate to hone the skills.¹²

Sustaining Changes from a Traditional Organization

Sustaining changes in shipyard production organizations has been a major problem for the industry. The given reasons for retrenchment are varied but come down to fundamentals such as changes in management support, poorly chosen processes, piecemeal implementation and no plan to bridge downturns in business. If these can be overcome, there are two other areas to which attention must be paid to sustain the changes: human resource policies and training.

Human Resources

There are three areas of human resources that stand out as important in sustaining work organization changes: job stability, job performance appraisal, and rewards and benefits. Too often the HR approach to organizational changes is to treat them as experiments and delay any HR adaptation until the methods are proven. The result is often failure because of worker resistance to continuing with the change when they see no tangible return. As one researcher reports, "...workers see self-directed teams as a management gimmick. To them teamwork means more responsibility for the same pay."¹³

Job Stability

Persons who are multi-skilled or perform successfully as a member of a team increase their value to the company. If the company has embarked on a staged or wave-riding strategy to change their production organization, steps should be taken to retain persons who have worked well in this environment.

Performance Evaluation

Performance evaluation should reflect the environment in which the work is performed. This means an appraisal system that recognizes team values and not just one that measures individual excellence. One team implementation facilitator has suggested:

"True teams and teaming cannot co-exist for long (if at all) in conjunction with individual performance appraisals. It is all too typical that upper management wants the benefits of

¹⁰ *Employee Opinion Survey, 1996*, Pacific Gas and Electric Company, San Francisco CA, Not Published

¹¹ *Teams and technology: tensions in participatory design*, Mankin, Don G.; Cohen, Susan.; Bikson, Tora K.; *Organizational Dynamics*: summer 1997

¹² *Self-managed teams: some operational difficulties*, Buckenmeyer, James A.: *Industrial Management* v38, Sept/Oct '96, p.10-14

¹³ *ibid*

teamwork without actually changing the system that supports individualism and kills teamwork.”¹⁴

Although the position may be extreme the message is clear. If the work environment and performance expectations change, the way performance is appraised should also change.

Rewards and Benefits

Reward systems in traditional organizations are designed to recognize and encourage excellent individual performance. Applying such systems in an environment meant to foster teamwork and cooperation would be counter-productive. Rewards both in the form of compensation and non-monetary rewards must give weight to group or team performance. The increased value to the shipyard of a multi-skilled individual should be recognized.

Training for Sustainment

Sustaining organizational change requires continuous training. Training supporting the evolution of form guards against reversion to a comfortable hierarchical relationship,¹⁵ and updates skills as technology advances or responsibilities within the work group change. Our survey indicated that organizations implemented a program of continuing training based on experience once the teams were established. (The training was not part of their original plan for teams.) Follow-on training had more technical content and less on non-technical (foundation) skills.

U.S. Shipyard Experience with Teams

Anecdotal information on the use of production teams in U.S. shipyards suggests three pervasive problems

1. Team leaders are not comfortable in situations where they are not the technical expert on the job.
2. Team leaders are reluctant to seek or accept technical advice from line members of the team.
3. Team members are reluctant to accept the role and responsibilities of technical expert on the on the job.

COMPETENCY IDENTIFICATION

Work Group-Related Technical Competencies

Technical skills associated with the move to multi-skill and self-directed work groups were addressed in the Phase One report (Deliverable 2). For the worker, technical skills do not change in kind but may change in quality. The worker must be secure enough in the trade to perform independently and to provide process council to group leaders as required. The 1st line supervisor exercises competencies related to the product and to the people he is supervising.

The move into multi-trade work groups initially requires an increase in product-related skills. These are the product skills needed to ensure safety and proper sequencing of process and to build and maintain credibility with the work group. Although the product skills are in theory available to the work group from other members, anecdotal evidence from shipyards and survey data from other industrial activities¹⁶ indicates that the 1st line supervisor must have broad product-related skills in the area being supervised.

Selection for participation in this project was based in part on a subjective analysis of the technical skills of the candidates. However, the project did not formally assess the technical skills of the assigned team

¹⁴ Teamnet Digest #1578, Brian Gordon: Live to Learn.

¹⁵ *Work-teams: why do they often fail?* Tudor, Thomas R.; Trumble, Robert R.; Diaz, Johanna J, Advanced-Management-Journal, v. 61, Autumn '96, pp. 31-40

¹⁶ *Employee Opinion Survey, 1996*, Pacific Gas and Electric Company, San Francisco, CA; Not Published

leaders, nor were there provisions within the project to improve the technical skills of either the team leaders or team members.

Foundation Competencies

The foundation competency identification methodology was designed to identify the five most important foundation competencies for team leaders and team member from a list of 20 candidate competencies. (Table 1 above). The selected competencies are shown in **Table 3**. Because of a tie in the selection process, the team leaders identified six competencies. All but one of these competencies (empathy) had been identified either by NSRP project 9-96 1&2 or by the survey associated with this project.

Table 3. Top Competencies Selected by Team Members and Team Leaders

Team members	Team leaders
Employee development/ coaching*	Teamwork*
Teamwork*	Employee development/coaching*
Conflict resolution*	Personal effectiveness*
Planning/Organizing*	Empathy
Personal Effectiveness*	Planning/Organizing*
	Interpersonal skills*

* Competency included in either the Project 9-96 foundation competencies or the current project survey

DEMONSTRATION PROJECT

Assessment

The assessment processes employed in this phase of the project met with only limited success in identifying the specific training needed by individuals to better perform as leaders and members of teams.

Team Leaders

The 360° assessment used with the leaders is resource-intensive to administer. Only two leaders were involved and the results are difficult to evaluate. Both team leaders were identified as having weaknesses in personal effectiveness competencies and empathy competencies. In addition, one leader had weaknesses evaluated in interpersonal skills and in coaching. The other team leader had perceived weakness with planing/organizing, and teamwork. Between the two leaders, each of the top six competencies selected as important to leadership of the team was identified as a weakness for one or the other, or both.

Team Members

An error took place in the duplication of the assessment forms and two of the five competencies, conflict management and planning/organizing, were not assessed. The assessment method used for the team members provided only a single evaluation for each team member. Analysis of results suggests that each team leader making the assessment applied the criteria somewhat differently.

The feedback received was generally positive. Comparing these results with anecdotal evidence, it appeared that the team leaders were reluctant in several cases to provide constructive feedback. With only one response point, it is unclear whether the team members were indeed performing successfully on the measured competencies or if the team leaders were skeptical of the process and weren't completely honest in their ratings.

Team One had eight of the 13 members scored as one's (Always Exhibits) for each competency rated. The other five members were given two's and three's (Often Exhibits and Rarely Exhibits) and comments indicated that room for improvement existed. For this team, the weakest areas were Employee

Development and Coaching and Teamwork. For Team Two, none of the 12 team members received ratings of “one” on all competencies, each being evaluated at two (Often Exhibits) on some competencies. Very few constructive comments were given for Team Two. The distribution of the grades and the difference in grading approach between the two leaders, made it difficult to isolate those competencies that were weaker for each and both teams.

Training

The NASSCO Training & Development Department has developed courses in the topics of leadership development, personal development and quality tools. Several of the objectives for these courses related directly to the top member and leader competencies. Thus, an in-house training program was created using segments from existing training courses at NASSCO. All of the courses were two hours in length and held over a period of three days. **Table 4** is a list of the courses and the competencies addressed.

Table 4: Training Courses for Team Members and Team Leaders

Class Title	Competency Addressed
Work styles (Leadership 7)	Interpersonal Skills and Empathy
Coaching (Leadership 5)	Employee Development/Coaching and Teamwork
Team Dynamics (Quality 8)	Teamwork and Employee Development/ Coaching
Effective Negotiation (Leadership 11)	Conflict Management
Time Management & Goal Setting (Personal Development 1, Parts 1 & 2)	Personal Effectiveness, Planning/Organizing and Teamwork

Note: The information in parentheses identifies the NASSCO course name and course segment that was used to support the work group competency training.

The assessment used for both the two team leaders and the team members did not provide a definitive picture of which of the identified competencies required training. All six competencies of the team leader competencies were mentioned as areas for development. Each of the team member competencies was also identified as a weak area for some participants. Because of the lack of clarity around specific areas needed for development in both team leaders and members, training was provided for everyone in all six competencies.

Training Evaluation

Participants were asked to assess the information they received in each class. A class evaluation was handed out at the conclusion of each class asking:

- The most useful part of the class
- The least useful part of the class
- What information the participant will transfer to their job
- The overall value of the course (Liker 5 point scale)

Comments from the participants were very favorable for all of the classes. Participants felt they would be able to take many of the operational competencies such as communication, feedback, working as a team, effective negotiation and time management back to their jobs. Participants gave the courses an overall average of 4 out of 5 points.

Pre Test and Skills Assessments

Pre-test results were compared with the skills assessments to determine if they identified similar strengths and weaknesses in individuals. There was insufficient correlation between them to suggest that either would be predictive of the other. One reason was possibly the small range of assessment grades assigned. With two exceptions all grades were either, “always exhibits” or

"often exhibits". For the two "rarely exhibits" grades assigned, one person got the lowest test grade (20) on the corresponding test. The other "rarely exhibits" mark was matched to a 100 on the corresponding test.

Pre and Post Test Comparison

Table 5 gives a comparison of pre and post-test means and averages. Also provided is information with respect to the number of persons whose scores improved, remained the same, or decreased. In addition, information is provided for each course on the maximum score gain any individual made on the post-test. The median score on three of the tests shows only one item missed on the pre-test and the same on the post-test. The pre and post-test results suggest that most participants gained little from the instruction, however, some participants showed significant improvement. The inference is that the courses would be useful for a targeted population.

Table 5.: Synopsis of Pre and Post-Test Results

	Work Styles		Coaching		Team Dynamics		Negotiation		Time & Goals	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Mean	71	81	74	89	81	80	84	83	84	86
Median*	75 (2)	88 (1)	80 (2)	90 (1)	86 (1)	86 (1)	83 (1)	83 (1)	90 (1)	90 (1)
Changes Between Pre and Post-Test										
Number of People who:										
Improved	12		18		7		8		10	
Had no change	6		7		14		14		10	
Had lower scores	6		2		7		6		8	
Greatest number of questions gained	(5)		(5)		(2)		(2)		(3)	

* In parentheses is the number of missed questions represented by the median score.

Reading the Test

There is some suggestion that the test may have been difficult for some of the participants to read because of language problems. Twenty-six of the 28 participants had Hispanic surnames. The two persons without Hispanic surnames made the two best overall scores, each missing only one question on all the tests combined. However, many other persons did nearly as well and the question of whether reading in general, or reading in English, made the test more difficult for some participants was not specifically addressed.

CONCLUSIONS

THE APPLICABILITY OF MULTI-SKILLED SELF-DIRECTED WORK GROUPS

Changes to the structure of the production workforce in shipyards include two elements that are necessary to build a shipbuilding and ship repair industry that is internationally competitive. These are:

- The productivity of the workforce
- The ability of the industry to compete for quality workers

Productivity gains come from a better use of worker's time and the need for fewer workers to maintain the needed skills base. Competition for workers is enhanced by a change in the work environment from one of close supervision to one that allows a worker to use a wider range of his or her total abilities and to have a greater sense of ownership for the product.

Introducing multi-skilled, self-directed work groups, with the associated role changes for both supervisors and workers, is more than a human resources and change management problem. All types of work group structures imply a loosening of the traditional first line control on the work force. For this to be practical the journey workers must be secure in their trade, able to perform with limited direction and able and willing to provide technical counsel to supervisors when required. Achieving journeymen of this caliber can only be done in a stable employment environment, or with a well-developed hiring pool. Lacking workers of known and acceptable quality, shipyards are forced to use systems of close supervision and do not have the worker skills to move toward more sophisticated work organizations.

Cyclic employment is likely to be the norm in shipbuilding and ship repair for the foreseeable future. This means that the long-staged process of moving toward self-direction in the workforce will likely be achieved through some wave riding strategy. If company personnel policies and union agreements are not structured to support this strategy, it will be doomed to failure.

THE DEMONSTRATION PROJECT

The demonstration project was only partly successful in meeting its goals. The positive results related to the effectiveness of the work groups in performing the tasks assigned to them. The shortcomings came when the work group demonstration departed from practical guidelines derived from the literature search and anecdotal experience of other shipyards. This occurred in the following areas:

Management Support

The manager for steel erection was fully supportive of the effort, however, the prototype work group was not integrated into the larger construction organization. This meant that no interfaces were created for the work group outside its specific area of responsibility. Furthermore, there was no recognition or tolerance of the inefficiencies associated with moving to a new work format. This affected the timing of project-related measurements and a general delay in project completion.

Human Resources Adaptation

The project was treated as an experimental organization and no move was made to adapt human resources support elements to recognize the team environment. This frustrates or delays any benefits expected to be gained by workers for participating in the teams. It also sends a message of impermanence, which must affect the attitude of team members. Team creation has been carried on at NASSCO on several occasions, but always as an experiment and without any HR adaptation.

Competency Analysis

The competency analysis methodology appears to be effective. It reflects the experience of working teams, which adds to its value and commends it to consideration by other organizations operating or planning the introduction of work teams.

It is not obvious that any of the 20 foundation skill options offered in the contract list address effectively, what anecdotal evidence both in shipyards and other industries indicates is the major problem in transitions to multi-trade/multi-skill environment, namely acceptance by both team members and team leaders of increased technical responsibility of the line worker.

Skills Assessment, Team Leaders

The 360° feedback methodology used to assess training needs for the team leaders was ineffective with respect to the project. Some part of the ineffectiveness relates the fact that there were only two team leaders and hence no way to develop a general focus for training. Timing of the assessment is also an issue. Done before the teams are operational, it produces results with reference to performance in a different work environment. Done after the teams are operational, it provides for corrective action but does not provide preparation for new responsibilities.

Skills Assessment, Team Members

The performance review assessment methodology was ineffective in this project in that it did not identify specific training needed for individuals. The problems lay in a lack of standardization in the application of the grading standards and in having only a single point of reference for each individual. The method was exercised after the team was operational and might therefore have proved useful for designing corrective training, but not for preparatory training. Training team leaders in the methodology might improve performance. Having team members complete the form on themselves would provide another point of reference.

Training

The training, as measured by the tests, was effective for a limited number of the participants and not clearly required for most of the participants. The lack of correlation between the tests and assessments raises questions about both the relevancy of the training to the identified competencies, and the ability of either method (test or assessment) to measure competence.

RECOMMENDATIONS

The recommendations below are based the information derived from the literature search and survey, and the experience gained through the demonstration project at NASSCO.

WITH RESPECT TO IMPLEMENTING AND SUSTAINING TEAMS

1. Ensure that work group implementation has full and informed management support.
2. Ensure that the intended roles of managers, first line supervisors, and line workers are understood by all participants.
3. Ensure that any work group plan addresses the interface between the work group and other shipbuilding and support functions.
4. Ensure that any team initiative includes a workable plan addressing the Human Resources aspects of work teams, particularly:
 - performance evaluation
 - job stability
 - rewards and benefits
5. Ensure that work group implementation strategy includes provision for sustaining teams during business lulls.

WITH RESPECT TO MEASUREMENT AND ASSESSMENT

1. Ensure that individual assessment includes input from more than one person or source.
2. Ensure that written instruments are appropriate to the language skills of the participants.

WITH RESPECT TO TRAINING

1. Ensure start-up training includes appropriate technical skills for team leaders and team members.
2. Make provision for both technical and foundation skills training to continue after the teams are operational.

APPENDIX A: Project Workshop Overview

A workshop presenting the final project results was conducted during the HR at the Summit conference in Seattle, Washington on November 9, 2000. The objectives of the workshop were to:

- ❑ Present findings from the NSRP project
- ❑ Provide a process for leading and sustaining multi-skilled work groups
- ❑ Share tools for assessing, measuring and training work team effectiveness

Lee Walker presented the first part of the workshop, outlining the project objectives and the technical approach to the project. Brienn Woods presented the second part of the workshop, presenting assessment tools to implement and sustain work groups and the results from NASSCO's team leader and member competency identification, assessment and training.

The audience was a mix of shipyard sizes and a wide variety of experiences with team approaches. The audience was interested in learning what they needed to consider and have in place in order to successfully implement work teams.

One of the key findings of the project was the variety of approaches to work groups being used in organizations. Three separate threads were identified in the introduction of multi-skilled, multi-trade and self directed work groups, however consistent competencies and organizational structure are needed to sustain them. Organizational changes must be made in order to implement and sustain any work group, with an increasing need for changes to management structure, first line supervision, line workers and support functions depending upon the complexity and self-direction of the work group. A matrix outlining the changes is included in the attached presentation document. Along with organizational changes, certain technical and non-technical competencies are needed for successful team leaders and team members. The results of the competency identification were discussed in the second portion of the presentation.

The project results indicated other considerations that are key when moving to teaming:

- ❑ Conducive operations – apply teaming to work that needs to be completed by a team
- ❑ Time and resources – tasks will take longer during initial efforts – ensure that work groups have the time and resources they need while starting
- ❑ A healthy market – if the work is not there, the teaming effort will stall – workforce fluctuation makes keeping a team together difficult
- ❑ Skilled workers – journeyman level workers are needed as supervision levels decrease and decision making and skill knowledge is performed at the worker level
- ❑ Management commitment – must provide vision and resources
- ❑ Planning – plan for the long term changes and be willing to accept uncertainty
- ❑ Human Resource management – systems for rewards and benefit in a team environment, job stability and performance evaluations supporting multi-skills and teams
- ❑ Training – provide continuous training for technical and non-technical skills for supervisors and team members

Overall, the process steps for implementing work groups can be summarized as:

- ❑ Identify type of work group to implement
- ❑ Identify changes needed in organizational structure
- ❑ Identify competencies needed at all levels
- ❑ Measure workforce competencies
- ❑ Identify gaps
- ❑ Implement changes to fill gaps

As part of the process of identifying what type of work group is best for the organization is it important assess the culture, skills and readiness of the organization. Five steps should be used to assist in the process.

- ❑ *Assess the company/department readiness – conduct a culture survey*
- ❑ *Identify group member and leader competencies – use a validated methodology to identify competencies needed. The NASSCO model used a product by Target Training International “DNA Competency Analysis”*
- ❑ *Identify individual group member team effectiveness – assess personal behavioral styles. The instrument used to for this was the TTI Managing for Success Team Analysis, based on the DISC behavioral model.*
- ❑ *Assess group members and leaders against identified competencies – customize an assessment using operational definitions from the competency analysis, or purchase a 360degree feedback instrument with similar competencies. Additional assessments can be obtained from focus groups, interviews, etc.*
- ❑ *Develop training to strengthen skills – match training to competency gaps, using competency definitions to customize training. Conduct pre and post measurement to assess effectiveness*

Samples of all of the assessment tools were explained and an individual TTI Managing for Success Team Analysis assessment was provided to all participants.

The results of the team leader and team member competencies for the NASSCO project were as follows:

Team Leader	Team Member
Teamwork	Employee Development/Coaching
Employee Development/Coaching	Teamwork
Personal Effectiveness	Conflict Management
Empathy	Planning/Organizing
Planning/Organizing	Personal Effectiveness
Interpersonal Skills	

It was determined after assessing the team members and leaders that all could benefit from training in all competencies to establish a baseline of understanding for all. Five courses were

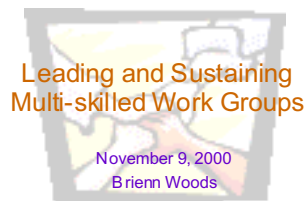
customized to meet the operational definitions of the competencies listed above and all team members attended all courses.

To wrap up the workshop, lessons learned from implementation at NASSCO were shared with the group. The highlights included:

- ❑ Need to educate all impacted workers and supervisors up-front on the benefits of teams to individuals and the company
- ❑ Need to have mid and upper management's full support of the team concept
- ❑ Need supervisor/team leader complete buy-in
- ❑ "Team supporting" HR systems (rewards, recognition, training, etc.) should be in place
- ❑ Need production organization and work structures that support the use of teams, not just multi-skilled workers

The workshop concluded with a question and answer session.

A complete set of the overheads in PowerPoint format is available for viewing by double-clicking on the icon below (You must have PowerPoint version 95 or later loaded on your computer).



[NOTE: The overheads follow in the PDF file.]

Leading and Sustaining Multi-skilled Work Groups

November 9, 2000
Brienn Woods



Workshop Objectives

- Present findings from NSRP Project
- Provide a process for leading and sustaining multi-skilled work groups
- Share tools for assessing, measuring and training work team effectiveness

2



Part One

Understanding work groups and
the processes needed to
implement and sustain them



Project Objectives

- Improve the competitiveness of U.S. shipyards through the development of effective production leadership within multi-skilled work groups
- Implement and monitor a model training program for groups and leaders

4



Project Team

- **Karin Hagen**, NASSCO Coordinator
- **Les Hansen**, Project Manager
- **Val Houlihan**, NASSCO Contributor
- **Lee Walker**, Consultant (Virginia)
- **Brienn Woods**, Consultant (formerly NASSCO)

5



Technical Approach

- Three phases
 - Phase 1: Identify Multi-skilled work groups
 - Phase 2: Develop production work group leaders and members
 - Phase 3: Implementation and final report

6



Identify Multi-skilled Work Groups

Gather data: What are current practices?

- Literature search
 - Provide insight into developing theory
 - Identified research on forming, leading and sustaining multi-skilled workgroups
- Survey of industry
 - Based on information from literature search

7



Literature Search

- Focus
 - Production teams
 - Leadership and supervision in a team environment
 - Multi-skilling
- Process
 - Electronic survey
 - Web-search resources from University of Virginia
 - Accessed psychological, engineering, economic, education and human resource data bases
 - NSRP project reports
 - Accessed existing reports in NsNet documentation center

8



Research Findings

- Varying types of work groups
 - Three separate threads in the introduction of multi-skilled, self-directed work teams
- Consistent competencies and organizational structure needed to sustain work groups
- Shipyards will benefit by implementing work groups
 - Success varies based on which type of work group is implemented

9



Work Group Definitions

- *Production work groups* or teams are two or more workers that function on the job to carry out production activities
- *Multi-skilled groups* are composed of members that possess journey-level technical skills in more than one trade
- *Self-directed teams* are lead by one of the members and possess some degree of autonomy

10



Threads

- Multi-Trade Workgroups
- Multi-Skilled Workers
- Self-Direction



11



Weaving the Threads

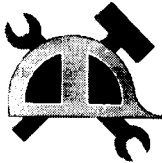
- Supervision Ratio
- Multi-Skilling
- Multi-Trade Work Groups

12



Operational Element Changes

- Management Structure
- 1st Line Supervision
- Line Worker
- Support Functions



15

Changes to Organizational Elements

	Multi-Trade Work groups	Multi-Trade, Multi-Skilled Work groups (with worker participation)	Self-directed, Multi-Skilled Teams
Management Structure	• Single upper level manager • Trade group-related manager (structural, mechanical) • Project or zone manager	• Single upper level manager • Trade group-related manager (structural, mechanical) • Project or zone manager	• Single upper level manager • Trade group-related manager (structural, mechanical) • Project or zone manager • Supervises team activities
1st line supervision	• 1st line supervisor from one of the component trades • Primary responsibilities are: - Safety - Coordination • Responsible for selected group activities • Coaching activity extends to more than one group • May perform some team coordination in selected support areas	• 1st line supervisor from one of the component trades • Primary responsibilities are: - Safety - Coordination • Responsible for selected group activities • Coaching activity extends to more than one group • May perform some team coordination in selected support areas	• 1st line supervisor needs with team members • For previous supervisors • Coaching activity extends to more than one group • May perform some team coordination in selected support areas
Line workers	• Technical expert on job • Can not rely on supervisor to catch errors • Responsible to provide technical support	• Technical expert on job • Can not rely on supervisor to catch errors • Responsible to provide technical support	• Assume leadership roles within work group • Participate in decision making and in process improvement • Interface with support functions and other work groups
Support functions	• Changes in support are driven more by project than by shift to multi-trade work	• Changes in support are driven more by project than by shift to multi-trade work	• Support functions configured to interface with team leader • HR functions adjusted to teams • Compensation and performance incentives adjusted to team performance
Benefits	• Improved coordination of trades in multi-trade process	• Improved coordination of trades in multi-trade process	• Improvement in process and productivity through worker participation • Better work environment

Changes to Organizational Elements

	Multi-Trade Work groups	Multi-Trade, Multi-Skilled Work groups (with worker participation)	Self-directed, Multi-Skilled Teams
Management Structure	• Single upper level manager • Trade group-related manager (structural, mechanical) • Project or zone manager	• Single upper level manager • Trade group-related manager (structural, mechanical) • Project or zone manager • Supervises team activities	• Single upper level manager • Trade group-related manager (structural, mechanical) • Project or zone manager • Supervises team activities
1st line supervision	• 1st line supervisor from one of the component trades • Primary responsibilities are: - Safety - Coordination • Responsible for selected group activities • Coaching activity extends to more than one group • May perform some team coordination in selected support areas	• 1st line supervisor from one of the component trades • Primary responsibilities are: - Safety - Coordination • Responsible for selected group activities • Coaching activity extends to more than one group • May perform some team coordination in selected support areas	• 1st line supervisor from one of the component trades • Primary responsibilities are: - Safety - Coordination • Responsible for selected group activities • Coaching activity extends to more than one group • May perform some team coordination in selected support areas
Line workers	• Technical expert on job • Can not rely on supervisor to catch errors • Responsible to provide technical support	• Technical expert on job • Can not rely on supervisor to catch errors • Responsible to provide technical support	• Assume leadership roles within work group • Participate in decision making and in process improvement • Interface with support functions and other work groups
Support functions	• Changes in support are driven more by project than by shift to multi-trade work	• Changes in support are driven more by project than by shift to multi-trade work	• Support functions configured to interface with team leader • HR functions adjusted to teams • Compensation and performance incentives adjusted to team performance
Benefits	• Improved coordination of trades in multi-trade process	• Improved coordination of trades in multi-trade process	• Improvement in process and productivity through worker participation • Better work environment

Changes to Organizational Elements

	Multi-Trade Work groups	Multi-Trade, Multi-Skilled Work groups (with worker participation)	Self-directed, Multi-Skilled Teams
Management Structure	• Single upper level manager • Trade group-related manager (structural, mechanical) • Project or zone manager	• Single upper level manager • Trade group-related manager (structural, mechanical) • Project or zone manager • Supervises team activities	• Single upper level manager • Trade group-related manager (structural, mechanical) • Project or zone manager • Supervises team activities
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Benefits	• Improved coordination of trades in multi-trade process	• Improved coordination of trades in multi-trade process	• Improvement in process and productivity through worker participation • Better work environment



Multi-Trade Work Groups

- Manager
 - trade group or project
- 1st Line Supervisor
 - safety and coordination
- Line Worker
 - secure in trade
- Support
 - materials

16



Multi-Skill with Participation

- Manager
 - patience
- 1st Line Supervisor
 - guidance and acceptance
- Line Worker
 - secure skills and responsibility
- Support
 - changing interface and policies

17



Self-Directed – Multi-Skilled

- Manager
 - 1st line direction and accountability
- 1st Line Supervisor
 - using skills in other roles
- Line Worker
 - peer facilitation and coordination
- Support
 - changing interface and policies



19



Application to Shipyards

- Multi-trade work groups
 - Simplify supervisory coordination
 - May be formed for assembly, installation, test or repair
- Multi-skilling
 - Improve work force stability
 - Maximizes efficiency
 - Requires fewer members
 - May be used in traditional hierarchical organizations in all areas
- Self-direction
 - Applicable to wide variety of work formats

20



First Line Supervision

- Gaining Competencies
- Changing Emphasis
- The Job has Changed

21



Supervisor's Role Change

- Management
 - Supervisor
 - Line Worker
- What is expected?
- What is not expected?

22



Implementing Change

Key considerations when moving to teaming

- Conducive Operations
- Time and Resources
- A Healthy Market
- Skilled Workers



23



Change Strategies

Smaller Span of Control



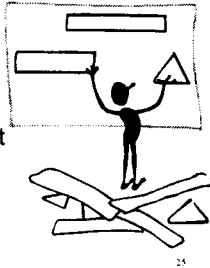
Wave Riding

24



Implementing Change

- Management commitment
 - vision and resources
 - tolerate inefficiencies
- Planning
 - very important element
 - accept uncertainty



25



Implementing Change

Support functions

- Materials and documentation
- Human resources

Training

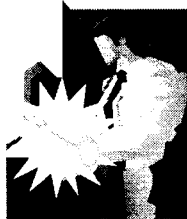
- Multi-Trade
 - supervisors
 - safety & coordination
- Multi-Skilled
 - technical
- Self-Direction
 - both team and technical

26



Sustaining Changes

- HR – Often overlooked, critical to success
 - rewards and benefits
 - job stability
 - performance evaluation
- Training
 - team and technical
 - continuing



Why Change?

- Productivity
- Compete for workers

28



Must Have to Succeed

- A skilled journeyman work force
- Personnel policies and union agreements that sustain incremental progress

29



Process

- Identify type of work group to implement
- Identify changes needed in organizational structure
- Identify competencies needed at all levels
- Measure workforce competencies
- Identify gaps
- Implement changes to fill gaps

30



Lessons Learned

- Need to educate all impacted workers and supervisors up-front on the benefits of teams to individuals and the company
- Need to have mid and upper management's full support of the team concept
- Need supervisor/ team leader complete buy-in
- "Team supporting" HR systems (rewards, recognition, training, etc.) should be in place
- Training for team leaders and members in team dynamics is important
- Need production organization and work structures that support the use of teams, not just multi-skilled workers

12



Part Two

Tools to help implement and sustain work groups



Steps for Discovery

- Assess company/department readiness
- Identify group member and leader competencies
- Identify individual group member team effectiveness
- Assess group members and leaders against identified competencies
- Develop training materials

13



Tools for Discovery

Assess company/department readiness

- Conduct culture survey
 - Customize to determine acceptance/readiness for implementing work groups
 - Administered by third party
 - Results help address steps to be taken next

14



Tools for Discovery

Identify group member and leader competencies

- The literature search and survey data were reviewed to determine the competencies that surfaced
 - teambuilding, communication, conflict resolution, problem solving, trust building, and coaching
- Similarities between data and Target Training International's (TTI) DNA competency model
 - Used TTI model to determine team leader and member competencies

15



Competency-based position analysis

- Based on validated, patented methodology identifying 20 non-technical competencies
- Closely matched competencies identified in previous NSRP project and literature search and survey
- Competencies are ranked by order of importance to the position
 - Focus on top 20%

16



Elements of Analysis

- Position elements
 - Authority, responsibility and control
- Behavioral elements
 - Dealing with ideas, people, change
- Measurement elements
 - Clarification of processes

17



Top Competencies for team member (NASSCO findings)

- Employee Development/Coaching
- Teamwork
- Conflict Management
- Planning/Organizing
- Personal Effectiveness

18



Top Competencies for team leader (NASSCO findings)

- Teamwork
- Employee Development/Coaching
- Personal Effectiveness
- Empathy
- Planning/Organizing
- Interpersonal Skills

19



Competencies Defined

- | | |
|--|--|
| <p>Team Members</p> <ol style="list-style-type: none"> Employee Development/Coaching – Encouraging and supporting the professional growth of others <ul style="list-style-type: none"> • Expresses confidence in others' ability to perform • Encourages initiative and improvement • Acknowledges and praises improvements • Trains, coaches, and mentors others to develop • Views mistakes as opportunities for learning Teamwork – Working effectively and productively with others <ul style="list-style-type: none"> • Respects team members and their individual contributions • Shares responsibility with team members for successes and failures • Encourages team members to develop • Provides constructive feedback to team and to members • Responds positively to feedback from team members Conflict Management – Addressing and resolving conflict constructively <ul style="list-style-type: none"> • Attempts to gain understanding of issues from different perspectives • Asks people to move from adversarial positions to collaborative positions • Seeks to settle differences equitably • Seeks to find solutions which are mutually satisfying | <p>Team Leaders</p> <ol style="list-style-type: none"> Employee Development/Coaching – Encouraging and supporting the professional growth of others <ul style="list-style-type: none"> • Expresses confidence in others' ability to perform • Encourages initiative and improvement • Acknowledges and praises improvements • Trains, coaches, and mentors others to develop • Views mistakes as opportunities for learning Teamwork – Working effectively and productively with others <ul style="list-style-type: none"> • Respects team members and their individual contributions • Shares responsibility with team members for successes and failures • Encourages team members to develop • Provides constructive feedback to team and to members • Responds positively to feedback from team members Conflict Management – Addressing and resolving conflict constructively <ul style="list-style-type: none"> • Attempts to gain understanding of issues from different perspectives • Asks people to move from adversarial positions to collaborative positions • Seeks to settle differences equitably • Seeks to find solutions which are mutually satisfying |
|--|--|

20



Competencies Defined (Cont'd.)

- | | |
|---|--|
| <p>Planning/Organizing – Establishing steps of execution and to develop procedures to meet the need</p> <ul style="list-style-type: none"> • Analyzes effectively within established time frame and priorities • Initiates logical, practical and efficient approaches • Prioritizes tasks for optimum productivity • Controls the performance, progress and outcome of tasks, activities, efficiency and effectiveness <p>Personal Effectiveness – Prioritizing and controlling individual and collective performance in the management of resources, time, energy and performance</p> <ul style="list-style-type: none"> • Controls resources and maintains competence in relevant situations • Utilizes time and resources to achieve results • Contributes to their ability to achieve goals • Controls mistakes and works to avoid repeating them • Accepts personal responsibility for achieving personal and organizational goals | <p>Empathy – Identifying with and caring about others</p> <ul style="list-style-type: none"> • Formulates caring concerns for others • Respects and values people • Cares about the interests, needs, and wants of others • Demonstrates cross-cultural sensitivity and understanding <p>Planning/Organizing – Establishing steps of execution and to develop procedures to meet the need</p> <ul style="list-style-type: none"> • Analyzes effectively within established time frame and priorities • Initiates logical, practical and efficient approaches • Prioritizes tasks for optimum productivity • Controls the performance, progress and outcome of tasks, activities, efficiency and effectiveness <p>Personal Effectiveness – Prioritizing and controlling individual and collective performance in the management of resources, time, energy and performance</p> <ul style="list-style-type: none"> • Controls resources and maintains competence in relevant situations • Utilizes time and resources to achieve results • Contributes to their ability to achieve goals • Controls mistakes and works to avoid repeating them • Accepts personal responsibility for achieving personal and organizational goals |
|---|--|

21



Individual Assessment

"He who knows others is learned.
He who knows himself is wise." – Lao Tse

- Assess personal behavioral styles
- Measures four dimensions of normal behavior
 - How you respond to problems and challenges (D)
 - How you influence others to your point of view (I)
 - How you respond to the pace of the environment (S)
 - How you respond to rules and procedures set by others (C)

22



DISC profile

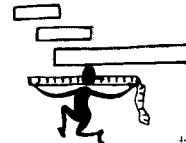
- Identifies:
 - Behavioral style
 - Natural style
 - Adapted to environment
 - Effective communication
 - Value to the team
 - Team effectiveness factors

23



Measuring performance

- Assess team members and team leaders to competencies
 - Develop customized report
 - Purchase 360 degree feedback report



24



Group Member Assessment

- Assessment tool developed by Project Team Members
- Group members were assessed by their team leaders in the top five team member competencies
 - Employee Development/Coaching
 - Teamwork
 - Conflict Management
 - Planning/Organizing
 - Personal Effectiveness
- Group members were given verbal feedback by their team leader

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Group Member Assessment Sample

Employee Development/Coaching – Facilitating and supporting the professional growth of others

- Expresses confidence in others' ability to perform
- Encourages initiative and improvement
- Acknowledges and praises improvements
- Trains, coaches and mentors others to develop
- Views mistakes as opportunities for learning

On a scale of 1 – 4, rate the degree to which the employee performs this competency:

1 = Always Exhibits	2 = Often Exhibits	3 = Rarely Exhibits	4 = Never Exhibits

Comments: _____

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Team Leader Assessment

- TTI's Discovery Tool (360-degree feedback) was customized to assess the top six team leader competencies
 - Teamwork
 - Employee Development/Coaching
 - Personal Effectiveness
 - Empathy
 - Planning/Organizing
 - Interpersonal Skills
- Team Leaders were assessed and received feedback from:
 - Themselves
 - Their boss, peers and subordinates (team members)

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Team Leader Assessment Sample

Employee Development/Coaching – Facilitating and supporting the professional growth of others

- Expresses confidence in others' ability to perform
- Encourages initiative and improvement
- Acknowledges and praises improvements
- Trains, coaches and mentors others to develop
- Views mistakes as opportunities for learning

How often does this occur?

- ☐ Almost never
- ☐ Sometimes
- ☐ Generally
- ☐ Almost always
- ☐ Always

How often should this occur?

- ☐ Almost never
- ☐ Sometimes
- ☐ Generally
- ☐ Almost always
- ☐ Always

28



Training

- Match training to competency gaps
- Use competency definitions to customize training
- Do pre and post measurement to determine effectiveness

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Training

Class Title	Competency
Leadership 7 - Workstyles	Interpersonal skills & Empathy
Leadership 5 - Coaching	Employee Dev /Coaching & Teamwork
Quality 8 - Team Dynamics	Teamwork & Employee Dev /Coaching
Leadership 11 - Effective Negotiation	Conflict Management
Personal Dev. - Time Management & Goal Setting	Personal Effectiveness, Planning/Organizing

50



Exercises

- 5 square puzzle
 - 6 team members
 - 5 participants
 - 1 observer
 - Listen for instructions
- Murder mystery

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Training Effectiveness

- Measure effectiveness on four levels
 - Level 1 – Reaction
 - Participants complete "smile sheets" at the conclusion of each class
 - Level 2 – Learning
 - Conduct pre and post tests for each class
 - Level 3 – Behavior
 - Conduct new 360 degree feedback
 - Conduct survey
 - Level 4 – Results
 - Have the business results changed?

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Questions?



53



Wrap - Up

- Questions...
- Comments...
- Information you can share based on your experiences



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APPENDIX B: List Of Survey Respondents

Shipyard Name	Location
Bath Iron Works	Bath, Maine
Electric Boat Corporation	Groton, Connecticut
Ingalls Shipbuilding	Pascagoula, Mississippi
Jeffboat Shipyard	Jeffersonville, Indiana
NASSCO (Blast, Paint, Services)	San Diego, California
NASSCO (Block Outfitting)	San Diego, California
NASSCO (Steel Erection)	San Diego, California
Newport News Shipbuilding	Newport News, Virginia
Pearl Harbor Naval Shipyard	Pearl Harbor, Hawaii

Industry Name	Product	Location
Eastman Kodak	Photographic Equipment	Rochester, NY
Monsanto Kelco	Food Additives	San Diego, CA
Saturn Corporation	Auto Manufacturing	Spring Hill, TN
UNISYS Corporation	Integrated Circuits	San Diego, CA
Weirton Steel	Steel Manufacturing	Weirton, WV

Shipyard Visits

Alaska Ship and Drydock	Ketchikan, Alaska
Bath Iron Works	Bath, Maine
Cascade General	Portland, Oregon
Electric Boat Corporation	Groton, Connecticut
Fraser Industries	Seattle, Washington
Lake Union Drydock	Seattle, Washington
Martinac Shipyard	Tacoma, Washington
NASSCO	San Diego, California
Todd Pacific Shipyard	Seattle, Washington

Industry Visit

Solar Turbines	Stationary Gas Turbines	San Diego, California
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Telephone Discussions

Jeffboat Shipyard	Jeffersonville, Indiana
Norfolk Naval Shipyard	Norfolk, Virginia
Pearl Harbor Naval Shipyard	Pearl Harbor, Hawaii
Puget Sound Naval Shipyard	Bremerton, Washington

APPENDIX C: Team Member Assessment, Non-Technical Competencies

1. *Employee Development/Coaching – Facilitating and supporting the professional growth of others*

- Expresses confidence in others' ability to perform
- Encourages initiative and improvement
- Acknowledges and praises improvements
- Trains, coaches and mentors others to develop
- Views mistakes as opportunities for learning

On a scale of 1 – 4, rate the degree to which the employee performs this competency:

1 = Always Exhibits	2 = Often Exhibits	3 = Rarely Exhibits	4 = Never Exhibits

Comments: _____

2. *Teamwork – Working effectively and productively with others*

- Respects team members and their individual perspectives
- Shares responsibility with team members for successes and failures
- Keeps team members informed regarding projects
- Supports team decisions
- Provides constructive feedback to team and its members
- Responds positively to feedback from team members

On a scale of 1 – 4, rate the degree to which the employee performs this competency:

1 = Always Exhibits	2 = Often Exhibits	3 = Rarely Exhibits	4 = Never Exhibits

Comments: _____

3. *Conflict Management – Addressing and resolving conflict constructively*

- Listens to gain understanding of issues from different perspectives
- Assists people to move from adversarial positions to a common ground
- Strives to settle differences equitably
- Negotiates tough agreements without damaging relationships

On a scale of 1 – 4, rate the degree to which the employee performs this competency:

1 = Always Exhibits	2 = Often Exhibits	3 = Rarely Exhibits	4 = Never Exhibits

Comments: _____

4. *Planning/Organizing – Utilizing logical, systematic and orderly procedures to meet objectives*

- Works effectively within established time frames and priorities
- Utilizes logical, practical and efficient approaches
- Prioritizes tasks for optimum productivity
- Develops procedures, processes and systems for order, accuracy, efficiency and productivity

On a scale of 1 – 4, rate the degree to which the employee performs this competency:

1 = Always Exhibits	2 = Often Exhibits	3 = Rarely Exhibits	4 = Never Exhibits

Comments: _____

5. *Personal Effectiveness – Projecting self-control, confidence and composure in the management of emotions, time, energy and performance*

- Controls emotions and maintains composure in stressful situations
- Manages time and priorities to achieve objectives
- Confident in their ability to achieve goals
- Admits mistakes and works to avoid repeating them
- Accepts personal responsibility for achieving personal and professional goals

On a scale of 1 – 4, rate the degree to which the employee performs this competency:

1 = Always Exhibits	2 = Often Exhibits	3 = Rarely Exhibits	4 = Never Exhibits

Comments: _____

APPENDIX D: Pre And Post Test Questions

Work Styles

1. The United States workforce has changed a lot in the last twenty years. It includes people with different ideas, from different cultures, and with different perspectives.
True_____ False_____
2. Working in a team is a common way of doing business today.
True_____ False_____
3. Knowing more about myself (personality, abilities, values, goals) will not affect my ability to work better with others.
True_____ False_____
4. There are four basic work styles/personalities at NASSCO.
True_____ False_____
5. It's not good if a company has employees with different work styles/personalities.
True_____ False_____
6. Our personality is formed when we are young kids.
True_____ False_____
7. My skills and abilities at NASSCO are only technical (welding, burning, fitting, etc.)
True_____ False_____
8. People are motivated/excited at work by the same things.
True_____ False_____

Coaching

1. When a team member acts as a “coach” at work, they teach and train other team members to help them do their job better.
True _____ False _____
2. Helping team members with personal problems should not take place at work.
True _____ False _____
3. We coach people to:
_ teach a new job skill
_ train a new team member
_ help a team member do better work
_ prepare the employee for a hard job
_ all of the above
4. We counsel team members when:
_ they are unhappy with their boss
_ they have a problem with their teammate(s)
_ they have a problem at home which effects their work
_ reorganizations take place at work
_ all of the above
5. We know we need to coach or counsel a team member when we see a problem with their performance or attitude.
True _____ False _____
6. People have problems with their performance or attitude because:
_ they don’t know how to do the job
_ something blocks them from doing the job
_ they don’t want to do the job
_ all of the above
7. Giving a team member/leader feedback about their job is always hard. There is not a way to give feedback on a daily basis.
True _____ False _____
8. It is okay to tell someone they did a bad job but not tell them why or how they can improve.
True _____ False _____

9. If a team member does a job poorly, it is okay to wait for many days before giving them the feedback about the poor job.
True _____ False _____
10. It's not okay to give a team member negative feedback in front of a lot of people.
True _____ False _____

Negotiation

1. All conflict has to be resolved in order for people to move forward with the work and/or relationship.
True_____ False_____
2. In a conflict situation, one person will walk away as the winner and the other will be the loser.
True_____ False_____
3. Conflict can be healthy if it:
_ produces change
_ results in a more united purpose/relationship
_ promotes working together and cooperation
_ all of the above

Negotiation is one way to resolve conflict

True_____ False_____

5. There are several possible ways to negotiate:
_ win-lose
_ lose-win
_ win-win
_ all of the above
6. It is important to know your personal goal for the result of the negotiation before you start to negotiate
True_____ False_____
7. It's okay to blame the other party in the negotiation for the problem
True_____ False_____

Team Dynamics

1. For a team to be successful, members need to share common goals and trust one another.
True _____ False _____
2. Which of the following are roles for members that a team should have:
 - leader
 - facilitator
 - scribe
 - timekeeper
 - participant
 - all of the above
3. It's okay if the team doesn't plan its work
True _____ False _____
4. A good team decision is made:
 - based on facts and data
 - knowing the consequences in advance
 - supported by those who will be affected
 - all of the above
5. The workstyles of team members does not have an impact on the group
True _____ False _____
6. It is likely that the team will go through several phases on development in its "life" as a team
True _____ False _____

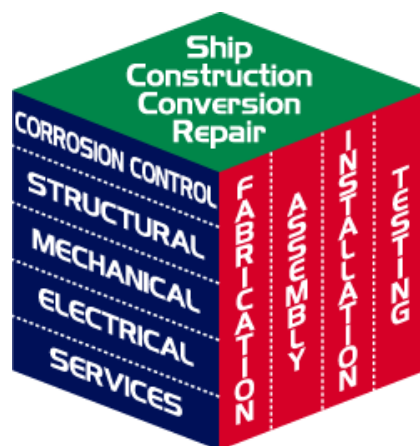
Time Management/Goal Setting

1. Three common time wasters are procrastination, interruptions and lack of planning.
True _____ False _____
2. One way to not procrastinate is to do the things you don't like to do first.
True _____ False _____
3. There is no way for us to control interruptions. We have to respond to them right away no matter what.
True _____ False _____
4. When planning work, it is good to try and do it in a place where you won't be distracted for a few minutes.
True _____ False _____
5. Which of the following are important steps in delegation:
 - analyze tasks
 - select the employee to do the job
 - instruct the employee and demonstrate the job
 - provide feedback to the employee on their performance
 - all of the above
6. It is very important to understand your values before you set goals.
True _____ False _____
7. Values are important because they:
 - help us be proactive
 - drive our decision making process
 - help us shape our future
 - all of the above
8. A goal is defined as:
 - an end toward which you direct some effort
 - a result you want and are willing to work for
 - an accomplishment you want to achieve
 - all of the above

9. When writing a goal statement, you should make it:
- ☐ specific
 - ☐ measurable
 - ☐ attainable
 - ☐ relevant
 - ☐ time specific
 - ☐ all of the above
10. In a company, it is important to link the corporate goals to the mission and vision statements.
- True _____ False _____

Leading and Sustaining Multi-skilled Work Groups

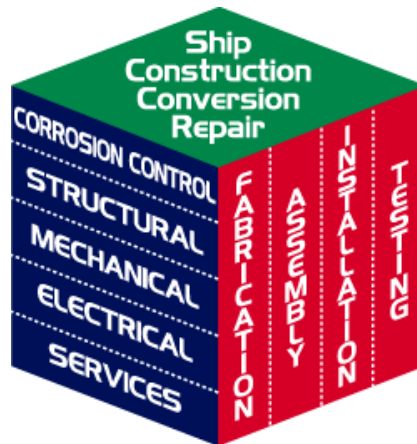
Literature Search & Survey of Production Work Groups



Project 9-98-1
The National Shipbuilding Research Program
August 1999

Leading and Sustaining Multi-skilled Work Groups

Literature Search & Survey of Production Work Groups



The National Steel and Shipbuilding Company (NASSCO)

Karin Hagen

Les Hansen

Lee Walker

For

The National Shipbuilding Research Program

August 1999

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Data Gathering for NSRP Project 9-98-1

Leading and Sustaining Multi-skilled Work Groups

Introduction

This is a report on two activities conducted to gather information on current practice and experience with leading and sustaining multi-skilled work groups in the U.S. shipbuilding and ship repair industry and in broader industrial applications. The first activity was the literature search, which was conducted to provide insight into developing theory and the research that has been conducted with respect to forming, leading and sustaining multi-skilled work groups. The survey was based on the information and concepts developed by the literature search. Shipyards, and other industries with success using work groups or teams, were included in the survey.

Production work groups are defined for this project as groups or teams (terms are used synonymously) of two or more workers that function on the job to carry out production activities. Multi-skilled groups are composed of members that possess journey-level technical skills in more than one trade. Self-directed teams are led by one of the members (as opposed to outside supervision) and possess some degree of autonomy.

Literature Search Focus and Sources

The focus of the literature search was on production teams, leadership and supervision in a team environment, and multi-skilling. The search was conducted electronically using the internal and web-search resources of the University of Virginia and on site at the library of the Darden Graduate School of Business Administration at the University of Virginia. Psychological, engineering, economic, education and human resource databases were accessed. In addition to these resources, the National Shipbuilding Research Program (NSRP) reports were accessed electronically through the NSNET documentation center at the University of Michigan Transportation Research Institute (UMTRI).

Survey Participants

Seven shipyards and five representatives of other industries completed the survey. Although numerically the shipyard participation represents a very small segment of the total number of shipbuilding and ship repair yards in the country, the respondents include five of the six largest yards and represent a very large proportion of the total workforce employed in the industry. The information was further rounded out by discussions with personnel from three government yards and visits to several smaller yards engaged primarily in commercial work. The industries responding represented a diversity of applications; all have successful self-directed production work teams.

Attachment 2 to Appendix B lists the survey respondents.

Data Analysis

Analysis and synthesis of the data from the literature search and survey will be the subject of a subsequent deliverable to this project. The introductory material for the literature search (Appendix A) has a brief synopsis and there are also preliminary observations on the survey responses in Appendix B. The following paragraphs juxtapose some themes from the literature search with related observations on the survey responses.

Team Form

Literature Search

Production teams occur in many forms and many degrees of self-direction or management. "Team" as a minimum implies some level of mutual support initiated by the members. From there teams can accept more and more responsibility until they become nearly autonomous

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entities within a parent organization responsible for both work completion and support functions. As a general maxim, the greater the autonomy of the work group the greater the benefit to the sponsoring organization.

Survey Indications

For the most part, the reporting shipyards are working in groups representing more than one trade (multi-skilled). Groups are led by supervisors assigned by management from one of the trades represented in the group. In contrast, the industrial participants have self-directed multi-skilled teams, that is, groups of workers representing several trades led by workers selected from within the group by the other workers.

Time and Planning

Literature Search

Teams take time and resources to put in place and more time and resources to become effective. Teams are never a “quick fix.” Because of this, implementing teams takes not only sustained management support but also an organization with resources and a market position that can both support and benefit from the long-term investment in team building.

Survey Indications

Some respondents reported planning and implementation time in months but most responded with years. Management commitment for several shipyards was indicated by the fact that they had previous failed team initiatives and were now moving back toward teams.

Transition to Self-Directed Teams

Literature Search

The introduction of teams is normally a phased effort with degrees of self-management being sought and achieved in defined steps. The role of the leader mutates as the team accepts more and more responsibility for its own functions. Ultimately, responsibilities of the hierarchical first line supervisor become dispersed within the team and supervision over the team occurs at a higher management level.

Survey Indications

Surveys, visits and anecdotal information suggest that shipyards are meeting with success in using work groups having workers from more than one trade and in developing workers with skills in more than one trade. Movement from these multi-skilled groups to teams, with workers participation and self direction, seems to be stalled at this point by the reluctance in sufficient numbers of both supervisors and line workers to accept role changes.

Training

Literature Search

Training is a continuing requirement if teams are to mature and remain successful. This training is both in non-technical (foundation) skills and in technical skills.

Survey Indications

All but one respondent provided initial training for team leaders and team members, and for the most part this was foundation skills training. Most respondents also had follow-on training. In contrast to initial training, follow-on training frequently was oriented on technical competencies. Half of the organizations responding indicated that follow-on training was initiated as a result of experience and was not part of the original team planning.

Compensation and Benefits

Literature Search

Workers performing in teams expect some tangible benefit. Workers leading or performing leadership roles within teams expect some additional tangible benefit.

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Survey Indications

Neither the shipyard or industry respondents indicated that team members or team leaders received any additional compensation or other tangible advantage.

Application of Industry Experience to Shipyards

Literature Search

Most of the industrial work team experience cited in the literature reflects some form of production line manufacturing. Care must be taken when extrapolating this experience to an environment of shipbuilding and ship repair.

Survey Indications

The responding industries represent a broad diversity of applications which suggests that the experiences, problems and solutions they hold in common are likely to also extrapolate to the shipbuilding/ship repair industry.

Report Format

The report consists of two essentially independent appendices, one containing the results of the literature search and the other the responses to the work team survey. Each appendix is supported by attachments.

Appendix A

Literature Search

Appendix A: Literature Search

Introduction

This literature search was conducted electronically using the internal and web-search resources of the University of Virginia and on site at the library of the Darden Graduate School of Business Administration at the University of Virginia (UVA). Psychological, engineering, economic, education and human resource databases were accessed. In addition to these resources, the National Shipbuilding Research Program (NSRP) reports were accessed electronically through the NSNET documentation center at the University of Michigan Transportation Research Institute (UMTRI).

The focus of the search was on production teams, leadership and supervision in a team environment, and multi-skilling. The subject of work teams, supervision and leadership are popular in a general sense and narrowing a search to relevant specifics is more difficult than getting responses to key words. However, when it comes to writings about teams and leadership in shipyards, the choices are much more limited. The only useful responses with respect to American shipyards came from previous NSRP studies.

Seventy-nine citations are included in Attachment 2 to this report. For the most part these are articles from journals and magazines. In some cases the citations include excerpts from the text in addition to the abstract.

Two books are cited. One, *Self-Directed Work Teams, The New American Challenge*, is a text on putting teams in place. Of the dozen or so in the UVA library it appeared to be complete and was the easiest to skim. The other book, *Alternatives to Lean Production: Work Organization in the Swedish Auto Industry*, is written by a Swedish engineer about instituting work teams in the Swedish automotive industry. It addresses the team subject from an engineering-production point of view as well from the vantage point of human resources.

Excerpts

The synopsis below is offered without specific attribution for the statements. Instead, 128 excerpts from 27 citations are presented in Attachment 1 under the following headings:

- Implementing Work Teams
- Conditions Required for Work Teams to Function Effectively
- Considerations with Respect to Empowerment of Work Teams
- Training Requirements and Considerations for Work Teams
- Managing, Supervising and Leading Work Teams
- The Role of Compensation and Rewards
- Sustaining Work Teams
- Work Team Processes and Dynamics
- Benefits Derived from Self-Directed Work Teams (SDWT)

Synopsis

Production teams occur in many forms and many degrees of self-direction or management. "Team" as a minimum implies some level of mutual support initiated by the members. From there, teams can accept more and more responsibility until they become nearly autonomous entities within a parent organization responsible for both work completion and support functions. As a general maxim, the greater the autonomy of the work group the greater the benefit to the sponsoring organization. That statement, however, is bounded by a near endless array of "ifs" and conditions. No two circumstances are quite the same and there is no team organization or degree of autonomy that is best for all situations.

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Teams need to be planned to meet specific objectives or solve specific problems. They take time and resources to put in place and more time and resources to become effective. Teams are never a “quick fix.” Because of this, implementing teams takes not only sustained management support, but also an organization with resources and a market position that can both support and benefit from the long term investment in team building.

For teams to be used effectively work processes, support processes and physical facilities may require modification or complete redesign. Human resources and training, although important to team introduction, play a support and advisory role to production and engineering.

The introduction of teams is normally a phased effort with degrees of self-management being sought and achieved in defined steps. The role of the leader mutates as the team accepts more and more responsibility for its own functions. Ultimately, responsibilities of the hierarchical first line supervisor become dispersed within the team and supervision over the team occurs at a higher management level. There is no single set of skills for leading teams since the requirements and responsibilities change as the team’s capability for self-direction increases. If there is a constant, it is communications and negotiation.

Training is a continuing requirement if teams are to mature and remain successful. This training is both in non-technical (foundation) skills and in technical skills.

Workers performing in teams expect some tangible benefit. Workers leading or performing leadership roles within teams expect some additional tangible benefit.

Most of the industrial work team experience cited in the literature reflects a breakout from some form of production line manufacturing. Care must be taken when extrapolating this experience to an environment of shipbuilding and ship repair.

Productivity gains need not be the sole objective for instituting teams. In a workplace that is becoming increasingly more diverse, and in an industry that will have to compete to attract new workers, teams offer an environment that facilitates integration of diverse elements and encourages people who want to have a sense of control in their day-to-day work early in their careers.

Recommended Reading

Anyone in the process of introducing production teams into a shipyard should read:

- NSRP Report 0380 *Design and Implementation of Self-Directed work teams in a pre-erection outfitting Department*. This is a detailed report, with appropriate academic documentation and reflective insights, of the problems, successes and failures of a team introduction that was subsequently withdrawn

Also recommended:

- *Alternatives to Lean Production, Work Organization in the Swedish Auto Industry*. This book gives a good feel for the complex layering of issues associated with moving from a production line to product orientation. It stresses the importance of knowing what problem you are solving by introducing teams and the effect changes in the problem may have while the solution is in progress.
- *Self-Directed Work Teams*. This is a well organized book that presents the process of moving from a traditional hierarchical organization to self-directed work teams in an easy to follow format.

Attachment A-1

Selected Excerpts
from the
Cited Literature

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Attachment 1: Selected Excerpts from the Cited Literature

The excerpts that follow are a series of sentences or short paragraphs removed from original place and arranged to try and give “snapshots” of the current thinking/experience on the selected topics. Most but not all represent positive experience. The excerpts are keyed to a reference list at the end of the appendix.

Implementation of Work Teams	A-1-2
Conditions Required for Work Teams to Function Effectively	A-1-3
Considerations with Respect to Empowerment of Work Teams	A-1-5
Training Requirements and Considerations for Work Teams	A-1-6
Managing, Supervising and Leading Work Teams	A-1-9
The Role of Compensation and Rewards	A-1-10
Sustaining Work Teams	A-1-11
Work Team Processes and Dynamics	A-1-12
Benefits Derived from Self-Directed Work Teams (SDWT)	A-1-13
List of References for Literature Excerpts	A-1-14

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Implementation of Work Teams	Ref
• <i>None of the diversity of a self-directed team -- cross-cultural or otherwise -- can be achieved without laying a solid foundation. Many managers underestimate the time and effort it takes to make a team work.</i>	z.
• Change should be based on diverse research and not just guided by a single authority. Most of the writing on teams and change come from academicians with an economic stake in fostering the process.	z1.
• The author suggests a good deal of advance planning and organizational analysis since SDWTs are not suitable for every organization.	a.
• The degree to which employees accept the team concept is often a reflection of how companies introduce it.	j.
• Applied Extrusion began working on the concept two years before introduction. Even then glitches occurred.	j.
• Describes a series of interventions for implementing self-directed work teams (SDWTs). The interventions are comprised of 6 phases: (1) research of concepts by all organizational members; (2) operational training of employees; (3) introduction of concepts; (4) facilitator training; (5) skill identification and acquisition, which stresses communication, interpersonal relationships, conflict management, and problem-solving techniques; and (6) team implementation.	a.
• Other fundamental tensions arise in the way organizations approach the change process itself. The tension here is between the desire to control the process, make it predictable, and predetermine the outcomes, versus the inherent uncertainty of the process. Organizations should embrace the uncertainty of change instead of trying to control it.	w.
• Management devoted many months to building up trust between team members and management. The trust building phase was a deliberate process and involved slowly increasing both the autonomy and authority of the workers.	k.
• Findings indicate that although teams at the plant improve overall organizational productivity, they experience a definite learning curve and may need both time and training before they develop into productive and cohesive units.	k.
• Management often underestimates the amount of time and effort needed to train successful teams.	z2.
• The company must be willing to stick out the two to five year transition to mature teams.	r1.
• The hard work and expense associated with the self-directed work team concept will discourage many companies.	z.
• The total acceptance of self-directed teams is not going to happen overnight.	j.

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Conditions Required for Work Teams to Function Effectively	Ref
<i>In order for a self-directed work team to succeed, it must be the last step, not the first, in a process that examines and perhaps modifies a company's structure and attitude toward employees and the manner in which employees are challenged and rewarded.</i>	z2.
Before carrying out movement to teams, precise goals should always be established, understood and supported by management and employees.	z2.
Work processes are such that motivated workers can in fact improve quality and productivity.	r1.
A stable or growing market will absorb and reward increased productivity..	r1.
A condition for not using teams: The work processes are so rudimentary that self-directed teams won't bring significant gains in productivity.	r1.
A condition for not using teams: The market conditions are such that increased productivity is unlikely to improve the operation's ability to compete..	r1.
These findings suggest that the first step in creating self managing teams is to get the team designed right.	f.
Structures, policies, and processes must change to support teams and their technologies as they operate within and increasingly across, its boundaries.	w.
Achieving high levels of performance requires the coordinated development of teams, technology, and the overall organizational context.	w.
Management needs to define the parameters within which the team must operate.	s.
Teams are successful because team members know what to expect and have received extensive developmental activity.	l.
The quality of a team's design, our data showed, actually had a larger effect on its level of self-management than coaching, - by a wide margin.	f.
Critical Success Factors 1. Clear, engaging direction, 2. A real team task 3. Rewards for team excellence, 4. Basic material resources 5. Authority to manage work 6. Team goals, 7. Team norms that promote strategic thinking	f.
(1) Is the team's mission clearly defined to each team member? (2) Are the goals clearly defined and achievable by all team members? (3) Will empowerment (decision-making power) be given equally to all team members? (4) Will open and honest communication be allowed among team members? (5) Will each team member be respected and valued for his/her position on the team? (6) Are self-directed work teams effectively rewarded for accomplishments? (7) Have team members received adequate training to effectively complete their job tasks.	b.
Eight behaviors are introduced and briefly described. The behaviors are: Collective Decision Making, Collaboration/Interchangeability, Appreciation of Conflicts/Difficulties, Balance of Participation, Focus, Open Communication, Mutual Support, Team Spirit	i.

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- How a team performs depends on two management factors: performance and process. The performance factor focuses on what results are expected of the team. It also deals with the structure of the team's tasks. The process factor focuses on how the team interacts in meetings and on the maintenance of the team. m.
- Two basic influences (1) How the team is set up and supported, and (2) how the team leader (coach) behaves in his or her day to day interactions with the team. f.
- Teams and groups operate more effectively when their size is limited to the smallest number needed to do the work. When everyone participates, nothing gets done. w.
- Communication between team members and management is essential. Its impossible for teams to thrive if members are unclear about their roles and responsibilities and management's expectations. z.
- Because businesses in the future will compete in a global economy, workers will need management, business and human relations abilities. The Deming model of teamwork and collaborative effort will be the norm. p.
- Ultimately team leaders need to create a culture that supports risk-taking, tolerates occasional failures, and enable all individuals and units involved to learn from experience. w.
- The sheer complexity of multidimensional change is one problem. But more than that, fundamental tensions arise when a team, technology, and organizational development must be coordinated. The expression "empowerment" masks a complex multifaceted concept. w.
- **Many attempts at implementing such teams will fail because the teams will be superimposed on a non-team culture.** z2.

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Considerations with Respect to Empowerment of Work Teams	Ref
• <i>The central principal behind self managing teams is that the teams themselves, rather than managers, take responsibility for their work, monitor their own performance and alter their performance strategies as needed to solve problems and adapt to changing conditions</i>	f.
• In cultivating a high performance work team environment all finalists have established self-directed or empowered teams that make daily decisions on production operations.	h.
• The most common team responsibilities in the finalists are quality assurance and training (100%). Next came handling daily work assignments and safety compliance (96%). Interteam communications was next at 92%.	h.
• The company has self-managed teams with no supervisors, inspectors, time clocks, or union stewards. These teams are responsible for their activities, including quality, cost, production, and people.	q.
• In general, team members are held collectively responsible for performance results, have discretion in distributing tasks and in scheduling work within the team, are able to do more than one job on the team, train one another to develop multiple job skills, assess one another's performance contributions, and are responsible for "total quality" of group products.	t.
• Saturn's self-directed teams make their own job assignments, plan their own work perform equipment maintenance, keep records, obtain supplies and makes selection decisions on new members.	r.
• Workers must grasp personal initiative to make the team work.	p.
• Moreover, management and union leaders are guardians of the belief that making mistakes is permissible, and they are also guardians of the organization's vision and direction.	q.
• Leaders do not have authority over scheduling, hiring, disciplining or firing. These activities are performed by the shift foreman.	s.
• The leaders authority is limited to scheduling the weekly meeting, preparing the agenda and running the meetings.	s.
• However, a misjudgment that Saturn made early in its history was giving too much responsibility too soon to the teams. The company would have been better served if it had released power and responsibility to the teams as they demonstrated the competence to handle them.	q.
• The only area of concern to the organization is that the participants felt they did not have true ownership of their teams; that is, team members were not given full empowerment. According to this study and the review of literature, full empowerment must be given to achieve successful and effective teams. If true empowerment is not given, the team will suffer in other areas of team building, and the organization will lose a valuable tool.	b.

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Training Requirements and Considerations for Work Teams	Ref
<i>In a team model, the responsibility for career development is shared among the individual employees, the team, and the company. Individuals continue to assume primary responsibility for career planning, career goal setting, education, and training. Companies provide job-related training, a setting in which growth and development are valued, and human resource systems that are supportive of career development.</i>	m.
Plants with more training generally report higher levels on performance measurements.	d.
Management should make sure that the training is aligned with specific company objectives rather than just offer basic courses in team building.	z2.
Most common team responsibilities in the finalists are quality assurance and training. (100%).	h.
Training is required to form successful teams. Employees will revert to a hierarchical structure within their teams unless management trains teams differently. In hierarchical groups interpersonal skills, although important were not as crucial because employees acted according to their status in the company.	z2.
Empowerment is not a standalone gambit for plants; it demands other HR initiatives, particularly training. "Plant managers have focused on building employees' skills so that the employees can work in several departments or perform multiple tasks."	d.
With line workers having more responsibility for their own production, scheduling and costs, supervisors will be challenged to see to it that their subordinates have just-in-time training needed to meet the fast-changing technology.	p.
The company shut down manufacturing operations in Middletown the first working day of 1997 to train the 130 employees in team building.	j.
Foreman will be more consumed with providing workers with the training they need to meet the ever-changing and more challenging requirements of production.	p.
Team training will have to be freshened, and new dimensions added, especially to handle knowledge work, to stimulate wider organizational learning, and to address the changing demographic composition of the workforce that will affect the dynamics of group interaction.	v.
Each employee receives a minimum of 92 hours of training annually. Everyone has an individual training plan that includes classroom and on-the-job training. Financial rewards are given for meeting training goals.	r.
At ABB industries each team controls a \$3000 a year training budget.	h.
61 % of plants training more than 40 hours per employee place significant emphasis on cross training. More than 805 of plant executives say they have sought to develop cross-trained work forces.	d.

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- The current study suggests that the type of cross-training necessary to improve team performance may be related to the nature of the task and that cross-training may be effective in allowing teams to coordinate implicitly--that is, without the need to communicate overtly. Results indicate strong support for the efficacy of cross-training as a means to help teams perform well. y.
- Each of the 25 finalists use work teams, cross functional teams and employee cross training. In cultivating a high performance work team environment all finalists have established self-directed or empowered teams that make daily decisions on production operations. h.
- Results indicated that positional rotation was an effective cross-training method for highly interdependent tasks, that cross-trained teams developed a greater degree of interpositional knowledge than did teams that were not cross-trained, and that cross-training was important only under high-workload performance conditions. y.
- A condition for not using teams: Employee learning capacity is so narrow that it dictates far more time in cross training than originally thought. r1.
- Starting now you will have to develop strategies to attract and train workers. Qualified entry-level and skilled workers will need personalized, continuous, just-in-time training to keep up with rapid advances of technology. p.
- The UAW has found added benefits to JIT training. Newly trained workers become experts in a particular technology and can deliver training needed as mentors on the shop floor. p.
- The manufacturing worker of the future will be asked to do things that have never been done before. So a follow-after-me-and-do-as-I-do methodology won't succeed in 2000. p.
- The behavioral dynamics of team membership consist of various interpersonal and communication skills required to build harmonious group relationships. Education in both group process and behavioral skills is important. l.
- Without the acquisition of appropriate team process or behavioral skills even the best-supported team efforts may fail. l.
- Trust building was followed by a lengthy period of training in the use of teams. k.
- To enhance the likelihood of team success organizations must provide specific team-skills to ease the transition. h.
- If we put a worker onto the shop floor who is an excellent welder but who can't get along with people or work in teams, then that welder is obsolete before he hits the manufacturing floor. p.
- From the experience at Mack and at other organizations using self-managed teams, it is evident that continuous training is necessary. 1) Teams need to know management's minimum expectations. 2) Teams need assistance in team management 3) teams need continual reminding of team functioning and 4) Teams need guidance on the technical matters relating to team performance. s.
- Workers desperately need training in gaining cooperation and consensus without using formal power. z2.

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- How much training is enough? Because the teams are self-directed training included such areas as quality control, purchasing, budgeting, consensus decision making and member recruitment. z2.
- The successful worker and foreman in 2000 will be business and computer literate as well as team builders. p.
- How will workers cope with the fast changing technology of manufacturing production? Workers must understand the underlying principles of these machines-- the science, the physics, the mathematics, the machine tool principles. Don't forget, in ten years all of today's manufacturing machines will be primitive. p.
- The original cadre of team leaders receives leadership training. The training was in-house and conducted by the plant manager. It consisted of some discussion of meeting and leadership skills; recording, graphing and charting data; problem analysis and decision making aids. The original leaders received training manuals. There has been little or no follow-up training. s.
- Team leaders need to learn how to manage team operations. Some relevant topics would be: What are typical team processes? What makes teams work? What makes teams effective? What goals will the team be striving to obtain? What is a good team? s.
- One way to gauge the effectiveness of the training as well as make future adjustment is to regularly survey and observe workers on their progress in a team environment. z2.
- Companies should regularly survey their teams for training success and group commitment. z2.
- While some leadership skills may be inherent, some of the technical approaches to team leadership are not. It would make every team leader's task easier if they were given training and assistance on team leadership characteristics and behaviors. s.
- **Managers stated that inadequate training was the biggest road block to the implementation of successful work teams.** 1.

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Managing, Supervising and Leading Work Teams	Ref
• <i>The team leader provides the following guidelines: A clear mission and goals; boundaries for making decisions; team ground rules; a map for access to information within the organization; an understanding of their roles on the team; and clear guidelines for responsibility.</i>	m.
• A key leadership task, therefore, is to create a context and a reward system that supports learning, encouraging innovation and risk taking and reducing the fear of making mistakes and fear of receiving harsh criticism and the anxieties associated with different types of learning.	e.
• Once teams have been designed well, leaders have the latitude to experiment with their own behavior and learn how to coach effectively. Helpful behaviors are: providing rewards and other signals that the team is responsible for managing itself; broadening the team's repertoire of problem solving skills; signaling that individuals (or manager/leader) were responsible for managing the team; intervening in the task in ways that undermined the teams authority.	g.
• Supervisors will be called upon for the special skills it takes to encourage their workers to produce their best work.	p.
• The supervisors will migrate from setting schedules and solving small problems to stepping in only when pressure from peers doesn't work to get problem workers in line.	p.
• All this training will require supervisors become patient coaches who can develop their own staffs to the fullest extent.	p.
• Leadership roles are rotated among team members.	r.
• Teams have appointed leaders selected by management from team membership.	s.
• Many managers, for example refer to a group of individuals as a team but manage them as individuals.	e.
• At a plant installing teams fellow workers began to treat a fellow worker elected team leader as a foreman.	j.
• Those responsible for overseeing such teams often focus on providing too much direction rather than ensuring team based authority or tearing down existing structures without creating or providing enabling team supports or resources.	e.
• From a manager's point of view, the incentive (to implement teams) is not always there. A successful self-directed work team ultimately eliminates the need for a manager.	z.

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The Role of Compensation and Rewards	Ref
• <i>68% of the finalists for America's Best Plants have team based compensation systems.</i>	h.
• Compensation for team members consists of base pay, risk pay and reward pay. Risk pay is money that depends on performance. Reward pay is additional pay on top of that. Base pay and risk pay are based on the prevailing market for similar skills.	r.
• Team efficiency and acceptance of management objectives correlated significantly with group leader's work status.	o.
• Rewarding team leaders is even more difficult. If team leaders receive more compensation than team members the team members view the leader as a supervisor.	s.
• Team leaders receive no additional compensation for their leadership activities.	s.
• Team leaders at Mack often asked to be relieved of the duties of team leader. Some team leaders expressly stated that they did not know why they accepted the additional responsibility and work when they received no tangible rewards.	s.
• A lot of people are absolutely terrified by it said a team leader at Applied Extrusion. Some workers see self-directed teams as a management gimmick. To them team work means more responsibility for the same pay.	l.

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Sustaining Work Teams	Ref
• <i>Barriers to Successful team performance</i> <i>Lack of top management support, insufficient commitment of time and money, and unrealistic expectations for team accomplishment.</i>	l.
• Team efficiency, acceptance of management objectives, average hourly earnings, satisfaction with rewards, and satisfaction with work were positively related to group solidarity, interpersonal confidence, and the social status of the group leader.	o.
• Teaming is not camaraderie or a "motivated" state of mind. An effective team results when a group of workers work well together. This happens only when each member performs competently and can help his or her co-worker. The essential interdependence of a team comes from shared purpose and skill and from language, not feelings.	u.
• One worker stated. "the main part of being a member of a team is to make sure that they (meeting) are happening all the time, consistently. It's something that is just really easy to sweep under the carpet. And once you do that a couple of times, pretty soon you lose the focus of the teams, and you don't have them anymore.	k.
• Implications discussed for designers and facilitators of self-managing teams include the need to be concerned about the adverse effects of age and status; to provide a clear path for job-switching to occur; to minimize status differences in jobs on the team; and to avoid attaching special rewards to a particular job classification.	n.
• One weakness of self-managing teams is that social loafing can sometimes occur within them.	t.
• Lack of focus or motivation can turn teams into social clubs and committees into political battlefields. This can slow the decision making process considerably.	z1.
• The author suggests that more attention will have to be given to interteam relations and to optimizing total system performance as well as work-unit performance.	v.
• Factors that can cause teams to fail include delegation of authority without direction or training, management not following through on promises, vague empowerment, lack of managerial support, and implementing a team approach when management is not empowered.	t.

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Work Team Processes and Dynamics	Ref
• <i>Group solidarity was significantly related to initiating structure and to group centeredness.</i>	o.
• Team facilitation is essential for helping team address process during meetings.	m.
• Team members experience conflicts when they perceive they cannot achieve their goals because of actions or intended actions of someone else.	m.
• The group's response to underproductive group members, in the form of frustration and resignation, correlated negatively with work variables, while punitive response correlated positively and more widely.	o.
• Defending group interests against management negated the group's confidence in the equity of compensation.	o.
• Cross-functional communications are reflected in a circular organizational structure comprised of decision rings, each of which meets weekly.	q.
• There was evidence that neither in-group processes nor communication processes were recognized. Team building was not planned or organized.	s.
• Teams acquire the roles of supervisors and assist individuals by providing feedback on skills, identifying opportunities for growth and development, coaching and mentoring, and serving as training grounds for the attainment of new skills and knowledge areas.	m.

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Benefits Derived from Self-Directed Work Teams (SDWT)	Ref
• <i>Self-managing work teams are used for work motivation, behavior management, social facilitation, and efficacy and productivity reasons.</i>	t.
• This is the report on a general productivity census of industrial plants. One portion deals with work-teams and empowered employees pointing out that productivity Dollar value of output per employee is significantly higher in plants with self-directed work teams that with plants with a traditional structure	d.
• An estimated 45% of Fortune 1000 companies use teams to some degree.	j.
• There are great benefits to have front-line people who have the best information participate in decision making and the resulting increased sense of ownership can have a positive impact on both quality and productivity.	z1.
• It is the team members' responsibility to figure out, on their own, how to work together to achieve a group's goals. In this sense, self-directed teams are unique. The members have a built-in opportunity to build intercultural bridges that some companies are paying diversity consultants thousands to install	z.
• Although the main impetus for implementing teams is to heighten productivity, the human incentive is just as significant. True team members can't help but get closer to one another and as they do, they tend to become like a family.	z.
• Of all types of work teams, the self-directed or self-managed work team is most effective in promoting diversity.	z.

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- | Ref | List of References for Literature Excerpts |
|-----|---|
| a. | <i>A training model for implementing self-directed work teams.</i> Glenn, Ray R.; Organization-Development-Journal.1995 Spr; Vol 13(1) |
| b. | <i>Are self-directed work teams successful and effective tools for today's organization.</i> Arnwine, A.D.; NA |
| d. | <i>Best Practices & Performance: manufacturers tackling leading edge initiatives generally reap the best results</i> Taninecz, George et al.; Industry Week, 12/01/97 pp28 |
| e. | <i>Building Effective Learning Teams: Lessons from the field</i> O'Brien, CharleneD'Andes;. Buono, Anthony F; SAM Advanced Management Journal, Summer 1996 |
| f. | <i>Critical success factors for creating superb self-managing teams</i> Wageman, Ruth; Organizational-Dynamics. v. 26 Summer '97 p. 49-60) |
| h. | <i>Culture-Change Lessons (1996 America's Best Plants finalists)</i> Sheridan, John H.; Industry Week, Vol 246 2/17/97 pp20 |
| i. | <i>Eight behaviors associated with effective teamwork</i> Panitz, Beth Team Players,; ASEE ACSIM (December 1997) |
| j. | <i>Employee Managed Teams heralded by employers, but workers aren't embracing them.</i> Milford, Maureen; Gannet News Service 02/19/97 |
| k. | <i>Give your work teams time and training</i> Cotrill, Melville; Academy of Management Executive. v. 11 Aug 97 p. 87-9 |
| l. | <i>How to get the most from team training</i> Bohlander, George W; McCarthy, Kathy; National-Productivity-Review). 15 Autumn '96 p. 25-35 |
| m. | <i>How to lead and facilitate teams</i> Antonioni, David; Industrial Management, November/December 1996 |
| n. | <i>Identification in the self-managing organization: Characteristics of target and tenure.</i> NA NA |
| m. | <i>Individual growth and team enhancement: moving toward a new model of career development</i> Cianni, Mary; Wnuck, Donna; Academy-of-Management-Executive. v. 11 Feb. '97p. 105-15 |
| o. | <i>Interpersonal relationships and work behavior in small work groups.</i> Bulak, Jozef; Synteza. 1972 Nov; Vol 5(4): 132-139 |
| p. | <i>Plan now for Workforce 2000</i> NA Material Handling Engineering 10/01/95 pp113 |
| q. | <i>Relying on the power of people at Saturn</i> White , Eleanor; National-Productivity-Review. v. 17 Winter '97 p. 5-10 |
| r. | <i>Saturn Teams Working and Profiting</i> Overman, Stephanie HR Magazine, Vol 40, 03/01/1995 pp72 |
| r1. | <i>Self-Directed Work Teams, The New American Challenge</i> , Orsburn, Jack D.et Alia; Business One Irwin, Homewood IL 1990 |

Leading and Sustaining Multi-skilled Work Groups

- s. *Self-managed teams: some operational difficulties* Buckenmeyer, James A.; Industrial-Management. v. 38 Sept./Oct. '96 p. 10-14
- t. *Self-managing work teams* Tang, Thomas Li Ping; Crofford, Amy Beth; Employment-Relations-Today. v. 22 Winter '95-'96 p. 29-39
- u. *Shattering the myths of hourly workers* Chesterton, Joan; Management Review, Vol 84 09/01/95 pp56
- v. *Tapping the power of teams.* Savoie, Ernest J. Tindale, R. Scott (Ed); Heath, Linda (Ed); et-al. (1998); Theory and research on small groups. Social psychological applications to social issues, Vol. 4. (pp. 229-244). New York, NY, USA. Plenum Press. xx, 277 pp
- w. *Teams and Technology: Tensions in Participatory Design* Mankin, Don; G. Cohen, Susan; Bikson, Tora K.; Organizational Dynamics: summer 1997
- y. *The impact of cross-training and workload on team functioning: A replication and extension of initial findings.* Cannon Bowers, Janis A.; Salas, Eduardo; Blickensderfer, Elizabeth; Bowers, Clint A. Human-Factors. 1998 Mar; Vol 40(1): 92-101
- z. *The new spin on corporate work teams* Hayes, Cassandra Black Enterprise 06/30/95 pp PG
- z1. *Think before following the latest management trend//Firms advised not to abandon what's working when making major changes* Mc Arthur, Jerie Star Tribune 04/14/97 pp03D
- z2. *Work-teams: why do they often fail?* Tudor, Thomas R; Trumble, Robert R; Diaz, Johanna J Advanced-Management-Journal. v. 61 Autumn '96 p. 31 40

Attachment A-2

Literature Citings

Attachment 2: Literature Citings

Title	Author(s)	Publication /Publisher	Abstract/Excerpt
25 fine facilities	Taninecz, George	Industry-Week. v. 246 July 21 '97 p. 28+	Details are provided of the finalists of Industry Week's 1997 best plants awards program. Twenty-five finalists, traversing the landscape of industrial production, were chosen from a record number of nominations. Despite the differences among the finalists, they share many highly competitive characteristics: The majority of the plants note that 100 percent of their production workforces participate in empowered natural work teams; each plant exhibits consistently superior product quality; and the plants have an impressive bottom line, primarily due to their best practices. Industry Week will conclude the 1997 awards program by naming the ten winners on October 20. A sidebar presents details of the 25 finalists.
A formula for success	NA	Inc.. v. 18 May '96 p. 111	Michael Dettmers, cofounder of Dettmers Industries in Florida, found that implementing team-based management requires giving workers solid incentives for making teams work and teaching them the necessary skills to earn those incentives. Supplementing his own training program with team coaching, Dettmers launched an approach that rewarded teams With a percentage of sales in return for taking responsibility for hiring, scheduling, customer service, quality, and their own cash flow. The firm, which makes seating and table products for private aircraft, now makes a single product in 80 hours compared with 140 hours three years ago; sales were up 50 percent in 1995, and margins are at roughly 20 percent, or twice the industry standard; and employees now make \$13-\$20 an hour, compared with comparable industry wages of \$11-\$12.
A predictive model of self-managing work team effectiveness.	Cohen, Susan G.; Ledford, Gerald E. Jr.; Spreitzer, Gretchen M.	Human-Relations. 1996 May; Vol 49(5): 643- 676	Presents a theoretically-driven model of self-managing work team effectiveness. Drawing on theoretical perspectives including work design, self-leadership, socio-technical and participative management, 4 categories of variables are theorized to predict self-managing work team effectiveness: group task design, encouraging supervisor behaviors, group characteristics, and employee involvement context. Data from 1,044 employees and 139 managers from self-managing and traditionally managed teams is used to test the model with structural equations modeling. Results show that practitioners trying to design effective self-managing work teams should first enhance the context of employee involvement, which has the strongest relationship to quality of work life and manager ratings of performance. Encouraging supervisory behaviors was (negatively) related only to manager performance ratings for self-managing teams. ((c) 1997 APA/PsycINFO, all rights reserved)

A training model for implementing self-directed work teams.	Ray. R. Glenn	Organization-Development-Journal.1995 Spr; Vol 13(1	Describes a series of interventions for implementing self-directed work teams (SDWTs). The interventions are comprised of 6 phases: (1) research of concepts by all organizational members; (2) operational training of employees; (3) introduction of concepts; (4) facilitator training; (5) skill identification and acquisition, which stresses communication, interpersonal relationships, conflict management, and problem-solving techniques; and (6) team implementation. The author suggests a good deal of advance planning and organizational analysis since SDWTs are not suitable for every organization. ((c) 1997 APA/PsycINFO, all rights reserved) .
Alternatives to Lean Production, Work Organization in the Swedish Auto Industry	Berggren, Christian	ILR Press, Cornell University, Ithaca, N.Y. 1992	This book discusses the introduction of various alternatives to production line building of automobiles, trucks and busses in Sweden. Work teams are a fundamental part of the alternative approaches and indeed the approaches were introduced in an attempt to make automobile production more attractive to the work force rather than in an effort to make production more efficient. The book looks at the process from an engineering point of view not a human resources point of view and highlights the fundamental changes in work flow and support needed to transform production from a line to a team approach where workers are responsible for a wide range of processes. Comparisons are made with motor vehicle team production in Japan and the United States. AN important message from the book is that your business objective for using teams is an important component and should be the driver of the team strategy.
Are self-directed work teams successful and effective tools for today's organization.	Arnwine A.D.	NA	The purpose of this research is to (1) show the effectiveness and success of self-directed work teams within the organization, (2) emphasize the importance of team building in the success of the team, and (3) assist organizations in building self-directed work teams. The researcher used a direct survey and studied the following team building techniques: (1) Is the team's mission clearly defined to each team member. (2) Are the goals clearly defined and achievable by all team members. (3) Will empowerment (decision-making power) be given equally to all team members. (4) Will open and honest communication be allowed among team members. (5) Will each team member be respected and valued for his/her position on the team. (6) Are self-directed work teams effectively rewarded for accomplishments. (7) Have team members received adequate training to effectively complete their job tasks. Upon completion of the literature review and statistical data, and after analyzing the seven areas of team building techniques, it was determined three of the four teams were successful and effective. The only area of concern to the organization is that the participants felt they did not have true ownership of their teams; that is, team members were not given full empowerment. According to this study and the review of literature, full empowerment must be given to achieve successful and effective teams. If true empowerment is not given, the team will suffer in other areas of team building, and the organization will lose a valuable tool.

Best Practices & Performance: manufacturers tackling leading edge initiatives generally reap the best results	Taninecz, George et al.	Industry Week, 12/01/97 pp28	This is the report on a general productivity census of industrial plants. One portion deals with work-teams and empowered employees pointing out that productivity dollar value of output per employee is significantly higher in plants with self-directed work teams than with plants with a traditional structure. Excerpts Empowerment is not a standalone gambit for plants; it demands other HR initiatives, particularly training. "Plant managers have focused on building employees' skills so that the employees can work in several departments or perform multiple tasks." One way to develop an employee's skills is to invest in formal training. Eighty-five percent of plants that have more than 25% of their workers in teams provide each employee with more than eight hours of formal training each year. compared with only 49% of plants with no empowered workers. Plants with more training generally report higher levels on performance measurements. 61 % of plants training more than 40 hours per employee place significant emphasis on cross training. More than 805 of plant executives say they have sought to develop cross-trained work forces.
Building Effective Learning Teams: Lessons from the field	Charlene D'Andes O'Brien, Anthony F. Buono	SAM Advanced Management Journal, Summer 1996	Deals primarily with project teams and with the teams interactive environment. Excerpts Manager Errors Many managers, for example refer to a group of individuals as a team but manage them as individuals. Similarly, those responsible for overseeing such teams often focus on providing too much direction rather than ensuring team based authority or tearing down existing structures without creating or providing enabling team supports or resources. A key leadership task, therefore, is to create a context and a reward system that supports learning, encouraging innovation and risk taking and reducing the fear of making mistakes and fear of receiving harsh criticism and the anxieties associated with different types of learning.

Critical success factors for creating superb self-managing teams	Wageman, Ruth	Organizational-Dynamics. v. 26 Summer '97 p. 49-60)	The factors that are necessary for creating quality self-managing teams that work to their full potential are examined. The conventional wisdom, which states that brilliant coaching results in superb self-managing teams, is proved wrong. Based on conclusions drawn from the observations of 43 self-managing teams in the Xerox customer service division, it is demonstrated that leaders of the most successful teams give first priority to getting the team set up correctly and to arranging organizational support for it and that only after this do they turn to coaching to assist the teams in capitalizing on their favorable performance situation. The seven factors that most strongly differentiate superb from struggling teams are illustrated, and the way in which team leaders can establish these conditions is described.
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Critical success factors for creating superb self-managing teams	Wageman, Ruth	Organizational-Dynamics. v. 26 Summer '97 p. 49-60)	The factors that are necessary for creating quality self-managing teams that work to their full potential are examined. The conventional wisdom, which states that brilliant coaching results in superb self-managing teams, is proved wrong. Based on conclusions drawn from the observations of 43 self-managing teams in the Xerox customer service division, it is demonstrated that leaders of the most successful teams give first priority to getting the team set up correctly and to arranging organizational support for it and that only after this do they turn to coaching to assist the teams in capitalizing on their favorable performance situation. The seven factors that most strongly differentiate superb from struggling teams are illustrated, and the way in which team leaders can establish these conditions is described. Notes on the article The central principal behind self managing teams is that the teams themselves, rather than managers, take responsibility for their work, monitor their own performance and alter their performance strategies as needed to solve problems and adapt to changing conditions. Two basic influences (1) How the team is set up and supported, and (2) how the team leader (coach) behaves in his or her day to day interactions with the team. The quality of a team's design, our data showed, actually had a larger effect on its level of self-management than coaching, - by a wide margin. These findings suggest that the first step in creating self managing teams is to get the team designed right.⁵⁵Critical Success Factors 1. Clear, engaging direction, 2. A real team task 3. Rewards for team excellence, 4. Basic material resources 5. Authority to manage work 6. Team goals, 7. Team norms that promote strategic thinking.&&Coaching&&Once teams have been designed well, leaders have the latitude to experiment with their own behavior and learn how to coach effectively. Helpful behaviors are: providing rewards and other signals that the team is responsible for managing itself; broadening the team's repertoire of problem solving skills; signaling that individuals (or manager/leader) were responsible for managing the team; intervening in the task in ways that undermined the teams authority.&&The role of leaders changes at the various stages in a teams life. Designer, factors one through 5, Midwife Success factors 6 & 7, Coach
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Culture-Change Lessons (1996 America's Best Plants finalists)	Sheridan, John H.	Industry Week, Vol 246 2/17/97 pp20	This article highlights the role of teams in Industry Week's 1996 America's Best Pants Finalists. The article stresses essentials for teams but is not specific with respect to training content. Excerpts Each of the 25 finalists use work teams, cross functional teams and employee cross training. In cultivating a high performance work team environment all finalists have established self-directed or empowered teams that make daily decisions on production operations. Most common team responsibilities in the finalists are quality assurance and training. (100%). Next came were handling daily work assignments, and safety compliance (96%) Interteam communications was next at 92%. At ABB industries each team controls a \$3000 a year training budget. To enhance the likelihood of team success organizations must provide specific team-skills to ease the transition. 68% of the finalists have team based compensation systems
Design and Implementation of Self-Directed work teams in a pre-erection outfitting Department	Susan Salata, Tom Caffo, Dave Webb	NSRP Report 0380 12/1/92	The paper discusses the suitability of work teams in a shipbuilding pre-erection outfitting area. Of special interest is NASSCO's attempt at implementing workteams in their On-Block Department. The paper includes recommendations for more effective design and implementation of work teams. A work team is a group of people who coordinate dependent tasks with one another in order to reach a collective goals. Common characteristics of work teams include: responsibility for completing a relatively whole task; members who possess a variety of skills relevant to the group task; empowerment to make such decisions as methods of work, task schedules and assignment of members to different tasks; responsibility to control and improve work their work process and acquisition of new training where necessary. Designing and implementing work teams is a difficult task. The following factors important to successful implementation are discussed. Vision, Analysis of work structure, Boundary Management, Coaching, Training, and Team Composition,
Diagnostic issues for work teams.	Fisher. Kimball	Howad, Ann; et-al. (1994). Diagnosis for organizational change' Methods and models. The professional practice series. (pp. 239-264). New York, NY, USA: Guilford Press. xvi, 299 pp.	(from the chapter) reviews some of the important questions organizations must consider when determining the structures and strategies of their future / what are teams / how are they different from traditional operations / when are teams needed / what kind of teams are most appropriate in today's work environment / examines the individual and organizational conditions under which teams are most likely to be effective, including the special issues associated with "greenfield" (start-up) and "brownfield" (established) applications / [examine] methods for determining how well teams are functioning / speculates on the place of self-directed work teams in the future ((c) 1997 APA/PsycINFO, all rights reserved) .

Diverse self-directed work teams: Developing strategic initiatives for 21st century organizations.	Hickman. Gill Robinson; Creighton Zollar. Ann	Public-Personnel- Management. 1998 Sum; Vol 27(2): 187- 200.	This article proposes strategic planning and training initiatives that human resource managers and others may use to facilitate the development of diverse self-directed work teams. The proposed approaches are based on an evaluation of collaborative processes among college level group members from diverse backgrounds. Insights gained from the performance of these groups have practical implications for effective functioning of diverse self-directed teams in the workforce. ((c) 1998 APA/PsycINFO, all rights reserved) .
Eight behaviors associated with effective teamwork	Panitz, Beth	Team Players, ASEE Prism (December 1997)	Eight behaviors are introduced and briefly described. The behaviors are: Collective Decision Making, Collaboration/Interchangeability, Appreciation of Conflicts/Difficulties, Balance of Participation, Focus, Open Communication, Mutual Support, Team Spirit
Employee involvement Methods for improving performance area work attitudes.	Cotton. John L.	Newbury Park, CA, USA: Sage Publications, Inc. (1993). x, 310 pp.	Employee Involvement defines, describes, and explains how businesses can improve their performance by cultivating employee interest and dedication. Cotton reviews the history, empirical research, and presents the case for greater employee participation in the workplace. Next, he surveys the variety of employee participation programs . . . with social attention to implementation and the pros and cons of each method. Drawing from organizational behavior, human resource management, and industrial relations, this . . . volume makes an outstanding contribution to the field by comprehensively addressing the wide range of employee participation methods, and consistently referencing what really works in the real world'1 ((c) 1~7 APA/PsycINFO, all rights reserved) .
Employee Managed Teams heralded by employers, but workers aren't embracing them.	Maureen Milford	Gannet News Service 02/19/97	Excerpts An estimated 45% of Fortune 1000 companies use teams to some degree. At a plant installing teams fellow workers began to treat a fellow worker elected team leader as a foreman . "A lot of people are absolutely terrified by it" said a team leader at Applied Extrusion. Some workers see self-directed teams a management gimmick. To them team work means more responsibility for the same pay. The degree to which employees accept the team concept is often a reflection of how companies introduce it. Applied Extrusion began working on the concept two years before introduction. Even then glitches occurred. The company shut down manufacturing operations in Middletown the first working day of 1997 to train the 130 employees in team building. "The total acceptance of self-directed teams is not going to happen overnight"

First Line Managers Role in Employee Relations	R. F. Hansing	Paper presented at Industrial Engineering Conference, Toronto 3/12/98	First Line managers deal with the workforce on a daily basis and are responsible for implementing the companies employee relations programs. These include such things as personnel selection, training, motivation, budgeting, scheduling, material planning and procurement and productivity. All too often the first line supervisor receives no or inadequate training in the exercise of these responsibilities. This is an area with high return for the training investment and an area to which management must pay attention.
From chimneys to cross-functional teams: developing and validating a diagnostic model	Denison, Daniel R. et al.	Academy of Management Journal, Vol 39, 08/01/96 pp1005	This article develops a framework for studying cross-functional teams in organizations that focuses on three domains: organizational context, internal processes and outcome measures. The framework was developed from qualitative data from over 200 individual and group interviews, written descriptions, and team observations. We then operationally defined this model through a set of questionnaire items and validated it through quantitative analysis of data from 565 members of cross-functional teams. The resulting framework provides a base for future study of cross-functional teams. This work deals with product development teams where members are on part time assignments.
Give Your Work Teams Time and Training	Melville Cottrill	Academy of Management Executive; 1997 Vol 11 No. 3	A study was conducted by Rajiv Banker, Joy Field, Roger Schroeder, and Kingshuk Sinha of the University of Minnesota to investigate the effects of both time and training in an electromechanical manufacturing plant operated by a division of a Fortune 500 firm. The researchers used quantitative indicators from the plant's production, quality, personnel, and accounting records, as well as qualitative measures gleaned from interviews, meeting logs, and other company documents to chronicle the transformation of the assembly plant into a team structure. Findings indicate that although teams at the plant improve overall organizational productivity, they experience a definite learning curve and may need both time and training before they develop into productive and cohesive units Excerpts Management devoted many months to building up trust between team members and management. Trust building was followed by a lengthy period of training in the use of teams . The trust building phase was a deliberate process and involved slowly increasing both the autonomy and authority of the workers. One worker stated. "the main part of being a member of a team is to make sure that they (meeting) are happening all the time, consistently. It's something that is just really easy to sweep under the carpet. And once you do that a couple of times, pretty soon you lose the focus of the teams, and you don't have them anymore.

High performance work teams: one firm's approach to team incentive pay	Johnson, Sam T	Compensation-and-Benefits-Review. v. 28 Sept./Oct. '96 p. 47-50	An account of how one prominent New England jewelry manufacturer introduced a successful team incentive pay scheme. The design effort for the team-based incentive plan was headed by a cross-functional design team with representatives from production, human resources, finance, and information systems. The design team developed the incentive pay plan's critical features in seven areas: program eligibility, incentive performance measures, goal-based reference point, incentive award formula, award pool, award distribution criteria, and frequency of payout. The design team also kept the division general manager apprised of the status of the project throughout. The seven areas of the incentive pay plan developed by the team are discussed.
High-performing self-managed work teams: A comparison of theory to practice.:	Weatts, Dale E.; Hyten, Cloyd	Thousand Oaks, CA, USA: Sage Publications, Inc. (1998). xvii, 379 pp.	(from the cover) How is a self-managed work team (SMWT) different from a work group or short-term team? Which problems compel an organization to create a SMWT? What factors explain successful SMWTs? What must the organization do to develop high-performance, cost-effective teams? In this book the authors answer these questions and examine the most widely accepted theories that attempt to explain SMWT performance. They introduce a synthesis of these theories based on 10 case studies from 3 different settings: manufacturing, public service, and health care. The authors lead students and professionals to better understand the theory behind SMWTs as well as the practical aspects of when to use SMWTs to find solutions and how to develop achieving teams. This book will be of interest to practitioners and scholars in management, human resources, organization studies, industrial psychology, public administration, organizational communication, marketing, sociology, and public health. ((c) 1998 APA/PsycINFO, all rights reserved) .

How to get the most from team training	Bohlander, George W ; McCarthy , Kathy	National-Productivity-Review). 15 Autumn '96 p. 25-35	Recent studies reveal that one major cause of team failure is the lack of appropriate training for team members. In a national survey conducted by Business Week' managers said that inadequate training was the biggest obstacle to the implementation of successful work teams. Companies with high-performance teams have learned that education in both process and behavioral skills is important. Process dynamic skills are the operational and organizational tools and techniques employed to complete team tasks. The behavioral dynamics of team membership consist of various interpersonal and communication skills needed to build harmonious group relationships. Attention to each area creates a complete package of team member knowledge. More importantly, when both process and behavioral skills are learned in a logical sequence supporting team development, a synergy that improves team performance is achieved. Ways to develop superior team training programs and the proper sequencing of training content for effective application are discussed, and a model training program is presented. Article contains tables of recommended training topics for both process and behavioral skills Notes from Article Barriers to Successful team performance Lack of top management support, insufficient commitment of time and money, and unrealistic expectations for team accomplishment. Without the acquisition of appropriate team process or behavioral skills even the best-supported team efforts may fail. Mangers stated that inadequate training was the biggest road block to the implementation of successful work teams. Teams are successful because team members know what to expect and have received extensive developmental activity. The behavioral dynamics of team membership consist of various interpersonal and communication skills required to build harmonious group relationships. Education in both group process and behavioral skills is important.
How to lead and facilitate teams	David Antonioni	Industrial Management, November/December 1996	How a team performs depends on two management factors: performance and process. The performance factor focuses on what results are expected of the team. It also deals with the structure of the team's tasks. The process factor focuses on how the team interacts in meeting and on the maintenance of the team. The team leader provides the following guidelines: A clear mission and goals; boundaries for making decisions; team ground rules; a map for access to information within the organization; an understanding of their roles on the team; and clear guidelines fro responsibility. Team facilitation is essential for helping team address process during meetings. Team members experience conflicts when they perceive they cannot achieve their goals because of actions or intended actions of someone else.

Identification in the self-managing organization: Characteristics of target and tenure.	NA	NA	Observed job switching behavior among 54 male workers aged 21-63 yrs] in a Pennsylvania slope mine over a period of 13 mo from June 28, 1974 to July 8, 1975. Ss completed a battery of instruments, including the Attitude Toward Job Switching scale, Job Satisfaction Index, and Index of Job-Switching Behavior. Results indicate that job-switching behavior was associated with a broad spectrum of variables related to the individual and his or her environment. Implications discussed for designers and facilitators of self-managing teams include the need to be concerned about the adverse effects of age and status; to provide a clear path for job-switching to occur; to minimize status differences in jobs on the team; and to avoid attaching special rewards to a particular job classification. ((c) 1997 APA/PsycINFO, all rights reserved)
Impact of Work Teams on Manufacturing Performance: a longitudinal field study	Banker, Rajiv et al.	Academy of Management Journal 08-01-1996 p. 867	We report the results of a longitudinal field study examining the impact of work teams on manufacturing performance. An electromechanical assembly plant was our research site from April 1992 through December of 1993. Work teams were formed on its four production line in August 1992. Our results show that both quality and labor productivity improved over time after formation of the teams. We offer qualitative insights into the functioning of these teams and their evolution over time leading to workforce transformation.
Identification of non-value-added tasks in shipbuilding	Barry M. Schram	NSRP 0375 4/1/93	This project was aimed at utilizing industrial engineering techniques to develop a true, non-accounting-focused definition of non-value-added tasks in the US shipbuilding industry. The definition of non-value-added tasks is detailed. The project recommends the definition of a shipyard's activities at levels of value-added and non-value-added, with attributes itemized. Includes some discussion of role of teams production teams in pricing work at European shipyards.
Individual growth and team enhancement: moving toward a new model of career development	Cianni, Mary; Wnuck, Donna	Academy-of-Management-Executive. v. 11 Feb. '97p. 105-15	Part of a special section on special challenges of careers in the 21st century. As human resource functions evolve to accommodate work teams, a convincing case can be made for career development systems that complement emerging team-based performance evaluation, compensation, reward, and training systems. In a team model, the responsibility for career development is shared among the individual employees, the team, and the company. Individuals continue to assume primary responsibility for career planning, career goal setting, education, and training. Companies provide job-related training, a setting in which growth and development are valued, and human resource systems that are supportive of career development. Teams acquire the roles of supervisors and assist individuals by providing feedback on skills, identifying opportunities for growth and development, coaching and mentoring, and serving as training grounds for the attainment of new skills and knowledge areas. A model that incorporates individual development and the growth of the team is proposed.

Interpersonal relationships and work behavior in small work groups.	Bulak, Jozef	Synteza. 1972 Nov; Vol 5(4): 132-139	Conducted a correctional study of work motivation of 200 construction workers working in 32 teams. Team efficiency, acceptance of management objectives, average hourly earnings, satisfaction with rewards, and satisfaction with work were positively related to group solidarity, interpersonal confidence, and the social status of the group leader. Team efficiency and acceptance of management objectives correlated significantly with group leader's work status. The group's response to underproductive group members, in the form of frustration and resignation, correlated negatively with work variables, while punitive response correlated positively and more widely. Group solidarity was significantly related to initiating structure and to group centeredness. Defending group interests against management negated the group's confidence in the equity of compensation. Recommendations for small group leadership are presented. (English, Russian, French & German summaries) ((c) 1997 APA/PsycINFO, all rights reserved) .
Knowledge worker team effectiveness: the role of autonomy, interdependence, team development, and contextual support variables	Janz, Brian D; Colquitt, Jason A; Noe, Raymond A	Personnel-Psychology. v. 50 Winter '97 p. 877-904	This study investigated how autonomy, interdependence, and team development, along with process and contextual support variables, were related to the effectiveness of teams of "knowledge workers. " The sample included 231 knowledge workers from 27 work teams. Team members completed surveys measuring the design, process, and contextual factors. Effectiveness measures included multiple key stakeholder evaluations of team performance and self-report measures of attitudinal outcomes. The results suggest that interactions among design, process, and contextual support factors have important implications for team effectiveness. In particular, the positive relationship between team autonomy and team job motivation was reduced as teams worked under more interdependent conditions. This interaction effect also varied across the types of autonomy (e. g., planning-related, product-related, and people-related) the team was given. Results also demonstrated that the relationship between job motivation and team process behaviors (helping, sharing, and innovating) was more positive in teams who were developmentally mature. Process behaviors were positively related to effectiveness, but those relationships became more positive in the presence of certain contextual factors (high-quality goals and efficient information transmission), and less positive in the presence of others (feedback and time pressure). Future research needs and practical implications of these results are discussed. Reprinted by permission of the publisher.
Leadership for self-managing work teams: A typology and integrative model.	Stewart, Greg L.; Manz, Charles C.	Human-Relations. 1995 Jul; Vol 48(7): 747-770	Examines regularities that explain relationships among leadership, team development and performance, and characteristics of the leader and the organizational setting. These relationships are based on the positivist paradigm. The article discusses the differences between the positivistic and the interpretive view and develops a typology explaining the different approaches to team leadership (overpowering, powerless, power building, and empowered). A theoretical model illustrates individual and organizational antecedents of team leader behavior. ((c) 1997 APA/PsycINFO, all rights reserved) .

Leading workers to lead themselves: The external leadership of self-managing work teams.	Manz, Charles C.; Sims, Henry P. Jr.	Glaser, Rollin (Ed); et-al. (1992). Classic readings in self-managing teamwork 20 of the most important articles. (pp. 276-307). King of Prussia, PA, USA: Organization Design and Development, Inc. xviii, 492	(from the chapter) identify specific self-management-team leader behaviors, specifically behaviors that facilitate effective employee self-management / develop preliminary measures of these behaviors / [explore] what behaviors are used by leaders (i.e., coordinators) within the self-managing work group system / interested in the question . . . what is the relationship between specific leader behaviors (what coordinators do) and overall leader effectiveness. A questionnaire was administered to 276 . . . hourly [manufacturing plant] employees, which included elected
Motivation in teams.	Weaver, Jeanne L.; Bowers, Clint A.; Salas, Eduardo; Cannon Bowers, Janis A.	Beyerlein, Michael M. (Ed); Johnson, Douglas A. (Ed); et-al. (1997). Advances in interdisciplinary studies of work teams, Vol. 4. (pp. 167-191). Greenwich, CT, USA: Jai Press, Inc. xviii, 303 pp.	(from the chapter) Increased dependence on teams in organizations and other work settings necessitates the consideration of the motivation construct as it applies to teams. However, we must first consider the manner in which team motivation differs from individual motivation and determine which mechanisms might explain motivation at the team level. The current paper contributes in this regard by offering a definition of team motivation, discussing the proposed mechanism in light of several recent empirical studies, and proposing several research and training implications suggested by the team motivation construct as conceptualized here. Specifically, team motivation is considered here as consisting of 4 components: taskwork ability, taskwork motivation, teamwork ability, and teamwork motivation. The discussion emphasizes the importance of congruence among these dimensions in order to maximize performance outcomes. ((c) 1998 APA/PsycINFO, all rights reserved)
Motivational basis of lean production work: Integrating people with the organisation beyond role specifications.	Wakabayashi, Mitsuru	Applied-Psychology:- An-International-Review. 1996 Apr; Vol 45(2): 135-138	Comments on K Taira's (see record 83:32429) exploration of the compatibility of human resource management (HRM), industrial relations, and work process engineering under mass production and lean production, and responses to the Japanese model of the latter by American and European firms. Discussion includes (1) the nature of HRM under the lean production system, (2) the motivational basis for work in lean production, and (3) emerging innovative and spontaneous team actions in the transplant work culture of Japanese lean manufacturers in the US. ((c) 1997 APA/PsycINFO, all rights reserved)

Multi-skilled work teams in a zone construction environment	NASSCO; Dan Stravinski	NSRP 0226 12/1/85	NSRP 1985 Ship Production Symposium Proceedings. Volume I, Paper No. 15. In order to address the problems inherent in a trade oriented production organization, and to develop a work force which will perform efficiently and effectively in a zone construction environment, NASSCO proposed to develop semiautonomous, multi-skilled work teams. The teams are made up of a stable membership, are well trained, have multiple skills, and have some degree of control over decisions necessary to complete work in their areas. One supervisor, rather than individual trade supervisors is responsible for completion of work within the area. Employee participation is encouraged to the greatest possible extent. Although ultimate authority for decisions within the work area remains with the supervisor, it is envisioned that the traditional role of supervision will shift in emphasis from "boss" to facilitator acting as liaison between the work team and other parts of the organization.
Multi-skilled self-managing work teams in a zone construction environment ≈	NASSCO; Dan Stravinski	NSRP 0281, 8/1/87	NSRP 1987 Ship Production Symposium Proceedings. Paper No. 32. This report documents National Steel and Shipbuilding Company's (NASSCO's) efforts to develop self-managing, multi-skilled work teams. The objective of this effort was to develop and test a new production work force organization corresponding to the technical requirements of product-oriented work breakdown structure, otherwise known as zone construction.
New Self-Directed Work Teams: Mastering the Challenge, Second Edition	Moran L.; Musselwhite E.; Orsburn J.; Zenger J.		Self-directed work teams have revolutionized the global workforce. The authors, while maintaining the practical, interactive format that made the first edition the classic reference in the field, bring their research up to date with the latest trends, examples, and case studies, such as New measurement systems that foster team growth; The expanding role of information technology; and Flexible compensation systems and greater stakeholder empowerment.
Performance measurement tools for enhancing team decision-making training.	Johnston, Joan Hall; Smith Jentsch, Kimberly A.; Cannon Bowers, Janis A.	Brannick, Michael T. (Ed); Salas, Eduardo (Ed); et-al. (1997). Team performance assessment and measurement: Theory, methods, and applications. Series in applied psychology. (pp. 311-327). Mahwah, NJ, USA: Lawrence Erlbaum Associates, Inc., Publishers. xii, 370 pp.	(from the chapter) In this chapter, the authors employ the conceptual framework of J. Cannon-Bowers and E. Salas (1997) as a means to organize, describe, and provide examples of an event-based strategy for building individual and team performance measures to support training. They begin by outlining a set of theoretical underpinnings for measuring team decision-making performance. Next, they explain their rationale for generating event-based strategy for assessing teams that operate in high performance environments. In doing so, they describe the development of process and outcome measurement tools, and their application to a specific team training application. Finally, they discuss the implications of this approach for enhancing team decision-making performance, and summarize the major guidelines that can be drawn from this work. ((c) 1997 APA/PsycINFO, all rights reserved)

Plan now for Workforce 2000	NA	Material Handling Engineering 10/01/95 pp113	This article looks to the characteristics of the workforce in 2000+ considering both composition, skills and training. It addresses changes in the role of first line supervisors but does not discuss required leadership skills in any depth. Excerpts Starting now you will have to develop strategies to attract and train workers. Qualified entry-level and skilled workers will need personalized, continuous, just-in-time training to keep up with rapid advances of technology. Because businesses in the future will compete in a global economy, workers will need management, business and human relations abilities. The Deming model of teamwork and collaborative effort will be the norm. If we put a worker onto the shop floor who is an excellent welder but who can't get along with people or work in teams, then that welder is obsolete before he hits the manufacturing floor. Workers must grasp personal initiative to make the team work. All this training will require supervisors become patient coaches who can develop their own staffs to the fullest extent. The manufacturing worker of the future will be asked to do things that have never been done before. So a follow-after me and do-as-I-do methodology won't succeed in 2000. The UAW has found added benefits to JIT training. Newly trained workers become experts in a particular technology and can deliver training needed as mentors on the shop floor. With line workers having more responsibility for their own production, scheduling and costs, supervisors will be challenged to see to it that their subordinates have just-in-time training needed to meet the fast-changing technology. Supervisors will be called upon for the special skills it takes to encourage their workers to produce their best work. The supervisors will migrate from setting schedules and solving small problems to stepping in only when pressure from peers doesn't work to get problem workers in line. The successful worker and foreman in 2000 will be business and computer literate as well as team builders. Increasingly it will be a partnership of supervisors and workers that will get the job done. Foreman will be more consumed with providing workers with the training they need to meet the ever-changing and more challenging requirements of production. How will workers cope with the fast changing technology of manufacturing production? Workers must understand the underlying principles of these machines--the science, the physics, the mathematics, the machine tool principles. Don't forget, in ten years all of todies manufacturing machines will be primitive.
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Power and the production of knowledge: Collective team learning in work organizations.	Brooks , Ann K.	Human-Resource-Development-Quarterly. 1994 Fal; Vol 5(3): 213-235	Used qualitative case study data to identify work organization team-learning tasks, and to examine how organizational structures make it difficult for low-power team members to carry out those tasks. Four teams in the research-and-development unit of a large high-technology new product manufacturing firm were studied over a 1-yr period. Interviews and observations focused on identifying difficulties the teams encountered in producing new knowledge collectively, and on finding out how these difficulties might be related to organizational structures and policies. Data collection from multiple sources continued over a 4-mo period, and data were sorted, coded, and interpreted in an ongoing process, resulting in a narrative story for each of the 4 teams. Analysis shows that collective team learning appears to encompass a process alternating between reflective and active work, and that differences in power among employees are a critical lever affecting the output of knowledge by teams. This analysis generated 4 grounded propositions on collective team-learning, followed by conclusions about how the current cultural and historical context in the US interacts to produce the team-learning experiences. ((c) 1998 APA/PsycINFO, all rights reserved)
Preparing entry-level workers for a team-based organization	NA	Getting-Results for the-Hands-on-Manager. v. 42 Oct. '97 p. 1	Several steps are presented that managers can take both before and after hiring to ensure that entry-level workers perform well in a team situation. Managers should make smart hiring choices from the start by analyzing a candidate's extracurricular activities, work experience, and previous job responsibilities from a team perspective; getting in touch with former supervisors, club sponsors, teachers, and other individuals for information about the candidate's ability to relate to others; and considering including current team members in the hiring process. In addition, managers should stress the importance of teamwork after hiring by emphasizing the job's team-related duties and responsibilities; flowcharting responsibilities both within and among work teams; considering a rotating orientation program involving each team member; and ensuring that the department's vocabulary is team-oriented.
Profile: Corning Incorporated, Blacksburg, Virginia	NA	Training-and-Development-(Alexandria,-Va.). v. 50 Oct. '96 p. 31+	Part of a special section on the power of high performance work systems (HPWSs). Under the guidance of Norm Garrity, the then senior vice president of manufacturing and engineering, Corning Inc. moved to HPWSs in 1987 when it decided to reopen its Blacksburg plant with fewer levels of managers and extensively trained self-managed teams. The work was structured so that employees could work with more flexibility and less supervision; a production process was introduced with 50 percent fewer steps than another plant; and job classifications were reduced to two so that production workers could rotate jobs as they learned new skills. The writer discusses the start-up, evolution and progress of the program at the Blacksburg plant and outlines the plans that have been developed to implement HPWSs at all Corning plants.

Relying on the power of people at Saturn	White , Eleanor	National-Productivity-Review. v. 17 Winter '97 p. 5-10	Since it was established, the Saturn Corp. has acted as an example of what partnership, teamwork and principle-centered leadership can accomplish in an organization that thoroughly comprehends and tries to apply those concepts. The company has self-managed teams with no supervisors, inspectors, time clocks, or union stewards. These teams are responsible for their activities, including quality, cost, production, and people. Cross-functional communications are reflected in a circular organizational structure comprised of decision rings, each of which meets weekly. Moreover, management and union leaders are guardians of the belief that making mistakes is permissible, and they are also guardians of the organization's vision and direction. However, a misjudgment that Saturn made early in its history was giving too much responsibility too soon to the teams. The company would have been better served if it had released power and responsibility to the teams as they demonstrated the competence to handle them Dedicated to quality and productivity, the company believes that meeting the requirements of people--customers, suppliers, team members, retailers, and the community--is the sole path to long-term growth and profitability in a global economy.
Research on leadership and group decision in Japanese organisations.	Misurni, Jyuji	Applied-Psychology:-An-International-Review. 1989 Oct; Vol 38(4): 321-336	Summarizes more than 20 yrs of field and laboratory research on leadership in Japan, based on the performance-maintenance (PM) leadership theory in which group functions can be divided into (1) goal achievement or problem solving (performance) and (2) self-preservation (maintenance). A leader evaluated high in P and M functions (PM-type leader) by immediate followers was more effective than those high in only 1 of the 2 functions (P-type and M-type leaders) or low on both of them. The latter type of leader was the least effective. Three studies of group decision conducted in different Japanese plants are also described, in which leadership measurement, feedback, and leadership training were carried out while K. Lewin's (1958) group decision procedures were introduced. The number of traffic and work accidents, which characterized these plants, decreased significantly. (French abstract) ((c) 1997 APA/PsycINFO, all rights reserved)
Rotating leadership at Harley-Davidson: from hierarchy to interdependence	Fessler, Clyde	Strategy-and-Leadership. v. 25 July/Aug. '97 p. 42-3	The vice president for business development at Milwaukee, Wisconsin-based Harley-Davidson Motor Co. explains how the company has reorganized to meet future competitive challenges by decentralizing decision making and facilitating cross-functional collaboration. Harley-Davidson has developed a flatter organization with groupings of functional leaders who work together to offer senior leadership and direction. The firm believes that this process will provide better support for individual growth and excellence, create interdependence and cross-functional cooperation as a norm, and position the firm to continue to meet whatever challenges arise. In the new organization, the company has been separated into three broad, functional areas called Circles, each of which operates as an empowered work team and consists of the leaders representing the functions within it. A diagram depicts the overlapping of Circles at Harley-Davidson. The visionary role of company president and CEO Richard Teerlink is discussed briefly.

Saturn Teams Working and Profiting	Stephanie Overman	HR Magazine, Vol 40, 03/01/1995 pp72	Saturn's self-directed teams make their own job assignments, plan their own work perform equipment maintenance, keep records, obtain supplies and makes selection decisions on new members. Leadership roles are rotated among team members. Each employee receives a minimum of 92 hours of training annually. Everyone has an individual training plan that includes classroom and on-the-job training. Financial rewards are given for meeting training goals. Compensation for team members consists of base pay, risk pay and reward pay. Risk pay is money that depends on performance. Reward pay is additional pay on top of that. Base pay and risk pay are based on the prevailing market for similar skills
Self-Directed Work Teams. (Latest citations from the ABI/Inform Database).	NA	Published Search	The bibliography contains citations concerning self-managed work teams, which are small autonomous work groups that take responsibility for a product, project, or service. Citations discuss the benefits of self-directed work teams, including increased productivity, reduced absenteeism, and increased employee morale and satisfaction. Recommendations for implementation, structure, and success of work teams are included.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)
Self-Directed Work Teams, The New American Challenge	Orsburn, Jack D.et Alia	Business One Irwin, Homewood IL 1990	This is a textbook on establishing team and in some detail addresses procedures and decision points in implementing work teams. Excerpts <u>Selected conditions for using teams</u> Work processes are such that motivated workers can in fact improve quality and productivity A stable or growing market will absorb and reward increased productivity The company is willing to stick out the two to five year transition to mature teams <u>Selected conditions for not using teams</u> Employee learning capacity is so narrow that it dictates far more time in cross-training than originally thought The work processes are so rudimentary that self-directed teams won't bring significant gains in productivity The market conditions are such that increased productivity is unlikely to improve the operation's ability to compete.

Self-Managed Teams, Some Operational Difficulties	Buckenmeyer, James A.	Industrial Management, v. 38 September/October 1996	More research needs to be carried out to ascertain the problems associated with utilizing self-managed teams, even in organizations where the approach is working well. Research with control groups needs to be conducted to determine the best possible method of addressing these problems. Individuals responsible for the effective use of self-managed teams should not have to rely on trial-and-error methods to solve these difficulties. Instead, these individuals should have some evidence-based solutions to help them. Furthermore, the institution and use of effective teams are not self-sustaining tasks. It takes considerable, continuous effort on management's part to construct and sustain good team performance. Observations of the use of self-managed teams by the Mack Manufacturing Co., which supplies parts to American, German, and Japanese automotive air-conditioner manufacturers, and by several other companies are provided. Excerpts Leaders- Teams have appointed leaders selected by management from among team membership. Team leaders receive no additional compensation for their leadership activities. Leaders do not have authority over scheduling, hiring, discipline or firing. These activities are performed by shift foremen. Leader Training- The original cadre of team leaders received leadership training. The training was in-house, conducted by the plant manager. It consisted of some discussion of meeting and leadership skills; recording, charting and graphing of data; and problem analysis and decision making aids. Team leaders had difficulty accounting for variability between groups. Rewarding team leaders is even more difficult. If the team leader receives more compensation than team members the team views the team leader as a supervisor or designated team leader. Team leaders often asked to be relieved of their duties of team leader. Some team leaders expressly stated that they did not know why they accepted the additional responsibility and work when they received no tangible rewards. From the experience at Mack and at other organizations using self managed teams, it is evident that continuous training is necessary. 1. Teams need to know management's minimum expectations; 2. Teams need assistance in team management; 3 Teams need continual reminders of team functions and; 4. Teams need guidance on technical matters related to improved team performance. Management needs to define the parameters within which a team must operate. While some leadership skills may be inherent, some of the techniques and approached to team leadership are not. It would make every leaders tasks easier if they were given training and assistance on team leadership characteristics and behaviors. Team leaders need to learn how to manage team operations. Some relevant topics would be. What are typical team processes? What makes teams work? What makes teams effective? What goals will the team be striving to obtain? What is a good team?
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Self-managed work teams approach: creative management tool or a fad?	Elmuti, Dean	Management-Decision. v. 35 no3 '97 p. 233-9	The introduction of employee empowerment through a self-managed work teams program into an organization can be viewed as a strategy to increase motivation, quality, productivity, and customer satisfaction and to maintain high performance. Self-managed teams act as the primary building blocks of the organization. However, they are not simple or easy to create. develop, and support, and firms need to realize that it takes time, training, and resources to implement teams and reap the rewards. They require the introduction of multifaceted changes in personal relationships and the entire organizational hierarchy.
Self-managing work teams	Tang, Thomas Li Ping; Crofford, Amy Beth	Employment-Relations-Today. v. 22 Winter '95-'96 p. 29-39	Self-work teams, their major characteristics, the reasons why they emerged in business organizations, and their strengths and weaknesses are discussed. In general, team members are held collectively responsible for performance results, have discretion in distributing tasks and in scheduling work within the team, are able to do more than one job on the team, train one another to develop multiple job skills, assess one another's performance contributions, and are responsible for "total quality" of group products. Self-managing work teams are used for work motivation, behavior management, social facilitation, and efficacy and productivity reasons. One weakness of self-managing teams is that social loafing can sometimes occur within them. Other factors that can cause teams to fail include delegation of authority without direction or training, management not following through on promises, vague empowerment, lack of managerial support, and implementing a team approach when management is not empowered. Guidelines for implementing successful work teams are provided, and several examples of team programs in facilities based in the U.S. are discussed.
Shattering the myths of hourly workers	Chesterton, Joan	Management Review, Vol 84 09/01/95 pp56	This paper is directed to informing an academic instructor about the difference between teaching factory workers and college students and to better appreciate the capabilities and work ethic to be found in an industrial environment. Excerpt Teaming is not camaraderie or a "motivated" state of mind. An effective team results when a group of workers work well together. This happens only when each member performs competently and can help his or her co-worker. The essential interdependence of a team comes from shared purpose and skill and from language, not feelings.
Situation awareness in team performance: Implications for measurement and training.	Salas, Eduardo; Prince, Carolyn; Baker, David P.; Shrestha, Lisa	Human-Factors. 1995 Mar; Vol 37(1): 123-136	Reviews the processes and behaviors by which situation awareness (SA) may be established in teams. Team SA involves 2 critical but poorly understood abstractions: individual SA and team processes (i.e., teamwork behaviors and cognitive processes that facilitate team process). The team model is also dynamic. Although the interrelationships of the tasks are considered an input variable, the team processes can modify those interrelationships. This can be done directly (e.g. the team leader reassigns duties) or indirectly (e.g., team members provide backup to one another). A framework is provided for conceptualizing team SA, and implications are generated for measurement and training. ((c) 1997 APA/PsycINFO, all rights reserved) .

Sustaining high performance through self-managed work teams	Elmuti, Dean	Industrial-Management. t. 38 Mar./Apr. '96 p. 46+	The introduction of employee empowerment through self-managed teams can improve competitiveness, but management must be sold on the idea of employee empowerment and develop a management strategy that fully supports the empowerment program. The benefits and limitations of self-managed team approaches to organization are discussed. The factors that may lead to either a failed or successful implementation of self-managed team programs are examined, as are the implications of the successful introduction and implementation of such teams.
Tapping the power of teams.	Savoie, Ernest J.	Tindale, R. Scott (Ed); Heath, Linda (Ed); et-al. (1998). Theory and research on small groups. Social psychological applications to social issues, Vol. 4. (pp. 229-244). New York, NY, USA. Plenum Press. xx, 277 pp	(from the chapter) The use of teams and of forms of employee involvement has mushroomed in American enterprises in the past 15 yrs. Teams, today, come in many sizes and shapes and do many kinds of work. There is a growing emphasis on knowledge-work teams, where work is more varied, has broader boundaries, and often requires the participation of many specialties. This chapter is divided into 3 parts. Part 1 reviews the reported extent of the use of teams and employee involvement in American organizations. Part 2 reviews the Ford experience. Ford has a reputation for best practices in these areas and is frequently benchmarked. Although Ford is not a microcosm of other organizations, some of its experiences may be instructive for others. Part 3 offers some broad observations about the future uses of teams. The author suggests that more attention will have to be given to inter-team relations and to optimizing total system performance as well as work-unit performance. Team training will have to be freshened, and new dimensions added, especially to handle knowledge work, to stimulate wider organizational learning, and to address the changing demographic composition of the workforce that will affect the dynamics of group interaction. ((c) 1998 APA/PsycINFO, all rights reserved)
Team discipline: Put performance on the line.	Barkman, Donald F.	Personnel-Journal. 1987 Mar; Vol 66(3): 58-63	Discusses the concept and applications of team discipline, in which positive help to a problem performer is encouraged over punitive actions. In team discipline, the obligations to the company, to the team, and to the individual are considered when dealing with a situation. The role of the team leader in counseling, making clarifications and suggestions for improved behavior, and acting diplomatically is described. A 6-step process for performance improvement that can be implemented with team discipline is outlined. (O ref) ((c) 1997 APA/PsycINFO, all rights reserved)

Team Leading. Supervising: Principles and Practice of Supervision. The Choice Series #14. A Self Learning Opportunity.	Tait, William	NA	This learning unit on team leading is one in the Choice Series, a self-learning development program for supervisors. Purpose stated for the approximately eight-hour-long unit is to develop the supervisor's knowledge of team leading and to enable the supervisor to select a leadership style appropriate to the circumstances. An introduction provides an overview of the unit and lists unit objectives. Parts A through D contain informative material, activities and answer keys self-checks and answer keys, and a summary. Topics include team leading at work, team leading as an activity, leadership qualities, and styles of leadership. Part E contains performance checks--an end check to be completed alone and a tutor check and work-based project. Part F consists of a brief unit review, extensions (print sources of additional information, such as units or sections in books), and a list of references. (YLB) .
Team-member exchange under team and traditional management: A naturally occurring quasi-experiment.	Seers, Anson; Petty, M. M.; Cashman, James F.	Group-and-Organization-Management. 1995 Mar; Vol 20(1) 1 R-3R	Assessed the quality of exchange relationships between work teams and their members for 103 manufacturing workers (aged <41 yrs). Higher levels of team-member exchange quality, as well as of cohesiveness and general job satisfaction, were reported by members of teams expected to be self-managing in contrast to teams expected to function as traditional work groups. Gains in departmental production efficiency were also found to be related to the work unit's average change in team-member exchange over time. ((c) 1997 APA/PsycINFO, all rights reserved)
Tenneco Automotive	Hasek, Glenn	Industry-Week. v. 246 Oct. 20 '97 p. 67+	Part of a special section on the ten winners in Industry Week's 1997 search for America's Best Plants examines the strategies that have brought success to Tenneco Automotive, Paragould, Arkansas. Tenneco Automotive, which produces 16.4 million shocks and struts each year, has become a model of manufacturing for its best practices in the areas of technology, teamwork, education, customer satisfaction, safety, and environmental protection. The company's strong workforce and the teams that have been established there have pushed the improvements at the plant. These teams address such areas as best methods, process improvement, kaizen approaches, emergency response, preventive maintenance auditing, new-product-introduction systems, problem elimination using people, cost reduction, and environment, health, and safety. Of the production workforce, 29.4 percent are involved in self-directed work teams and 85.7 percent in empowered work teams. The impressive results that have been achieved at the plant as a consequence of team efforts are discussed.

Teams and Technology: Tensions in Participatory Design	Don Mankin, Susan G. Cohen, Tora K Bikson	Organizational Dynamics; Summer 1997	Paper is directed toward teams in an information technology environment, however there are some observations that appear to be generalizable to any teams. Excerpts Structures, policies and processes must change to support teams and their technologies as they operate within, and increasingly across, its boundaries. Achieving high levels of performance requires the coordinated development of teams, technology, and the overall organizational contest. The sheer complexity of multidimensional change is one problem. But more than that, fundamental tensions arise when a team, technology, and organizational development must be coordinated. The expression "empowerment" masks a complex multifaceted concept. Teams and groups operate more effectively when their size is limited to the smallest number needed to do the work. When everyone participates, nothing gets done. Other fundamental tensions arise in the way organizations approach the change process itself. The tension here is between the desire to control the process, make it predictable, and predetermine the outcomes, versus the inherent uncertainty of the process. Organizations should embrace the uncertainty of change instead of trying to control it. Change should be implemented in a way that enables the change agents to learn from the consequences of their actions. If the results diverge significantly they can modify their plans. If the results are successful, they can apply what they learned in subsequent steps. Ultimately team leaders need to create a culture that supports risk-taking, tolerates occasional failures, and enable all individuals and units involved to learn from experience.
The empowering role of self-directed work teams in the quality focused organization.	Robbins. Tina L; Fredendall Lawrence D.	Organization-Development-Journal.1995 Spr; Vol 13(1): 33-42.	Examines self-directed work teams (SDWTs) as a means of employee empowerment. A model is presented that explains how SDWTs can lead to empowerment and, in turn, improve quality. SDWTs are suggested to have a direct positive impact on task assessments; SDWTs enhance an employee's sense of competence since other team members can compensate for an individual's areas of deficiency. Employee perceptions of the impact and meaningfulness of their work are also enhanced by team processes. ((c) 1997 APA/PsycINFO

The impact of cross-training and workload on team functioning: A replication and extension of initial findings.	Cannon Bowers, Janis A.; Salas, Eduardo; Blickensderfer, Elizabeth; Bowers, Clint A.	Human-Factors. 1998 Mar; Vol 40(1): 92-101	Although previous research has shown that cross-training team members improves team performance, a number of questions remain concerning the nature of cross-training. The current study provides an extension of previous cross-training research by investigating 2 theoretical issues: the nature of cross-training and the joint impact of cross-training and workload on team functioning. The study examined 40 3-person teams (120 US Navy recruits and trainees) performing a simulated radar task. Results indicated that positional rotation was an effective cross-training method for highly interdependent tasks, that cross-trained teams developed a greater degree of interpositional knowledge than did teams that were not cross-trained, and that cross-training was important only under high-workload performance conditions. The current study suggests that the type of cross-training necessary to improve team performance may be related to the nature of the task and that cross-training may be effective in allowing teams to coordinate implicitly--that is, without the need to communicate overtly. Results indicate strong support for the efficacy of cross-training as a means to help teams perform well. Potential applications of this research include training for military, medical, and aviation teams. ((c) 1998 APA/PsycINFO, all rights reserved)
The learning curve at Volvo.	Bernstein, Paul	Glaser, Rollin (Ed); et-al. (1992). Classic readings in self-managing teamwork: 20 of the most important articles. (pp. 354-372). King of Prussia, PA, USA: Organization Design and Development, Inc. xviii, 492 pp	(from the book) [suggests that] Volvo is one of the best known organizations for its development of socio-technical systems and work teams / describes 2 broad states of organization change and development at Volvo / these stages spanned 20 yrs and include both an experimental period where work improvement projects were individually initiated by managers in various plants and a strategy period where an attempt was made to develop a systemwide coherence and a philosophical base / the ultimate goal at Volvo was to replace assembly lines with stationary work sites staffed by multi-skilled teams / [the chapter is interesting for its] description of the variety and depth of organizational learning required for the transition to self-managing teams ((c) 1997 APA/PsycINFO, all rights reserved)
The management of strategies for internal labour market flexibility.	Mueller, Walter S.; Cordery, John L.	Hosking, Dian Marie (Ed); Anderson, Neil (Ed); et-al. (1992). Organizational change and innovation: Psychological perspectives and practices in Europe. (pp. 208-221). London, England UK: Routledge. xiii,314pp.	(from the chapter) reports on a longitudinal study of the management of multi-skilled self-regulating teams within a greenfield minerals processing plant / focuses on a combined skills development and work design initiative, which was intended to promote internal labour market flexibility while also promoting employees' quality of working life / describes why the programme was only partially implemented, and the consequences this had for the quality of working life outcomes ((c) 1997 APA/PsycINFO, all rights reserved)

The new spin on corporate work teams	Hayes, Cassandra	Black Enterprise 06/30/95 pp PG	The incentive for this article is to highlight the benefits to cultural diversity of working in teams. The article also gives a good synopsis of the possible benefits to industries of using teams. Excerpts Of all types of work teams, the self-directed or self-managed work team is most effective in promoting diversity. It is the team members' responsibility to figure out, on their own, how to work together to achieve a group's goals. In this sense, self-directed teams are unique. The members have a built-in opportunity to build intercultural bridges that some companies are paying diversity consultants thousands to install. None of the diversity of a self-directed team -- cross-cultural or otherwise -- can be achieved without laying a solid foundation. Many managers underestimate the time and effort it takes to make a team work. Companies must create appraisal and compensation systems, like SMP's gain sharing program, to fairly measure and reward team performance. They can't expect to increase productivity without paying employees to take on additional responsibility. Communication between team members and management is essential . Its impossible for teams to thrive if members are unclear about their roles and responsibilities and management's expectations. From a manager's point of view, the incentive is not always there. A successful self-directed work team ultimately eliminates the need for a manager. The hard work and expense associated with the self-directed work team concept will discourage many companies. Although the main impetus for implementing teams is to heighten productivity, the human incentive is just as significant. True team members can't help but get closer to one another and as they do, they tend to become like a family.
The power of empowered teams	Carroll, Bob	National-Productivity- Rev v. 15 Autumn '96 p. 85-92	As most people want and could contribute significantly more to the success of their organization than organizational design usually allows, numerous firms have turned to high-commitment, self-managed empowered work teams supported by a lean organization. An empowered team is a group of highly trained, self-directed workers who have progressively accepted, as a team, the responsibilities necessary for completing a well-defined segment of work that can be present in any collective endeavor: production, engineering, administration or service. Management sets the goals and boundaries for these teams, and the team then develops the methods, measurements, and strategies to reach those goals. As the team members meet those goals, they assume more of the responsibility for the management of their activities. A case study details the major improvements achieved by a cross-functional empowered production line at Motorola's Government and Space Technology Group in Scottsdale, Arizona, over a five-year period.

The relationship between collective efficacy and performance in manufacturing work teams.	Little, Beverly L.; Madigan, Robert M.	Small-Group-Research. 1997 Nov; Vol 28(4): 517-534	This study explores the construct of collective efficacy and its relationship to team performance behaviors for self-managed work teams in a manufacturing plant, a setting that provided a real task, truly self-managing teams, and a measure of team performance behavior from a source outside the teams. A questionnaire assessing collective efficacy and the Behavioral Observation Scale measuring performance behaviors were completed at 4 time periods for 8 work teams (104 Ss). Collective efficacy was shown to differ between teams, to have shared meaning within teams, and to be related to the performance behaviors of work teams. ((c) 1998 APA/PsycINFO, all rights reserved)
The role of management intervention in the development of empowered work teams	Carroll, Bob	National-Productivity-Review. v. 16 Spring '97 p. 25-30	The development of empowered teams, like the development of a manager, needs a process in which training is strategically linked with increasingly responsible tasks. It also requires the guidance of a manager who will promote the developmental process, seeking and sensing situations or opportunities where his/her intervention will keep the team moving in the intended direction. This intervention may be necessary to remove some organizational barrier or to help team members to acquire a new skill they need to achieve their goals, get them to face some interpersonal conflicts, or challenge them to take on some new responsibilities. Regardless of the type of intervention, its principal purpose is to keep the team moving toward full empowerment. The team can grow only by developing the ability to solve its own problems, make its own decisions, and control its own activities. The most effective interventions will be those that the team considers to be necessary. Details are presented of the development of a cross functional production team at Motorola's Space and System Technology Group in Scottsdale, Arizona, where such intervention occurred.
The "three waves" of industrial group work: Historical reflections on current research on group work.	Moldaschl, Manfred; Weber, Wolfgang G.	Human-Relations. 1998 Mar; Vol 51 (3) 347-388	Deals with the 3 waves of the discourse on group work in social science and industrial practice that have helped pave the way for the current boom in the introduction of group work in companies. These waves are represented by the human relations approach, the socio-technical systems approach, and the lean management debate. They are reviewed in 2 perspectives. The first relates to their concepts of work design and group work, following 4 questions: (1) What emphasis is put on work factors or on subjective orientations, on the design of working conditions or symbolic strategies? (2) How do the various approaches address the relationship between efficiency and control? (3) Which concepts of participation or democracy are involved? (4) How is the role of the social scientist in the process of industrial modernization conceptualized, explicitly or implicitly? The 2nd perspective from a sociology of science relates to the Context of production and utilization of social scientific knowledge. Two theses are put forward. One states that a gap exists between the aspirations and reality of group work because the basic conflict of efficiency and control has been overlooked for ideological reasons. The other postulates that there is no linear progress in the theory and practice of group work. ((c) 1998 APA/PsycINFO, all rights reserved)

The well-managed SMT	Moravec, Milan; Johannessen, Odd Jan; Hjelmas, Thor A	Management-Review. v. 87 no. 6 June '98 p. 56-8	In order to stimulate a sense of individual initiative or to renew the spark and energy that earned success in the first place, many companies have opted for a new form of control called self-management teams (SMTs). A number of companies worldwide have found that SMTs create a work environment that stimulates people to become self-motivated. Besides speeding up decision making and innovation, SMTs inspire employees to connect with the company's vision in a very personal way: They see the company as the means by which they can affect key issues and develop their leadership skills. A number of the challenges that companies face when trying to introduce SMTs are discussed.
Think before following the latest management trend//Firms advised not to abandon what's working when making major changes	Jerie Mc Arthur	Star Tribune 04/14/97 pp03D	This short article suggests that work teams are not the answer for every workplace. There are great benefits to have front-line people who have the best information participate in decision making and the resulting increased sense of ownership can have a positive impact on both quality and productivity. However, lack of focus or motivation can turn teams into social clubs and committees into political battlefields. This can slow the decision making process considerably. Change should be based on diverse research and not just guided by a single authority. Most of the writing on teams and change come from academicians with an economic stake in fostering the process
Thumbs up for self-managed teams	Moravec, Milan; Johannessen, Odd Jan; Hjelmas, Thor A	Management-Review. v. 86 July/Aug. '97 p. 42-7	In its efforts to develop self-managed teams (SMTs), BP Norge, the Norwegian arm of British Petroleum, learned that leadership vision and patience are required for SMTs to become effective. From an initial abortive attempt, which failed as a result of inadequate systems, to a subsequent successful effort, BP Norge learned lessons that apply to practically any kind of organization. SMTs cannot be formed by decree: The evolution from work group to team must be made consciously, using an explicit transition "technology. " Every member must start making decisions and practicing leadership from the beginning. For an SMT program to succeed' the following need to be in place from the outset. a champion for the program, an expert in SMT methodology, a neutral facilitator, commitment and involvement from top management, and preparation of all program participants. Obstacles can be overcome through involvement of all levels in training; self discovery--with assistance; open, honest communication; humor; and strategic follow-up. A detailed account of the development of SMTs at BP Norge is provided.

Transformational leadership in teams.	Atwater, David C.; Bass, Bernard M.	Bass, Bernard M. (Ed); Avolio, Bruce J. (Ed); et al. (1994) Improving organizational effectiveness through transformational leadership. (pp. 48-83). Thousand Oaks, CA, USA: Sage Publications, Inc. x, 238 pp.	(from the chapter) presents a set of principles about how teams--and small groups in general--develop and function effectively / these are principles that have been validated in research on small groups and teams over the past 4.0 years / awareness of this information can guide the team leader who aims to transform a group composed of members who often differ in education experience, attitudes, and beliefs, into an effective, cooperative, and high-performing team / present selected research findings and principles derived from these findings / examples also will clarify or illustrate applications of the principles to the full range of leadership ((c) 1997 APA/PsycINFO, all rights reserved) .
U.S. Steel. (America's Best Plants)	Sheridan, John H.	Industry Week, Vo; 245 10/21/96 pp 68	Plant is located near Pittsburgh and is the has the only two working blast furnaces in Pennsylvania. Discusses the use of multi-functional teams in problem solving. Some of these teams are also work teams. Tapping worker experience is cited as one of the reason the plant has both stayed in business and prospered.
Unions, flexibility, team working and financial performance.	McNabb , Robert; Whitfield, Keith	Organization-Studies. 1997; Vol 18(5): 821-838	Examined the relationship between trade unions and the introduction of flexible work systems and/or team working and investigated the single and joint effects of such work practices and unionism on financial performance. Data was used from the 3rd Workplace Industrial Relations Survey (1990) and the Employer Manpower Skills Practices Survey (1991). Both studies obtained information from the manager most responsible for employee-related issues, a financial manager, and union representatives from various work sites. The results indicate that the presence of a closed shop at the workplace inhibits the adoption of flexibility and team working but that the presence of a recognized union is beneficial to their introduction. A binomial unit analysis of financial performance also indicates that the joint effect of union presence and both flexibility and team working on financial performance is positive, even though the single effect of union presence is negative.
What makes teams work: group effectiveness research from the shop floor to the executive suite	Cohen, Susan G; Bailey, Diane E	Journal-of-Management. v. 23 no3 '97 p. 239-90	Part of a special issue on developments in the areas of leadership and group dynamics. A summary and review is presented of the research on teams and groups in organization settings published between January 1990 and April 1996. Four types of teams are discussed: work, parallel, project, and management. The review concentrates on research in which the dependent variables are concerned with various dimensions of effectiveness. A heuristic framework illustrating recent trends in the literature portrays team effectiveness as a function of task, group, and organization design factors, environmental factors, internal processes, external processes, and group psychosocial characteristics.

Work teams: Selecting members for optimal performance.	Kichuk, Susan L.; Wiesner, Willi H.	Canadian-Psychology. 1998 Feb-May; Vol 39(1-2): 23-32	Personality, which is known to contribute to the prediction of individual performance may also have a role in predicting team performance. The purpose of this paper is to establish what is currently known about personality as an individual and team selection measure, to establish a systematic research plan for team selection using personality, and to suggest the implications of what is known about personality as a team selection measure. The authors review research evidence on traits such as conscientiousness, extroversion, and neuroticism, new research on the relation between personality and team performance, and issues in using personality testing for team membership such as faking and fairness. It is concluded that given the evidence in the individual selection literature and the interpersonal dimensions of teamwork, team member personality seems a likely candidate for selecting optimal teams. ((c) 1998 APA/PsycINFO, all rights reserved)
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Work-teams: why do they often fail?	Tudor, ThomasR; Trumble, Robert R; Diaz, Johanna J	Advanced-Management-Journal. v. 61 Autumn '96 p. 31 40	In order for a self-directed work team to succeed, it must be the last step, not the first, in a process that examines and perhaps modifies a company's structure and attitude toward employees and the manner in which employees are challenged and rewarded. Many attempts at implementing such teams will fail because the teams will be superimposed on a non-team culture. The reservations of both management and employees concerning the long-term success of teams are discussed, and concrete recommendations on how to properly implement these groups and how to troubleshoot common team problems are provided. The authors discuss the reservations of both management and employees concerning the long-term success of teams along with offering concrete recommendations on how to properly implement these groups and how to trouble shoot common team problems. Excerpts Most change is naturally resisted. Before carrying out movement to teams, precise goals should always be established, understood and supported by management and employees. It is imperative to have initial and continuous team building to persuade employees to think in terms of the group. Training Required to Form Successful Teams Employees will revert to a hierarchical structure within their teams unless management trains them differently. In hierarchical groups interpersonal skills, although important were not as crucial because employees acted according to their status in the company. Workers desperately need training in gaining cooperation and consensus without using formal power. Time and Effort for Training Management often underestimates the amount of time and effort needed to train successful teams. Management should make sure that the training is aligned with specific company objectives rather than just offer basic courses in team building. Training Pitfalls The key, however is to train employees only in areas that will have the greatest impact to avoid unnecessary expenses. How Much Training is Enough Because the teams are self-directed training included such areas as quality control, purchasing, budgeting, consensus decision making and member recruitment. One way to gauge the effectiveness of the training as well as make future adjustment is to regularly survey and observe workers on their progress in a team environment. Work force training is thought to have contributed more to the success of many companies than modern technology or formal education Companies should regularly survey their teams for training success and group commitment
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Appendix B

Survey of Shipyards
and
Other Industries

Appendix B: Survey of Shipyards and Other Industries

Introduction

The survey was conducted to look at the current status of the U.S. shipbuilding/ship repair industry with respect to production teams and multi-skilled work groups and to record what has been attempted and what has been successful. In addition to shipyards, survey participation was solicited from industrial organizations that had been identified as successfully using production teams or multi-skilled work groups. The survey also included telephone interviews and visits to several smaller shipyards and one industrial activity.

Survey Participants

A two-stage approach was used in identifying survey participants. In the first stage, a brief letter was sent to over 100 shipyards and 30 industries outlining the purpose of the survey and requesting points of contact for those organizations interested in participating. This letter was sent with a CD-ROM from the NSRP Project “Assist U.S. Shipyards to Develop and Maintain Skilled Workers” as a way of emphasizing the practical value to the industry of NSRP projects. Attachment 1 to this appendix is a copy of the request for participants.

In the second stage, the actual survey form was sent to those organizations that had agreed to participate. Twelve shipyards and nine industries agreed to participate. Nine completed survey forms were received from shipyards and five from industries. Attachment 2 lists the survey respondents.

The Survey Form

Seven topics for the survey were selected after review of the literature search results. The topics were aimed at providing the project team with a good feel for the current state of team and multi-skilled work group implementation in U.S. shipyards and to provide back to the industry advice and cautions for those yards in the process of implementing or considering the use of production teams or multi-skilled work groups. The seven topics were:

1. Team History: The why, when and how long of putting teams/work groups in place
2. Team Demographics: This topic looks at how teams are made up and how personnel benefit from team membership.
3. Team Application: The processes or production areas in which teams/multi-skilled work groups are being used and the combinations of skills comprising the groups
4. Leading Teams: The way teams are led and the functions in which teams have decision making roles.
5. Training: This looks at the who and when of training and focuses on three areas, start-up, continuing, and training for replacement team members.
6. Competencies: This topic examines the knowledge, skills and abilities that team leaders and members must know or be able to do to function successfully
7. Problems Encountered: This topic addresses a number of areas of potential problems for organizations establishing or using work teams.

The survey form was 11 pages in length and had approximately 50 questions. To make responding easier, most questions were configured to permit answering by selecting suggested responses or by simple completions. Some questions were configured for narrative responses and all questions made provision for written responses if the respondent felt none of the suggested answers were appropriate. The questionnaire is included as Attachment 3 to this appendix.

Leading and Sustaining Multi-skilled Work Groups

Survey Responses

Survey responses were recorded in a database and arranged so that answers for the shipyards and the other industries can be viewed together for comparison purposes. No statistical analysis was done because there were so few respondents out of the total community. Legends are provided with the responses where they are needed to help interpretation.

Preliminary Indications

The data from the research phase of this project are to be analyzed and reported in depth in a latter deliverable. The indications presented here are from a preliminary review of the survey responses.

Shipyard Participation: Numerically, shipyard participation in the survey represents a very small segment of the total number of shipbuilding and ship repair yards in the country, however the respondents do include five of the six largest yards in the country and a very large proportion of the total workforce employed in the industry. The information was further rounded out by discussions with personnel from three government yards and visits to several smaller yards engaged primarily in commercial work. The government yards were an important addition because collectively they have been aggressively pursuing workforce organizational change to improve efficiency. The yards doing primarily commercial work were useful because they have a very different dynamic with respect to time and cost considerations than that found in the longer lead time work on navy ships.

Industry Participation: The industries responding all have successful self-directed production work teams. They represent a broad diversity of applications which suggests that those experiences, problems and solutions they hold in common are likely to also extrapolate to the shipbuilding/ship repair industry.

Teams and Multi-skilled Workgroups: There are many permutations as an organization progresses from single-trade gangs working under close supervision to self-directed multi-trade teams. Descriptions of the intermediary stages are probably more useful than defining names for stages of a moving target. For the most part, the reporting shipyards are working in groups representing more than one trade led by supervisors assigned by management and drawn from one of the trades represented in the group. In contrast, the industrial participants have self-directed, multi-skilled teams, that is, groups of workers representing several trades led by workers selected from within the group by the other workers.

Transition to Teams: Surveys, visits and anecdotal information suggest that shipyards are meeting with success in using work groups having workers from more than one trade and in developing workers with skills in more than one trade. Movement from these multi-skilled groups to teams with worker participation and self direction seems to be stalled by the reluctance by sufficient numbers of both supervisors and line workers to accept role changes.

Union Participation: All of the shipyard respondents and two of the five industry respondents have unions. This suggests that within limits and with stipulations unions are willing to support team formation initiatives.

Compensation: Neither the shipyard or industry respondents indicated that team members or team leaders received any additional compensation or other measurable advantage. This is an interesting contrast to the literature that suggests that appropriate compensation and rewards systems are an important part of sustaining teams.

Training: All but one respondent provided initial training for team leaders and team members; for the most part this was foundation (non-technical) skills training. Most respondents also had follow-on training. In contrast to initial training, follow-on training frequently was oriented on technical competencies. Half of the organizations responding indicated that follow-on training was initiated as a result of experience and was not part of the original team planning.

Attachment B-1

Letter of Request for Participants

Leading and Sustaining Multi-skilled Work Groups

Attachment 1: Letter of Request for Participants

March 11, 1999

TO: Potential Survey Participant

RE: NSRP Project 9-98-1: Leading and Sustaining Multi-skilled Work Groups

The National Shipbuilding Research Program (NSRP) is sponsoring a research project to determine the elements of leading and sustaining Production Work Groups in shipbuilding, ship repair, or other manufacturing industries. NASSCO is the lead shipyard undertaking this project. The first step in this study is a survey of the current status of the industry to determine what has been attempted and what has been successful (or not successful) with respect to these groups. **Production Work Groups** are defined for this project as groups or teams (terms are used synonymously) that function on the job to carry out production activities.

The purpose of this letter is to announce the survey and determine which shipyards, or other companies, have experience with or interest in work groups or teams, and would be willing to participate in the survey. If you express interest by returning the attached sheet, we will contact you and provide you with a survey form that contains the topics below. The form is structured for simple responses and should take less than 30 minutes to complete. The seven survey topics are:

1. **Team History:** This topic is concerned with the development and implementation of teams
2. **Team Application:** Types of production or manufacturing functions for which you use teams and the traditional trades or crafts that participate in the teams
3. **Team Demographics:** Team characteristics and the benefits of team membership
4. **Leading Teams:** The way teams are led, team leader's functions, and interfaces between the leader and organization
5. **Training:** Start-up, continuing, and replacement training for team members and leaders
6. **Competencies:** The knowledge, skills and abilities that team leaders and members must know or be able to do to function successfully
7. **Problems Encountered:** Potential problems encountered by organizations establishing or using work teams.

At the completion of the survey phase of the project we will provide all participants a report detailing where and how work groups are being used in shipbuilding and other industries responding. The report will highlight successful approaches and give examples of problems encountered.

If you can help, please complete the form on the next page.

Sincerely,

Karin Hagen
Project Coordinator

Leading and Sustaining Multi-skilled Work Groups

PLEASE RETURN THIS PAGE

Before March 22, 1999

If you (or someone else in your organization) have experience with, or interest in, work groups or teams and would like to participate in the survey, please fill in the bottom section and return this form to NASSCO by fax or mail at the following address / number. You will receive a survey in the mail shortly. We may contact you for follow-up after we receive your completed survey.

Attn.: Karin Hagen at Mail Stop 20R-Barge
National Steel and Shipbuilding Co. (NASSCO)
28th St. and Harbor Dr.
San Diego CA 92113

Fax: (619) 231-9151

Phone: (619) 544-7911

Shipyard or Company Name _____

Address _____

Survey Point of Contact _____ **Title** _____

Phone _____ **Fax** _____ **e-mail** _____

Total Number of Employees _____

Number of Production / Manufacturing Employees _____

Number of Years of Company Experience with Work Group / Teams _____

FOR NON-SHIPYARDS:

Business Description _____

Product(s) Manufactured _____

Customers Served _____

Number of Years in Operation _____

Please indicate how you would like to receive the survey:

() Mail () e-mail

() Fax

Attachment B-2

List of Survey Respondents

Leading and Sustaining Multi-skilled Work Groups

Attachment 2: List of Survey Respondents

Identifier	Shipyard Name	Location
SY 1	Bath Iron Works	Bath, Maine
SY2	Electric Boat Corporation	Groton, Connecticut
SY3	Ingalls Shipbuilding	Pascagoula, Mississippi
SY 4	Jeffboat Shipyard	Jeffersonville, Indiana
SY 5	NASSCO (Blast, Paint, Services)	San Diego, California
SY 6	NASSCO (Block Outfitting)	San Diego, California
SY 7	NASSCO (Steel Erection)	San Diego, California
SY 8	Newport News Shipbuilding	Newport News, Virginia
SY 9	Pearl Harbor Naval Shipyard	Pearl Harbor, Hawaii

Identifier	Industry Name	Product	Location
IND A	Eastman Kodak	Photographic Equipment	Rochester, NY
IND B	Monsanto Kelco	Food Additives	San Diego, CA
IND C	Saturn Corporation	Auto Manufacturing	Spring Hill, TN
IND D	UNISYS Corporation	Integrated Circuits	San Diego, CA
IND E	Weirton Steel	Steel Manufacturing	Weirton, WV

Shipyard Visits

Alaska Ship and Drydock	Ketchikan, Alaska
Bath Iron Works	Bath, Maine
Cascade General	Portland, Oregon
Electric Boat Corporation	Groton, Connecticut
Fraser Industries	Seattle, Washington
Lake Union Drydock	Seattle, Washington
Martinac Shipyard	Tacoma, Washington
NASSCO	San Diego, California
Todd Pacific Shipyard	Seattle, Washington

Industry Visit

Solar Turbines	Stationary Gas Turbines	San Diego, California
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Telephone Discussions

Jeffboat Shipyard	Jeffersonville, Indiana
Norfolk Naval Shipyard	Norfolk, Virginia
Pearl Harbor Naval Shipyard	Pearl Harbor, Hawaii
Puget Sound Naval Shipyard	Bremerton, Washington

Attachment B-3

Survey Form

Leading and Sustaining Multi-skilled Work Groups

Attachment 3: Survey Form

March 1999

TO: Survey Participant

RE: NSRP Project 9-98-1: Leading & Sustaining Multi-skilled Work Groups

Thank you for agreeing to participate in our efforts to collect information on leading and sustaining Production Work Groups. Again, we define Production Work Groups as groups or teams (terms are used synonymously) that function on the job to carry out production activities.

Attached is the survey which address the following topics: Team History, Team Application, Team Demographics, Leading Teams, Training, Competencies and Problems Encountered. Please complete each section as thoroughly as possible given the experience and/or interest you have with work groups in your organization.

Please mail your completed survey within ten days of receipt. The survey should be mailed to the attention of: NASSCO, Karin Hagen, Training & Development Department, Mail Stop 20-R, 28th Street and Harbor Drive, San Diego, CA 92113. We will then review your responses and determine if we need to follow-up with you by phone.

At the completion of the survey phase of the project, we will provide you with a report detailing where and how work groups are being used in shipbuilding and other industries responding. The report will highlight successful approaches and give examples of problems encountered.

If you have any questions, please don't hesitate to contact me at (619)544-7911. Once again, thank you for taking the time to contribute to our study. We look forward to hearing from you soon.

Sincerely,

Karin Hagen
Project Coordinator

National Shipbuilding Research Program

Survey of Production Work Teams

The National Shipbuilding Research Program (NSRP) is sponsoring this project to determine the elements of leading and sustaining Production Work Teams in shipbuilding and ship repair. Part of such a study is to look at the current status of the industry and to record what has been attempted and what has been successful with respect to production work teams. The attached survey is designed to facilitate this process.

Production Work Teams are teams that function on the job to carry out production activities.

The survey form has been provided for reference and shows seven topics we believe will help describe the status of the shipbuilding industry with respect to work teams. With your cooperation, we intend to collect information by means of telephone interviews.

In structure the interviews will follow the survey form. Where answers are provided in a multiple choice format the choices are not intended to be limiting but only to facilitate recording by offering responses consistent with other industrial experience. Your answers are not constrained to the "multiple-choices."

The seven survey topics are:

1. **Team History**
This topic is concerned with planning for implementing teams
2. **Team Application**
This topic asks for information of the type of functions for which you use teams and the traditional trades or crafts that participate in the teams. The organization reflects the structure used in the skill standards and database developed for NSRP project 9-96-1&2 *Assist U.S. Shipyards to Develop and Maintain Skilled Workers*.
3. **Team Demographics**
This topic looks at how teams are made up and how personnel benefit from team membership.
4. **Leading Teams**
This topic is concerned with the way teams are led and the functions in which teams have decision making roles.
5. **Training**
This looks at three areas of training, start-up, continuing, and training for replacement team members.
6. **Competencies**
This topic examines the knowledge, skills and abilities that team leaders and members must know or be able to do to function successfully. Your views and experience in this area are of particular importance to the project.
7. **Problems Encountered**
This topic addresses a number of areas of potential problems for organizations establishing or using work teams.

Shipyard / Organization _____

Contact _____

Phone _____ e-mail _____

Team History / Organization Background

1. What is the status of your organization with respect to production teams?
 - a. Currently have fully operational production teams
 - b. Currently have functioning teams moving towards final operational form
 - c. Are planning for production teams but have not started implementation
 - d. Are considering production teams but have not started a planning phase
 - e. Have had production teams in the past but have no teams currently
 - f. Do not have and have not considered teams.
2. How long did it take to develop your team concept? _____ Mos.
3. What internal functional organizations participated in the team plan?
 - a. Production
 - b. Engineering (design, planning, scheduling, work packaging)
 - c. Human Resources (position descriptions, compensation, performance evaluation, advancement,)
 - d. Training
 - e. Unions
 - f. Other worker representation
 - g. Other _____
4. How long have you had teams in place? _____
5. What production or business objective led to the formation of teams?

 - Is the objective established in writing? Yes ___ No ___
 - Is it known and understood by team members? Yes ___ No ___
 - Is the objective available to internal functions interfacing with the teams? Yes ___ No ___
6. Did the implementation involve a phased process with team responsibilities increasing as experience was gained? Yes ___ No ___
7. What criteria are established for validating team effectiveness?

8. How much time was planned for the teams to meet the criteria? _____ Mos
9. How much time did it actually take before the transition to teams was complete and the groups met the criteria? _____ Mos
10. Does your production group operate under an active trade union structure? Yes ___ No ___
 - Are teams subject to union collective bargaining agreements? Yes ___ No ___
 - If so, do the agreements give special consideration to teams? Yes ___ No ___

Comments:

Team Demographics

1. What is the size of your production workforce? _____ employees.
What % of the production workforce performs in a team environment? _____%
Total number of teams in production _____ Number of non-production teams _____
2. How large are the teams?
 - a. 1-3
 - b. 4-6
 - c. 7-10
 - d. >10
3. How are teams composed?
 - a. Single trade
 - b. Multi-trade (Trade members lead in own trade. Team members from other trades provide only assist work (Second set of hands))
 - c. Multi-skilled (Each team member can perform unassisted the basic processes needed for most assigned work while retaining responsibility for some advanced trade specific processes.)
 - d. Other _____
4. How were initial team members selected/assigned?
 - a. Assigned by trade management
 - b. Selected from volunteers based on supervisor evaluation.
 - c. Selected from designated pool or from volunteers based on a formal assessment of team potential.
 - d. Other _____
5. How are replacement team members selected/assigned?
 - a. Assigned by management without consultation with the team
 - b. Assigned by management with consultation of the team
 - c. Selected by team from available candidates
6. How stable are teams?
 - a. Team membership changes slowly and teams can expect to move between assignments as a group.
 - b. Teams, established to perform a certain set of tasks are stable, however, job assignments use only subsets of the total team.
 - c. Teams are constituted for a specific piece of work, for instance on a single block or module, and membership is expected to change from job to job.
7. Is the compensation package for team members different from that of non-team production workers? Yes ___ No ___
Please describe. _____
8. Do team members gain some measure of priority for retention in cases of lay-offs? Yes ___ No ___
If they do, is this based on;
 - a. Team membership?
 - b. Additional skills?

Team Application

1. What production processes/functions do teams perform in which trades or areas?

Activity	Processes/functions	Areas/trades
fabrication		
assembly		
installation/removal		
repair		
testing		
other		

2. Do you use other types of teams in the organization?

If yes, in which organizational functions / departments are they located?

Do their objectives differ from the teams in Production (i.e. Project Teams, Continuous Improvement Teams, Product Development Teams, etc.)?

Leading Teams

1. How are teams led?
 - a. Leader is assigned by management from outside the team
 - b. Leader is selected by management from team members
 - c. Leader is selected by team
 - d. Other _____
2. Does the leadership role transfer within the group? Yes __ No __
3. What is the trigger for changing leaders?
 - a. Change on a periodic basis every _____ (frequency/unit)
 - b. Change as primary focus of work changes
 - c. Change is triggered by consensus of team
 - d. Change is normally at the request of the current leader
 - e. There is no set process for changing the leader
4. What organizational and administrative responsibilities does the team manage?

- Work assignment within the team	determine __ advise __ none __
- Work processes to be used	determine __ advise __ none __
- Schedules	determine __ advise __ none __
- Team composition and membership	determine __ advise __ none __
- Team leadership	determine __ advise __ none __
- Absences for training and for leave/vacation	determine __ advise __ none __
- Quality Assurance	determine __ advise __ none __
- Performance improvement	determine __ advise __ none __
- Other _____	determine __ advise __ none __
5. How are interfaces with technical functions such as engineering, supply, planning, and services maintained?
 - a. By management designated supervisor
 - b. By management designated person other than the supervisor
 - c. By the team selected leader
 - d. By team selected person other than the leader
 - e. Other _____
6. How are interfaces with HR functions maintained?
 - a. By management designated supervisor
 - b. By management designated person other than the supervisor
 - c. By the team selected leader
 - d. By team selected person other than the leader
 - e. Other _____
7. How are performance reviews conducted?
 - a. For team members _____
 - b. For team leaders _____
8. Do internal team leaders receive different compensation than other team members? Yes __ No __
9. Are there other benefits to the leadership position?
Please describe _____

Training

We would like to understand the training activities that production team members participated in during the start-up phase. We are also interested in training for replacement purposes and continuing training to sustain team members.

To be consistent with NSRP Study 9-96-1&2; Assist U.S. Shipyards to Develop and Maintain Skilled Workers, we have separated skills into two categories: Foundation Skills and Technical Skills. We define Foundation Training to include such things as communication skills, personal work ethic, interpersonal skills, thinking skills, team building, problem solving, and leadership. Technical Training is defined as activities to develop skills directly related to manufacturing or repairing the product.

Start-up Training

- | | |
|--|--|
| 1. Did your team members receive formal training? | Foundation ☐ Technical ☐ |
| 2. Did your team leaders receive formal training? | Foundation ☐ Technical ☐ |
| 3. Did you use some form of assessment to determine what specific training was required for team members? | Yes ☐ No ☐ |
| 4. Did you use some form of assessment to determine what specific training was required for team leaders? | Yes ☐ No ☐ |
| 5. Did personnel external to the team (engineering, scheduling, planning etc.) receive training on team functions? | Yes ☐ No ☐ |

Continuing Training

- | | |
|--|--|
| 1. Is there a program of continuing training for team members? | Foundation ☐ Technical ☐ |
| 2. Is the continuing training part of the start-up plan or a response to implementation or operational experience? | Planned ☐ Experience ☐ |
| 3. Did you use some form of assessment to determine what specific training was required for team members? | Yes ☐ No ☐ |
| 4. Did you use some form of assessment to determine what specific training was required for team leaders? | Yes ☐ No ☐ |
| 5. Is some form of structured on the job training used for continuing training? | Yes ☐ No ☐ |

Replacement Training

- | | |
|---|--|
| 1. Is there a formal training program for newly-designated personnel to become members of existing teams? | Foundation ☐ Technical ☐ |
| 2. Does the program differ in content from start-up training? | Yes ☐ No ☐ |
| 3. Does the program differ in delivery method from start-up training? | Yes ☐ No ☐ |
| 4. Is some form of structured on the job training used for replacement training? | Yes ☐ No ☐ |

Competencies

Please indicate for both team leaders and members, in both foundation and technical skills, the skills that you provided training on and the number of hours spent on that training. You may also write in skills that are not listed for which you provided training. *If no training was provided, please rank your opinion of the importance of the competencies in each category by using 1 for the most important.*

Team Leaders

Foundation

Skill	hrs	Skill	hrs	Skill	hrs
Communications	_____	listening	_____	negotiation	_____
team building	_____	goal setting	_____	project planning	_____
Coaching	_____	trust building	_____	meeting effectiveness	_____
Problem solving	_____	diversity awareness	_____	conflict resolution	_____
Leadership	_____	time management	_____	delegation	_____
other _____	_____	other _____	_____	other _____	_____

Technical

Skill	hrs	Skill	hrs	Skill	hrs
Budget management	_____	supply or purchasing	_____	personnel accounting	_____
job orders	_____	work specifications	_____	quality assurance	_____
work processes	_____	automated systems	_____	_____	_____
other _____	_____	_____	_____	_____	_____

Team Members

Foundation

Skill	hrs	Skill	hrs	Skill	hrs
Communications	_____	listening	_____	negotiation	_____
team building	_____	goal setting	_____	project planning	_____
Coaching	_____	trust building	_____	meeting effectiveness	_____
Problem solving	_____	diversity awareness	_____	conflict resolution	_____
Leadership	_____	time management	_____	delegation	_____
other _____	_____	_____	_____	_____	_____

Technical

Skill	hrs	Skill	hrs	Skill	hrs
job orders	_____	work specifications	_____	quality assurance	_____
work processes	_____	automated systems	_____	budget management	_____
other _____	_____	_____	_____	_____	_____

Problems Encountered

Implementation

Please address any problems encountered during planning or implementation that slowed or disrupted progress toward full operation. Following are examples of areas in which some organizations have had difficulty in implementing teams:

- | | |
|-------------------------------|--------------------------|
| Team composition | Team member interactions |
| Technical skills preparation | Team responsibilities |
| Foundation skills preparation | Team external interface |
| Team leadership/direction | |

Briefly describe the problem and action taken to correct

Mature Teams

Please address any problems in mature teams that effect sustaining team operations or disrupt maintaining efficiency in team operations. Following are examples of areas in which some organizations have had difficulty in sustaining teams:

- Team composition
- Training Issues
- Team leadership/direction
- Team member interactions
- Team responsibilities
- Team external interface
- Compensation
- Workforce integration
- Process for replacing personnel
- Process for selecting/replacing leadership
- Changes in team self-management responsibilities
- Changes in work processes

Briefly describe the problem and action taken to correct.

Suspended or abandoned team operations

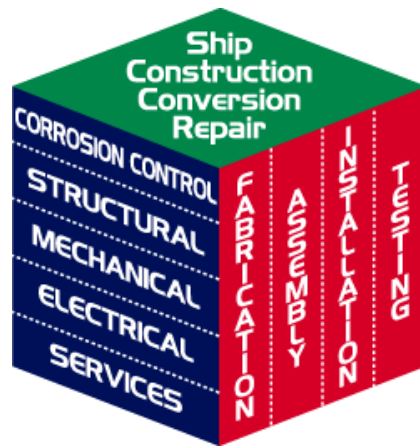
Please address any problems in team operations that caused you to suspend or abandon the use of production teams. Indicate the functions that the team was performing, the primary reasons for stopping team operations and the length of time the team operated before being curtailed.

Deliverable 2

Leading and Sustaining Multi-skilled Work Groups

Phase One Report

Identify Multi-skilled Work Group and Leader Types



Project 9-98-1

The National Shipbuilding Research Program

December 1999

Leading and Sustaining Multi-skilled Work Groups

Phase One Report

Identify Multi-skilled Work Group and Leader Types



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The National Shipbuilding Research Program

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DELIVERABLE 2:

Phase 1 Report

Identify Multi-skilled Work Group and Leader Types

Introduction

The Overall Project

The primary objective of this project is to improve the competitiveness of U.S. shipyards through the development of effective production leadership and multi-skilled work groups.

Work groups (or teams) have been in limited use in shipyards for years and other progressive manufacturing organizations also use them. However, there is no baseline of the leadership or team member competencies applicable to the shipbuilding/ship repair industry, nor is there a compendium of best practice in teaching those skills. This project will analyze and extrapolate current industry experience in multi-skilled groups to identify various group types and applications. The project will then define the competencies needed for both group leaders and group members, provide for assessment of competencies and for appropriate training. The last part of the project will be a practical demonstration of the whole process by assessing and training pilot groups to the selected competencies, and then monitoring and evaluating, over time, the functioning of the groups.

Deliverable 1

Deliverable 1 reported on two activities – a literature search and survey – conducted to gather information on current practice and experience with leading and sustaining multi-skilled work groups in the U.S. shipbuilding and ship repair industry and in broader industrial applications. The literature search was conducted to provide insight into developing theory and the research that has been conducted with respect to forming, leading and sustaining multi-skilled work groups. The survey was based on the information and concepts developed by the literature search. Shipyards, and other industries with success using work groups or teams, were included in the survey.

Production work groups are defined for this project as groups or teams (terms are used synonymously) of two or more workers that function on the job to carry out production activities. Multi-skilled groups are composed of members that possess journey-level technical skills in more than one trade. Self-directed teams are led by one of the members (as opposed to outside supervision) and possess some degree of autonomy.

The focus of the literature search was on production teams, leadership and supervision in a team environment, and multi-skilling. The search was conducted electronically using the internal and web-search resources of the University of Virginia and on site at the library of the Darden Graduate School of Business Administration at the University of Virginia. Psychological, engineering, economic, education and human resource databases were accessed. In addition to these resources, the National Shipbuilding Research Program (NSRP) reports were accessed electronically through the NSNet documentation center at the University of Michigan Transportation Research Institute (UMTRI). Selected excerpts from the literature search are included in **Appendix A**.

Seven shipyards and five representatives of other industries completed the survey. Although numerically the shipyard participation represents a very small segment of the total number of shipbuilding and ship repair yards in the country, the respondents include five of the six largest yards and represent a very large proportion of the total workforce employed in the industry. The information was further rounded out by discussions with personnel from three government yards and

visits to several smaller yards engaged primarily in commercial work. The industries responding represented a diversity of applications; all have successful self-directed production work teams.

Appendix B lists the survey respondents. **Appendix C** is a synopsis of relevant survey responses.

This Report

Deliverable 2 reports on the results of the remaining two tasks of Phase 1: Identify Multi-Skilled Work Group and Leader Types and Applications (Task 1.2), and Identify Elements Necessary to Sustain Successful Multi-Skilled Groups (Task 1.3). The primary objective of these two tasks is to analyze, interpret and draw conclusions from the data gathered previously and reported in Deliverable 1.

Work Groups and Leaders

Production work groups occur in many forms and many degrees of self-direction or management. In the most basic form a work group is the traditional small “gang” directed by a foreman. The term “team,” when applied to a work group, at a minimum implies some level of mutual support initiated by the members. From that point, work groups can accept more and more responsibility until they become nearly autonomous entities within a parent organization responsible for both work completion and support functions. As a general maxim, the greater the autonomy of the work group the greater the benefit to the sponsoring organization. That statement, however, is bounded by a near endless array of “if’s” and conditions. No two circumstances are quite the same and there is no team organization or degree of autonomy that is best for all situations.

The transition of gangs to teams is normally a phased effort with degrees of self-management being sought and achieved in defined steps. The role of the leader mutates as the work group accepts more and more responsibility for its own functions. Ultimately responsibilities of the hierarchical first line supervisor become dispersed within the team and supervision over the team occurs at a higher management level.

Threads

There are three separate threads in the introduction of multi-skilled self-directed work teams. Each pursued separately has tangible benefit. The threads are multi-trade work groups, multi-skilled individuals and self-direction within the group

Multi-Trade Work Groups

Multi-trade work groups have workers from more than one trade under the direction of a single supervisor who organizes and directs the work. Each worker performs the conventional duties of his trade. Efficiency is gained by a reduction in the external inter-trade coordination needed for a given process, with the often-associated dead time in getting workers on or off the job. The supervisor is stretched in this arrangement by responsibilities outside of his or her trade.

Multi-Skilled Individuals

Multi-skilling occurs when an individual has skills that permit him or her to perform work of more than one trade. The skills for the second trade may be limited to supporting specific processes or may be a full set. By itself, multi-skilling benefits both the worker and the shipyard by allowing work assignments that better adjust to cyclic demand for skills. These skills can be exercised in a traditional line management context. Placed in the context of a multi-trade work group, multi-skilling permits a worker to provide support for other trades within the group or to work across trade requirements for the assigned work.

Self-Direction

Self-direction is an issue of control and can be associated with either single trade or multi-trade work groups. Self-direction implies participation of the work group members in decisions affecting the group and its assigned work. The scope of the decisions varies from those affecting minor aspects of group operations to near autonomous action within a larger production unit. Associated benefits are a flattening of the control hierarchy resulting in a need for fewer managers, and a more direct access to, and better use of, the collective experience of line workers.

Weaving the Threads

U.S. shipyards have been pursuing three activities for many years that are conducive to the development of self-direction in work groups. However, each of the activities seem to be undertaken for business reasons other than achieving the benefits of self-direction. These are:

Leading and Sustaining Multi-skilled Work Groups

Changing the ratio of first line supervisors to line workers

Ratios of 5 or 6 to 1 that were once common are now more likely to be around 15 to 1. Although done primarily to reduce the number of management personnel being supported, this move has the effect of reducing the closeness of supervision and frequency of direction for the individual worker. As a consequence, the worker is placed in a situation where greater self-reliance is necessary on the job.

Encouraging multi-skilling in individual workers

Multi-skilled workers can be more flexibly assigned and can adapt to cyclic peaks and valleys in the need for specific skills. This adaptability means that a worker's time can be more efficiently used, that the shipyard can keep fewer total workers on the rolls, and that there is less need for layoff and rehire cycles with the associated continuing loss to the industry of skilled workers.

Forming multi-trade work groups

Multi-trade work groups are used as a means of reducing the upper level inter-trade coordination needed to get the right mix of skills in place at the right time to carry out a process or group of processes. The benefits are a reduction in non-productive time while waiting for the proper skills to assemble and fewer inter-trade coordination meetings among mid and upper level managers.

Taken together these activities provide an excellent environment for moving toward self-directed multi-skilled work groups. In multi-trade work groups opportunities abound for the worker to both observe and practice new skills. A worker can begin on the new skill set as a helper or "second set of hands," and progress to full performance. Supervisors in multi-trade work groups will not normally be equally proficient in all the supervised trades and will need to rely on journey workers for technical information. This is a beginning step in an exchange of technical responsibility from the supervisor to the line worker, a necessary condition to achieve any level of self-direction. The lower ratio of supervisor to worker, as noted above, means the worker must exercise more self-reliance on the job, another condition conducive to self-direction.

Changes to Organizational Elements

The introduction of multi-trade work groups and a move toward self-directed teams have implications for workers, supervisors, work management and support functions. Adjustments are required in all four of these areas if change is to be successful and sustained. The adjustments are discussed below and summarized in Table 1.

Multi-Trade Work Groups

- **Management Structure:** Multi-trade work groups normally perform under the supervision of a single upper level manager. This may be a trade group related manager (such as structural or mechanical) but frequently multi-trade work groups will be incorporated under a project or zone management structure.
- **1st Line Supervision:** The 1st line supervisor is drawn from one of the component trades. Although there is a likelihood of familiarity with the work of the other trades, the primary responsibilities for the supervisor are safety and coordination. When placed in a zone or project management environment the 1st line supervisor's immediate supervisor may also be working from a limited technical skills base. The supervisor must depend on line workers for technical support.
- **Line Worker:** Within the work group, line workers may have the highest level of technical skill in their given trade. They cannot rely on the supervisor to catch errors in procedures and have a responsibility to provide support to the supervisor on workflow and process.

Leading and Sustaining Multi-skilled Work Groups

- **Support Functions:** Changes in support functions at this stage are driven more by the shift to project management than by placing workers from more than one trade under a single supervisor. Organization of materials and documentation formerly done by the trade or shop must be addressed.

Multi-Trade, Multi-Skilled Work Groups (with worker participation)

- **Management Structure:** The addition of multi-skilling has no direct effect on the upper level management structure. Interface with the group will still be through the 1st line supervisor. However, as workers begin to participate in production related decisions, some inefficiencies are to be expected and upper management must exercise tolerance and not force the 1st line supervisor back into the role of “pusher” if the transition is to succeed.
- **1st Line Supervisor:** This is the most difficult time in the transition to self-directed teams for a 1st line supervisor. In addition to responsibility for new trade areas, the supervisor must oversee and support group decisions that may be at variance with his/her own practice or instinct. In addition, the supervisor must serve as a buffer between the learning group and upper management’s schedules and priorities. This can only be achieved if upper management, the 1st line supervisor, and the work group have a clear and congruent understanding of the role.
- **Line Worker:** The line worker builds on the role of technical advisor and begins to work with peers in making decisions effecting group performance and production processes. This places individuals in an exposed position relative to the performance of the group and the progress of production. For the group to perform effectively each represented skill set must have at least one person sufficiently secure in the skill set to speak out when required.
- **Support Functions:** Support functions must accommodate new interfaces as the work group picks up decisions and directions formerly the province of the 1st line supervisor. HR functions, including compensation and performance evaluations, must be changed to reflect multi-skilling and work group accomplishments.

Self-Directed Multi-Skilled Teams

- **Upper Management:** Upper management effectively becomes the first line of external supervision for self-directed teams. In this role, management is not dealing with the production work force behind the screen of an intermediary and must accept accountability in what should become an environment of increasing collaboration.
- **1st Line Supervisor:** This role now rests with the team members. Interface responsibilities may rest with a leader selected within the team, may be dispersed among the members, or for some support functions may rest outside the group.
Persons that were formerly 1st line supervisors move to coaching and mentoring roles or may provide interface and inter team coordination. Maintaining the skills of this group of people actively engaged in production is important to the success of the enterprise.
- **Line Workers:** The line workers assume leadership roles within the team that are more in the nature of facilitating team processes than of replacing the directive role of traditional leaders. Responsibility for functions may be distributed within the team rather than concentrated in a single individual.
- **Support Functions:** The support functions must be configured to work with self-directed teams. Interfaces may be distributed within the team, move to upper management or be designated to intermediaries working with several teams.

Self-Directed Single Trade Teams

Teams and self-direction may be introduced to perform single trade processes. For management, this lacks the incentive of achieving better coordination of workers moving on

and off the job. For the 1st line supervisor, the driver of being dependent on group members for technical information is absent. The movement can still begin with a lowering of supervisor to worker ratio, and the objective of getting worker participation is still appropriate.

Application of Work Group Formats to Shipbuilding and Ship Repair Activities

In addressing applicability of the several work group formats, it is important to consider the separate elements of multi-trade, multi-skill and self-direction.

Multi-Trade Work Groups

Multi-trade work groups are used to simplify the supervisory coordination needed to reduce interference, or facilitate cooperation, between or among trades working in the same space or on the same project. An example of cooperation is the installation of a large machine, and an example of interference is repairs within a machinery space. Multi-trade work groups will not generally be associated with the fabrication area but may be formed for assembly, installation, test or repair.

Multi-Skilling

Multi-skilling serves two purposes. One is to improve workforce stability by providing skills that will bridge slack times by some means other than layoffs or busy work.¹ The other is to enable workers to do simple tasks, frequently of short duration, that would otherwise require an additional worker with the associated costs and problems of coordination, timing, and travel. Skills that bridge slack times can be employed in traditional hierarchical organizations and can be employed in any of the areas of fabrication, assembly, installation, test or repair.

The assist-work skills are by their nature applicable to multi-trade groups. Multi-skilled workers can permit the work group to function with fewer total members. They can also extend the effectiveness of the group by permitting it to work on sequential tasks with the technical lead shifting as required by the work. Assist-work skills have the same general area applicability as multi-trade work groups.

Self-Direction

Self-direction is applicable to a wide variety of work formats. It can be used for such things as job assignment and process improvement on tasks where group members perform essentially independently, such as machine shop operations. It can also occur in groups where the members perform in close coordination, such as a test group.

1st Line Supervision

The 1st line supervisor plays a pivotal role in work force organizational changes that incorporate any aspect of multi-trades, multi-skills, or self-direction. As the organization changes toward self-direction, the role of the supervisor changes, becoming more and more subtle until the position goes away. If the organization transitions are properly planned and executed, there are no distinct breakpoints in the supervisor's role. Competencies are gained by the supervisor, applied for a time and then passed on to the work group. In many ways the process is not unlike raising children where the parent first gains skills, passes them on to the child but maintains control. Then, at some point, the parent backs out of the controlling role without ever really disappearing as a resource. Continuing the analogy, the parent and supervisor share two distinct challenges: one is gaining the technical skills to stay ahead in the development stage and the second is gracefully letting go when it is time.

Gaining Competencies

The 1st line supervisor uses competencies related to the product and to the people being supervised. The move into multi-trade work groups initially requires an increase in

product related skills without any diminishment in the people-related skills. These are the product skills needed to ensure safety and proper sequencing of process and to build and maintain credibility with the work group. Although the product skills are in theory available to the work group from other members, anecdotal evidence from shipyards and survey data from other industrial activities² indicates that the 1st line supervisor must have broad product related skills in the area being supervised.

Changing Emphasis on Selected Competencies

The people-related competencies used in the transition to multi-trade work groups and to self-directed work teams are not unique and should also be present in supervisors of small hierarchical single trade gangs. The difference is partly a matter of emphasis on certain competencies and partly a change in which competencies are critical for success. A supervisor whose principal skill is hounding a job to on-time completion will need to develop other competencies to succeed in the changing organization. Delegation and coaching increase in importance, as do planning and logistics. Communication skills, including listening, become essential as line workers take a greater role in process direction. Well-conducted personal interactions replace a regime of threat and promise.³ Managing training and worker development is also a critical role for leaders in a team environment.⁴

Changing Workforce Organization and Span of Control

Increasing the number of people supervised increases the amount of time the 1st line supervisor must spend on personnel administration. Traditional supervisors are frustrated by being squeezed for time on the technical aspects of the work. If the increased span of control occurs in conjunction with multi-trade or multi-skill organizational changes, the supervisor finds him or herself tight on time, short on technical expertise, and consequently overloaded and very frustrated.⁵ Time management and delegation skills can be of some help here, but only when accompanied by recognition that the job has changed.

Within the changing work force environment, 1st line supervisor leadership must have a clear understanding of how the supervisor's role has changed. The supervisor must also know what is expected of the incumbent and, of possibly greater importance, what is not expected. This role change must be initiated, understood, and accepted by upper management. Upper management must create for the supervisor, and permit the supervisor to create for the work group, an atmosphere that "... supports risk taking, tolerates occasional failures, and enables all individuals to learn from failure."⁶ Although the needed competencies to facilitate the transition are inherent in any line leadership position, they lie dormant in many leaders and training for the supervisor is appropriate to hone the skills.⁷

Implementing Changes from the Traditional Structure

The literature is full of cautions on moving from traditional trade or craft based organizations to one based on teams and more particularly on self-directed teams. Four citations seem to be especially relevant to the shipyard environment.

- There must be operations conducive to work teams.⁸
- There must be enough time and resources.⁹
- The market must be healthy enough to support improved productivity without reducing the workforce.¹⁰
- Individual workers must have sufficient skills to perform independently.

Conducive Operations

Work teams are most productive when used on operations that include a range of tasks, some complex, which can benefit from initiative, cooperation, and flexibility. Some ship construction and ship repair tasks fit nicely into this category. On the other hand, there are many tasks performed by individuals working small independent jobs on their own, as well as jobs worked on by groups, that are simple and repetitive. Although any job can show some improvement from worker involvement, selecting work that can yield sufficient improvement to justify continuing resource commitment by management is important to the introduction of teams.

Time and Resources

In general, any major change in work structure and organization will carry with it inefficiencies as people learn to make the new system work. Introducing a process leading toward self-directed work teams means moving through intermediate stages. Each of the stages must stabilize, realize some efficiencies, and then have a relapse as the next advance is introduced. Unless there is both a long-range vision and the will to pursue it, the temptation to stop at intermediate stages is very strong. For shipyards to embark on and pursue self-directed teams will require a strong order book, and a willingness to invest some present gains to build a sustainable future. The alternative is to accept incremental steps with a determination to hold each gain until circumstances are right to make the next step. Given the cyclic nature of shipbuilding, this wave riding (gaining in steps) approach is the one that will suit most shipyards.

A Healthy Market

Multi-trade work groups, a multi-skilled workforce, and self-directed teams are strategies adopted primarily to improve productivity. If the immediate result of improved productivity is laying-off workers made redundant by the improvement, a major credibility gap will open between management and the workers needed to sustain the project. In shipbuilding and ship repair, this is another reason for most yards to prepare for and adapt a wave riding strategy. For those yards with long term projects, such as multi-ship navy contracts, this is a reason to include organizational transition as part of their workforce build-up strategy.

Individual Worker Skills

Multi-trade work groups and self-directed work teams each have the underlying assumption that individual workers have sufficient shipbuilding/ship repair skills to perform reliably without close trade supervision. Shipyards with a stable workforce may achieve this state. Those whose business relies on short cycle hiring will find it harder to sustain the workforce skill levels necessary to move to these more efficient organizations.

Appendix A provides excerpts from the literature search on nine topics relevant to changing production work organizations.

Management Commitment

Any change from a traditional trade/craft oriented workforce requires full and sustained management support at the highest levels. Support means a defined vision, a commitment of resources, a willingness to tolerate transitional inefficiencies, and recognition of the need for changes in support functions and human resource policies and procedures. Management's role includes establishing precise goals that are understood and supported by both management and employees.¹¹ Management must also define the parameters within which the teams will operate.¹² Whole hearted management support for multi-trade work groups and multi-skilled individuals is relatively easy to obtain because the multi-trade work group offers a solution to long standing coordination problems and multi-skilling offers a way to obtain a complete skill base with fewer workers. These can be accomplished with only a minor cultural disturbance as far as the line workers are concerned. It is harder to relate self-direction to such specific benefits; the start-up is longer and more complex, and the cultural disruption profound. For these reasons, obtaining and sustaining management commitment for self-direction may be expected to be more difficult.

Planning

Planning is as important as management commitment for successful implementation of any change to work force structure. The plan should be based on diverse research¹³ and may take months or years to put together. Research has shown that team design is probably the most important factor in successful implementation.¹⁴ It is more important than interventions such as coaching and will permit teams to begin to function even in the face of inadequate leadership. Important in the planning is the selection of a process where motivated workers can in fact improve quality and productivity.¹⁵ Even so, there will be uncertainties in the process and an attempt to control the process too tightly will likely result in frustration. Organizations should accept the uncertainty as part of the process and be prepared to adapt the plan.¹⁶

Support Functions

Support functions are an element of planning that are of sufficient importance to be identified separately. They fall generally into two types:

- Material and Documentation
- Human Resources

Material and Documentation

Trade oriented work groups traditionally receive support for materials and documentation through the shop structure, which either provides things directly or interfaces with sources. A major study¹⁷ and anecdotal evidence suggest that failure to provide efficient access to material and documentation has caused significant problems for shipyards trying to implement multi-trade and self-directed work group structures.

Human Resources

Implementation of new work structures is often treated as pilot efforts with changes to human resource programs left to be dealt with in a later consolidation phase. This approach can create major problems when human resource capabilities try to catch-up with worker expectations. For this reason, HR support should be incorporated into the early planning.

Training

Training should not and does not drive changes in workforce organization. However, successful implementation of changed structures is always accompanied by training. The focus of training varies with the changes being implemented.

Multi-Trade Work Groups

Training for multi-trade work groups is aimed principally at the 1st line supervisor. The training has a large technical component focused on safety and work process issues connected with the trades being supervised. The intent is not to make the supervisor multi-skilled. Some training or indoctrination is given to both line workers and supervisors on their altered role with respect to technical expertise. Shipyards, with their aging and experienced workforce, have usually assumed that their journeymen had the skills to take up the technical expert responsibilities. Anecdotal information suggests that many workers are reluctant to fill this role but whether the problem is a lack of technical expertise or comfort with multi-trade culture is not clearly established.

Multi-Skilled Workers

This is a technical training issue. Effective employment of multi-skilled workers is an organizational and administrative issue that differs very little from multi-trade issues as far as leadership or cultural training is concerned.

Self-Directed Work Teams

This is a major cultural and change acceptance training issue. Indeed some managers have stated that “inadequate training was the biggest road block to the implementation of successful work teams”.¹⁸ Training must occur before the work teams begin to function and continue as long as the teams are in place. Technical expertise issues raised under multi-trade work groups become even more important as self-direction is sought.

Sustaining Changes from a Traditional Organization

Sustaining changes in shipyard production organizations has been a major problem for the industry. The given reasons for retrenchment are varied but come down to fundamentals such as changes in management support, poorly chosen processes, piecemeal implementation and no plan to bridge downturns in business. If these can be overcome, there are two other areas to which attention must be paid to sustain the changes: human resource policies and training.

Human Resources

There are three areas of human resources that stand out as important in sustaining work organization changes: job stability, job performance appraisal, and rewards and benefits. Too often the HR approach to organizational changes is to treat them as experiments and delay any HR adaptation until the methods are proven. The result is often failure because of worker resistance to continuing with the change when they see no tangible return. As one researcher reports, "...workers see self-directed teams as a management gimmick. To them teamwork means more responsibility for the same pay."¹⁹

Job Stability

Persons who are multi-skilled or perform successfully as a member of a team increase their value to the company. If the company has embarked on a staged or wave-riding strategy to change their production organization, steps should be taken to retain persons who have worked well in this environment.

Performance Evaluation

Performance evaluation should reflect the environment in which the work is performed. This means an appraisal system that recognizes team values and not just one that measures individual excellence. One team implementation facilitator has suggested:

"True teams and teaming cannot co-exist for long (if at all) in conjunction with individual performance appraisals. It is all too typical that upper management wants the benefits of teamwork without actually changing the system that supports individualism and kills teamwork."²⁰

Although the position may be extreme the message is clear. If the work environment and performance expectations change, the way performance is appraised should also change.

Rewards and Benefits

Reward systems in traditional organizations are designed to recognize and encourage excellent individual performance. Applying such systems in an environment meant to foster teamwork and cooperation would be counter-productive. Rewards both in the form of compensation and non-monetary rewards must give weight to group or team performance. The increased value to the shipyard of a multi-skilled individual should be recognized.

Training for Sustainment

Sustaining organizational change requires continuing training. Training supporting the evolution of form guards against reversion to a comfortable hierarchical relationship,²¹ and updates skills as technology advances or responsibilities within the work group change. Our survey indicated that organizations implemented a program of continuing training based on experience once the teams were established. (The training was not part of their original plan for teams.) Follow-on training had more technical content and less on non-technical (foundation) skills.

Conclusions and Recommendations

Changes to the structure of the production workforce in shipyards include two elements that are necessary to build a shipbuilding and ship repair industry that is internationally competitive. These are:

- The productivity of the workforce
- The ability of the industry to compete for quality workers

Productivity gains come from a better use of worker's time and the need for fewer workers to maintain the needed skills base. Competition for workers is enhanced by a change in the work environment from one of close supervision to one that allows a worker to use a wider range of his or her total abilities and to have a greater sense of ownership for the product.

Introducing multi-skilled, self-directed work groups, with the associated role changes for both supervisors and workers, is more than a human resources and change management problem. All types of work group structures imply a loosening of the traditional first line control on the work force. For this to be practical the journey workers must be secure in their trade, able to perform with limited direction and able and willing to provide technical counsel to supervisors when required. Achieving journeymen of this caliber can only be done in a stable employment environment, or with a well-developed hiring pool. Lacking workers of known and acceptable quality, shipyards are forced to use systems of close supervision and do not have the worker skills to move toward more sophisticated work organizations.

Cyclic employment is likely to be the norm in shipbuilding and ship repair for the foreseeable future. This means that the long-staged process of moving toward self-direction in the workforce will likely be achieved through some wave riding strategy. If company personnel policies and union agreements are not structured to support this strategy, it will be doomed to failure.

The next phase of the project, entitled "Develop Production Work Group Leaders and Participants," will focus on preparing work group leaders and members to function effectively within a pilot work group. The first step will be the identification of appropriate leadership and group competencies (KSA's). This will be followed by the selection of an appropriate assessment instrument and then assessing the selected competencies of the leaders and group members. The final step of Phase 2 will be development of training materials and instructional modules to be used in Phase 3.

Endnotes

- 1 *Model Training Plan for Shipbuilding and Ship Repair*, National Steel and Shipbuilding Company, National Shipbuilding Research Program Project 9-96-1&2, San Diego, CA, 1998
- 2 *Employee Opinion Survey, 1996*, Pacific Gas and Electric Company, San Francisco CA, Not Published
- 3 *Critical success factors for creating superb self-managing teams*, Wageman, Ruth; *Organizational Dynamics*, v26 Summer '97, p49-60
- 4 *Plan now for workforce 2000*, *Material Handling Engineering*, 10/01/95, p 113
- 5 *Employee Opinion Survey, 1996*, Pacific Gas and Electric Company, San Francisco CA, Not Published
- 6 *Teams and technology: tensions in participatory design*, Mankin, Don G.; Cohen, Susan.; Bikson, Tora K.; *Organizational Dynamics*: summer 1997
- 7 *Self-managed teams: some operational difficulties*, Buckenmeyer, James A.; *Industrial Management* v38, Sept/Oct '96, p.10-14
- 8 *Self-Directed Work Teams, The New American Challenge*, Orsburn, Jack D. et Alia; Business One Irwin, Homewood IL, 1990
- 9 *ibid*
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- 11 *Work-teams: why do they often fail?*, Tudor, Thomas R; Trumble, Robert R; Diaz, Johanna J., *Advanced-Management-Journal*, v. 61, Autumn '96, p. 31-40
- 12 *Self-managed teams: some operational difficulties*, Buckenmeyer, James A.; *Industrial-Management*. v. 38, Sept./Oct. '96, p. 10-14
- 13 *Think before following the latest management trend//Firms advised not to abandon what's working when making major changes*, Mc Arthur, Jerie, *Star Tribune*, 4/14/97, pp. 03D
- 14 *Critical success factors for creating superb self-managing teams*, Wageman, Ruth; *Organizational-Dynamics*, v. 26, Summer '97, pp. 49-60
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- 16 *Teams and Technology: Tensions in Participatory Design*, Mankin, Don; G. Cohen, Susan Bikson, Tora, K.; *Organizational Dynamics*: Summer 1997
- 17 *Design and Implementation of Self-Directed Work Teams in a Pre-Erection Outfitting Department*, NSRP Report #0380, National Steel and Shipbuilding Company, San Diego, CA, January | 1991
- 18 *How to get the most from team training*, Bohlander, George W.; McCarthy, Kathy; *National-Productivity-Review*, v. 15, Autumn '96, pp. 25-35
- 19 *ibid*
- 20 *Teamnet Digest #1578*, Brian Gordon: Live to Learn.
- 21 *Work-teams: why do they often fail?*, Tudor, Thomas R.; Trumble, Robert R.; Diaz, Johanna J., *Advanced-Management-Journal*, v. 61, Autumn '96, pp. 31-40

Appendix A

Literature Excerpts

Appendix A: Selected Excerpts from the Cited Literature

The excerpts that follow are a series of sentences or short paragraphs removed from original place and arranged to try and give “snapshots” of the current thinking/experience on the selected topics. Most but not all represent positive experience. The excerpts are keyed to a reference list at the end of the appendix.

Implementation of Work Teams	A-2
Conditions Required for Work Teams to Function Effectively	A-3
Considerations with Respect to Empowerment of Work Teams	A-5
Training Requirements and Considerations for Work Teams	A-6
Managing, Supervising and Leading Work Teams	A-9
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Benefits Derived from Self-Directed Work Teams (SDWT)	A-13
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Implementation of Work Teams	Ref
• <i>None of the diversity of a self-directed team -- cross-cultural or otherwise -- can be achieved without laying a solid foundation. Many managers underestimate the time and effort it takes to make a team work.</i>	z.
• Change should be based on diverse research and not just guided by a single authority. Most of the writing on teams and change come from academicians with an economic stake in fostering the process.	z1.
• The author suggests a good deal of advance planning and organizational analysis since SDWTs are not suitable for every organization.	a.
• The degree to which employees accept the team concept is often a reflection of how companies introduce it.	j.
• Applied Extrusion began working on the concept two years before introduction. Even then glitches occurred.	j.
• Describes a series of interventions for implementing self-directed work teams (SDWTs). The interventions are comprised of 6 phases: (1) research of concepts by all organizational members; (2) operational training of employees; (3) introduction of concepts; (4) facilitator training; (5) skill identification and acquisition, which stresses communication, interpersonal relationships, conflict management, and problem-solving techniques; and (6) team implementation.	a.
• Other fundamental tensions arise in the way organizations approach the change process itself. The tension here is between the desire to control the process, make it predictable, and predetermine the outcomes, versus the inherent uncertainty of the process. Organizations should embrace the uncertainty of change instead of trying to control it.	w.
• Management devoted many months to building up trust between team members and management. The trust building phase was a deliberate process and involved slowly increasing both the autonomy and authority of the workers.	k.
• Findings indicate that although teams at the plant improve overall organizational productivity, they experience a definite learning curve and may need both time and training before they develop into productive and cohesive units.	k.
• Management often underestimates the amount of time and effort needed to train successful teams.	z2.
• The company must be willing to stick out the two to five year transition to mature teams.	r1.
• The hard work and expense associated with the self-directed work team concept will discourage many companies.	z.
• The total acceptance of self-directed teams is not going to happen overnight.	j.

Conditions Required for Work Teams to Function Effectively	Ref
<i>In order for a self-directed work team to succeed, it must be the last step, not the first, in a process that examines and perhaps modifies a company's structure and attitude toward employees and the manner in which employees are challenged and rewarded.</i>	z2.
Before carrying out movement to teams, precise goals should always be established, understood and supported by management and employees.	z2.
Work processes are such that motivated workers can in fact improve quality and productivity.	r1.
A stable or growing market will absorb and reward increased productivity.	r1.
A condition for not using teams: The work processes are so rudimentary that self-directed teams won't bring significant gains in productivity.	r1.
A condition for not using teams: The market conditions are such that increased productivity is unlikely to improve the operation's ability to compete.	r1.
These findings suggest that the first step in creating self-managing teams is to get the team designed right.	f.
Structures, policies, and processes must change to support teams and their technologies as they operate within and increasingly across, its boundaries.	w.
Achieving high levels of performance requires the coordinated development of teams, technology, and the overall organizational context.	w.
Management needs to define the parameters within which the team must operate.	s.
Teams are successful because team members know what to expect and have received extensive developmental activity.	l.
The quality of a team's design, our data showed, actually had a larger effect on its level of self-management than coaching, - by a wide margin.	f.
Critical Success Factors: 1) Clear, engaging direction, 2) A real team task, 3) Rewards for team excellence, 4) Basic material resources, 5) Authority to manage work, 6) Team goals, 7) Team norms that promote strategic thinking.	f.
(1) Is the team's mission clearly defined to each team member? (2) Are the goals clearly defined and achievable by all team members? (3) Will empowerment (decision-making power) be given equally to all team members? (4) Will open and honest communication be allowed among team members? (5) Will each team member be respected and valued for his/her position on the team? (6) Are self-directed work teams effectively rewarded for accomplishments? (7) Have team members received adequate training to effectively complete their job tasks.	b.
Eight behaviors are introduced and briefly described. The behaviors are: Collective Decision Making, Collaboration/Interchangeability, Appreciation of Conflicts/Difficulties, Balance of Participation, Focus, Open Communication, Mutual Support, Team Spirit	i.

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- How a team performs depends on two management factors: performance and process. The performance factor focuses on what results are expected of the team. It also deals with the structure of the team's tasks. The process factor focuses on how the team interacts in meetings and on the maintenance of the team. m.
- Two basic influences (1) How the team is set up and supported, and (2) how the team leader (coach) behaves in his or her day to day interactions with the team. f.
- Teams and groups operate more effectively when their size is limited to the smallest number needed to do the work. When everyone participates, nothing gets done. w.
- Communication between team members and management is essential. It's impossible for teams to thrive if members are unclear about their roles and responsibilities and management's expectations. z.
- Because businesses in the future will compete in a global economy, workers will need management, business and human relations abilities. The Deming model of teamwork and collaborative effort will be the norm. p.
- Ultimately team leaders need to create a culture that supports risk-taking, tolerates occasional failures, and enable all individuals and units involved to learn from experience. w.
- The sheer complexity of multidimensional change is one problem. But more than that, fundamental tensions arise when a team, technology, and organizational development must be coordinated. The expression "empowerment" masks a complex multifaceted concept. w.
- **Many attempts at implementing such teams will fail because the teams will be superimposed on a non-team culture.** z2.

Considerations with Respect to Empowerment of Work Teams	Ref
<i>The central principal behind self managing teams is that the teams themselves, rather than managers, take responsibility for their work, monitor their own performance and alter their performance strategies as needed to solve problems and adapt to changing conditions</i>	f.
In cultivating a high performance work team environment, all finalists have established self-directed or empowered teams that make daily decisions on production operations.	h.
The most common team responsibilities in the finalists are quality assurance and training (100%). Next came handling daily work assignments and safety compliance (96%). Inter-team communications was next at 92%.	h.
The company has self-managed teams with no supervisors, inspectors, time clocks, or union stewards. These teams are responsible for their activities, including quality, cost, production, and people.	q.
In general, team members are held collectively responsible for performance results, have discretion in distributing tasks and in scheduling work within the team, are able to do more than one job on the team, train one another to develop multiple job skills, assess one another's performance contributions, and are responsible for "total quality" of group products.	t.
Saturn's self-directed teams make their own job assignments, plan their own work, perform equipment maintenance, keep records, obtain supplies and make selection decisions on new members.	r.
Workers must grasp personal initiative to make the team work.	p.
Moreover, management and union leaders are guardians of the belief that making mistakes is permissible, and they are also guardians of the organization's vision and direction.	q.
Leaders do not have authority over scheduling, hiring, disciplining or firing. The shift foreman performs these activities.	s.
The leader's authority is limited to scheduling the weekly meeting, preparing the agenda and running the meetings.	s.
A misjudgment that Saturn made early in its history was giving too much responsibility too soon to the teams. The company would have been better served if it had released power and responsibility to the teams as they demonstrated the competence to handle them.	q.
The only area of concern to the organization is that the participants felt they did not have true ownership of their teams; that is, team members were not given full empowerment. According to this study and the review of literature, full empowerment must be given to achieve successful and effective teams. If true empowerment is not given, the team will suffer in other areas of team building, and the organization will lose a valuable tool.	b.

Training Requirements and Considerations for Work Teams	Ref
<i>In a team model, the responsibility for career development is shared among the individual employees, the team, and the company. Individuals continue to assume primary responsibility for career planning, career goal setting, education, and training. Companies provide job-related training, a setting in which growth and development are valued, and human resource systems that are supportive of career development.</i>	m.
Plants with more training generally report higher levels on performance measurements.	d.
Management should make sure that the training is aligned with specific company objectives rather than just offer basic courses in team building.	z2.
Most common team responsibilities in the finalists are quality assurance and training. (100%).	h.
Training is required to form successful teams. Employees will revert to a hierarchical structure within their teams unless management trains teams differently. In hierarchical groups interpersonal skills, although important, were not as crucial because employees acted according to their status in the company.	z2.
Empowerment is not a standalone gambit for plants; it demands other HR initiatives, particularly training. "Plant managers have focused on building employees' skills so that the employees can work in several departments or perform multiple tasks."	d.
With line workers having more responsibility for their own production, scheduling and costs, supervisors will be challenged to see to it that their subordinates have just-in-time training needed to meet the fast-changing technology.	p.
The company shut down manufacturing operations in Middletown the first working day of 1997 to train the 130 employees in team building.	j.
Foreman will be more consumed with providing workers with the training they need to meet the ever-changing and more challenging requirements of production.	p.
Team training will have to be freshened, and new dimensions added, especially to handle knowledge work, to stimulate wider organizational learning, and to address the changing demographic composition of the workforce that will affect the dynamics of group interaction.	v.
Each employee receives a minimum of 92 hours of training annually. Everyone has an individual training plan that includes classroom and on-the-job training. Financial rewards are given for meeting training goals.	r.
At ABB industries each team controls a \$3000 a year training budget.	h.
61 % of plants training more than 40 hours per employee place significant emphasis on cross training. More than 805 of plant executives say they have sought to develop cross-trained work forces.	d.

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- The current study suggests that the type of cross-training necessary to improve team performance may be related to the nature of the task and that cross-training may be effective in allowing teams to coordinate implicitly--that is, without the need to communicate overtly. Results indicate strong support for the efficacy of cross training as a means to help teams perform well. y.
- Each of the 25 finalists use work teams, cross functional teams and employee cross training. In cultivating a high performance work team environment all finalists have established self-directed or empowered teams that make daily decisions on production operations. h.
- Results indicated that positional rotation was an effective cross-training method for highly interdependent tasks, that cross-trained teams developed a greater degree of inter-positional knowledge than did teams that were not cross-trained, and that cross-training was important only under high-workload performance conditions. y.
- A condition for not using teams: Employee learning capacity is so narrow that it dictates far more time in cross training than originally thought. r1.
- Starting now you will have to develop strategies to attract and train workers. Qualified entry-level and skilled workers will need personalized, continuous, just-in-time training to keep up with rapid advances of technology. p.
- The UAW has found added benefits to JIT training. Newly trained workers become experts in a particular technology and can deliver training needed as mentors on the shop floor. p.
- The manufacturing worker of the future will be asked to do things that have never been done before. So a follow-after-me-and-do-as-I-do methodology won't succeed in 2000. p.
- The behavioral dynamics of team membership consist of various interpersonal and communication skills required to build harmonious group relationships. Education in both group process and behavioral skills is important. l.
- Without the acquisition of appropriate team process or behavioral skills even the best-supported team efforts may fail. l.
- Trust building was followed by a lengthy period of training in the use of teams. k.
- To enhance the likelihood of team success, organizations must provide specific team-skills to ease the transition. h.
- If we put a worker onto the shop floor who is an excellent welder but who can't get along with people or work in teams, then that welder is obsolete before he hits the manufacturing floor. p.
- From the experience at Mack and at other organizations using self-managed teams, it is evident that continuous training is necessary. 1) Teams need to know management's minimum expectations; 2) Teams need assistance in team management; 3) Teams need continual reminding of team functioning; and 4) Teams need guidance on the technical matters relating to team performance. s.
- Workers desperately need training in gaining cooperation and consensus without using formal power. z2.
- How much training is enough? Because the teams are self-directed, training included such areas as quality control, purchasing, budgeting, consensus decision making and member recruitment. z2.

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- The successful worker and foreman in 2000 will be business and computer literate as well as team builders. p.
- How will workers cope with the fast changing technology of manufacturing production? Workers must understand the underlying principles of these machines-- the science, the physics, the mathematics, the machine tool principles. Don't forget, in ten years all of today's manufacturing machines will be primitive. p.
- The original cadre of team leaders receives leadership training. The training was in-house and conducted by the plant manager. It consisted of some discussion of meeting and leadership skills; recording, graphing and charting data; problem analysis and decision making aids. The original leaders received training manuals. There has been little or no follow-up training. s.
- Team leaders need to learn how to manage team operations. Some relevant topics would be: What are typical team processes? What makes teams work? What makes teams effective? What goals will the team be striving to obtain? What is a good team? s.
- One way to gauge the effectiveness of the training as well as make future adjustment is to regularly survey and observe workers on their progress in a team environment. z2.
- Companies should regularly survey their teams for training success and group commitment. z2.
- While some leadership skills may be inherent, some of the technical approaches to team leadership are not. It would make every team leader's task easier if they were given training and assistance on team leadership characteristics and behaviors. s.
- **Managers stated that inadequate training was the biggest road block to the implementation of successful work teams.** 1.

Managing, Supervising and Leading Work Teams	Ref
• <i>The team leader provides the following guidelines: A clear mission and goals; boundaries for making decisions; team ground rules; a map for access to information within the organization; an understanding of their roles on the team; and clear guidelines for responsibility.</i>	m.
• A key leadership task, therefore, is to create a context and a reward system that supports learning, encouraging innovation and risk taking and reducing the fear of making mistakes and fear of receiving harsh criticism and the anxieties associated with different types of learning.	e.
• Once teams have been designed well, leaders have the latitude to experiment with their own behavior and learn how to coach effectively. Helpful behaviors are: providing rewards and other signals that the team is responsible for managing itself; broadening the team's repertoire of problem solving skills; signaling that individuals (or manager/leader) were responsible for managing the team; not intervening in the task in ways that undermined the teams authority.	g.
• Supervisors will be called upon for the special skills it takes to encourage workers to produce their best work.	p.
• The supervisors will migrate from setting schedules and solving small problems to stepping in only when pressure from peers doesn't work to get problem workers in line.	p.
• All this training will require supervisors become patient coaches who can develop their own staffs to the fullest extent.	p.
• Leadership roles are rotated among team members.	r.
• Teams have appointed leaders selected by management from team membership.	s.
• Many managers, for example, refer to a group of individuals as a team but manage them as individuals.	e.
• At a plant installing teams, fellow workers began to treat a fellow worker elected team leader as a foreman.	j.
• Those responsible for overseeing such teams often focus on providing too much direction rather than ensuring team based authority or tearing down existing structures without creating or providing enabling team supports or resources.	e.
• From a manager's point of view, the incentive (to implement teams) is not always there. A successful self-directed work team ultimately eliminates the need for a manager.	z.

The Role of Compensation and Rewards

	Ref
• <i>68% of the finalists for America's Best Plants have team based compensation systems.</i>	h.
• Compensation for team members consists of base pay, risk pay and reward pay. Risk pay is money that depends on performance. Reward pay is additional pay on top of that. Base pay and risk pay are based on the prevailing market for similar skills.	r.
• Team efficiency and acceptance of management objectives correlated significantly with group leader's work status.	o.
• Rewarding team leaders is even more difficult. If team leaders receive more compensation than team members, the team members view the leader as a supervisor.	s.
• Team leaders receive no additional compensation for their leadership activities.	s.
• Team leaders at Mack often asked to be relieved of the duties of team leader. Some team leaders expressly stated that they did not know why they accepted the additional responsibility and work when they received no tangible rewards.	s.
• A lot of people are absolutely terrified by it said a team leader at Applied Extrusion. Some workers see self-directed teams as a management gimmick. To them team work means more responsibility for the same pay.	l.

Sustaining Work Teams	Ref
• <i>Barriers to Successful team performance</i> <i>Lack of top management support, insufficient commitment of time and money, and unrealistic expectations for team accomplishment.</i>	l.
• Team efficiency, acceptance of management objectives, average hourly earnings, satisfaction with rewards, and satisfaction with work were positively related to group solidarity, interpersonal confidence, and the social status of the group leader.	o.
• Teaming is not camaraderie or a "motivated" state of mind. An effective team results when a group of workers work well together. This happens only when each member performs competently and can help his or her co-worker. The essential interdependence of a team comes from shared purpose and skill and from language, not feelings.	u.
• One worker stated. "The main part of being a member of a team is to make sure that they (meetings) are happening all the time, consistently. It's something that is just really easy to sweep under the carpet. And once you do that a couple of times, pretty soon you lose the focus of the teams, and you don't have them anymore".	k.
• Implications discussed for designers and facilitators of self-managing teams include the need to be concerned about the adverse effects of age and status; to provide a clear path for job-switching to occur; to minimize status differences in jobs on the team; and to avoid attaching special rewards to a particular job classification.	n.
• One weakness of self-managing teams is that social loafing can sometimes occur within them.	t.
• Lack of focus or motivation can turn teams into social clubs and committees into political battlefields. This can slow the decision making process considerably.	z1.
• The author suggests that more attention will have to be given to inter-team relations and to optimizing total system performance as well as work-unit performance.	v.
• Factors that can cause teams to fail include delegation of authority without direction or training, management not following through on promises, vague empowerment, lack of managerial support, and implementing a team approach when management is not empowered.	t.

Work Team Processes and Dynamics	Ref
• <i>Group solidarity was significantly related to initiating structure and to group centeredness.</i>	o.
• Team facilitation is essential for helping team address process during meetings.	m.
• Team members experience conflicts when they perceive they cannot achieve their goals because of actions or intended actions of someone else.	m.
• The group's response to under-productive group members, in the form of frustration and resignation, correlated negatively with work variables, while punitive response correlated positively and more widely.	o.
• Defending group interests against management negated the group's confidence in the equity of compensation.	o.
• Cross-functional communications are reflected in a circular organizational structure comprised of decision rings, each of which meets weekly.	q.
• There was evidence that neither in-group processes nor communication processes were recognized. Team building was not planned or organized.	s.
• Teams acquire the roles of supervisors and assist individuals by providing feedback on skills, identifying opportunities for growth and development, coaching and mentoring, and serving as training grounds for the attainment of new skills and knowledge areas.	m.

Benefits Derived from Self-Directed Work Teams (SDWT)	Ref
• <i>Self-managing work teams are used for work motivation, behavior management, social facilitation, and efficacy and productivity reasons.</i>	t.
• This is the report on a general productivity census of industrial plants. One portion deals with work-teams and empowered employees pointing out that productivity Dollar value of output per employee is significantly higher in plants with self-directed work teams that with plants with a traditional structure	d.
• An estimated 45% of Fortune 1000 companies use teams to some degree.	j.
• There are great benefits to have front-line people who have the best information participate in decision making and the resulting increased sense of ownership can have a positive impact on both quality and productivity.	z1.
• It is the team members' responsibility to figure out, on their own, how to work together to achieve a group's goals. In this sense, self-directed teams are unique. The members have a built-in opportunity to build intercultural bridges that some companies are paying diversity consultants thousands to install	z.
• Although the main impetus for implementing teams is to heighten productivity, the human incentive is just as significant. True team members can't help but get closer to one another and as they do, they tend to become like a family.	z.
• Of all types of work teams, the self-directed or self-managed work team is most effective in promoting diversity.	z.

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Appendix B

Survey Respondents

Appendix B: List of Survey Respondents

Shipyard Name	Location
Bath Iron Works	Bath, Maine
Electric Boat Corporation	Groton, Connecticut
Ingalls Shipbuilding	Pascagoula, Mississippi
Jeffboat Shipyard	Jeffersonville, Indiana
NASSCO (Blast, Paint, Services)	San Diego, California
NASSCO (Block Outfitting)	San Diego, California
NASSCO (Steel Erection)	San Diego, California
Newport News Shipbuilding	Newport News, Virginia
Pearl Harbor Naval Shipyard	Pearl Harbor, Hawaii

Industry Name	Product	Location
Eastman Kodak	Photographic Equipment	Rochester, NY
Monsanto Kelco	Food Additives	San Diego, CA
Saturn Corporation	Auto Manufacturing	Spring Hill, TN
UNISYS Corporation	Integrated Circuits	San Diego, CA
Weirton Steel	Steel Manufacturing	Weirton, WV

Shipyard Visits

Alaska Ship and Drydock	Ketchikan, Alaska
Bath Iron Works	Bath, Maine
Cascade General	Portland, Oregon
Electric Boat Corporation	Groton, Connecticut
Fraser Industries	Seattle, Washington
Lake Union Drydock	Seattle, Washington
Martinac Shipyard	Tacoma, Washington
NASSCO	San Diego, California
Todd Pacific Shipyard	Seattle, Washington

Industry Visit

Solar Turbines	Stationary Gas Turbines	San Diego, California
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Telephone Discussions

Jeffboat Shipyard	Jeffersonville, Indiana
Norfolk Naval Shipyard	Norfolk, Virginia
Pearl Harbor Naval Shipyard	Pearl Harbor, Hawaii
Puget Sound Naval Shipyard	Bremerton, Washington

Appendix C

Survey Indications

Appendix C: Survey Indications

The data from the survey of shipyards and selected industries made a useful contribution to the understanding of the status of multi-trade work groups, multi-skilling and self-direction in the U.S shipbuilding and ship repair industry. The actual responses are published in Deliverable 1 to this project. This synopsis does not include a statistical reduction of responses because there were too few shipyard (7) and other industry responses (5).

Participation

Shipyard Participation

Although numerically shipyard participation in the survey represents a very small segment of the total number of shipbuilding and ship repair yards in the country, the respondents do include five of the six largest yards in the country, and a very large proportion of the total workforce employed in the industry. The information was further rounded out by discussions with personnel from three government yards and visits to several smaller yards engaged primarily in commercial work. The government yards were an important addition because collectively they have been aggressively pursuing workforce organizational change to improve efficiency. The yards doing primarily commercial work were useful because they have a very different dynamic with respect to time and cost considerations than that found in the longer lead time work on navy ships.

Industry Participation

The industries responding all have successful self-directed production work teams. They represent a broad diversity of applications which suggests that those experiences, problems and solutions they hold in common are likely to also extrapolate to the shipbuilding/ship repair industry.

Multi-Trade Work Groups and Multi-skilled Workers in Shipyards

The reporting shipyards all reported currently having some form of work group having members from more than one trade or core skill led by supervisors assigned by management and drawn from one of the trades represented in the group. Four of seven shipyards reported using multi-skilled individuals.

Union Participation

All of the shipyard respondents have unions. This suggests that, within limits and with stipulations, unions are willing to support multi-trade work group and multi-skilled worker initiatives.

Compensation and Benefits

None of the shipyard respondents indicated that team members or team leaders received any additional compensation or other measurable advantage. This includes consideration for work group membership when the shipyard is reducing staffing.

Work Group Leaders

The work group leaders in all the responding shipyards were assigned by management. In three of the seven yards there was some consultation with the work group members.

Interface with Other Shipyard Functions (Human Resources, Engineering, etc.)

A management-selected leader performed all interface functions in the shipyard work groups. By contrast all of the other industry respondents reported interfaces maintained by a team-selected person.

Leading and Sustaining Multi-skilled Work Groups

Performance Reviews

Performance reviews were conducted for team members and team leaders in the same way that they are conducted for other employees.

Training

All but one respondent provided initial training for team leaders and team members, for the most part this was foundation (non-technical) skills training. Most respondents also had follow-on training. In contrast to initial training, follow-on training frequently was oriented on technical competencies.

Self-Directed Work Groups in Shipyards

Surveys, visits and anecdotal information suggest that movement from multi-skilled groups to teams with worker participation and self-direction seems to be stalled. The problems come from a minority of supervisors and line workers but a sufficiently large minority to obstruct the process. For supervisors it is the inability to understand, or reluctance to accept the changed role. For line workers it is the lack of skills to perform, or a reluctance to accept the increased technical responsibility.

Changes to Organizational Elements

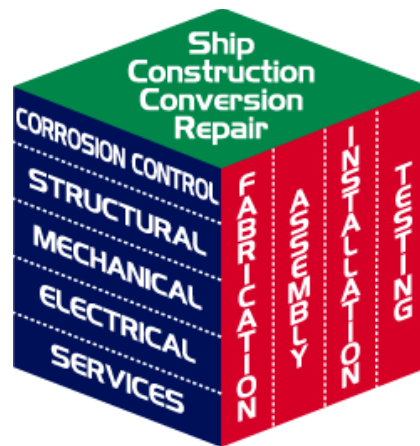
	Multi-Trade Work groups	Multi-Trade, Multi-Skilled Work groups (with worker participation)	Self-Directed, Multi-Skilled Teams
Management Structure	• Single upper-level manager • Trade group-related manager (structural, mechanical) • Project or zone manager	• Single upper level manager • Trade group related manager (structural, mechanical) • Project or zone manager	• Single upper level manager • Trade group related manager (structural, mechanical) • Project or zone manager • Supervises team activities
1 st Line Supervision	• 1st line supervisor from one of the component trades • Primary responsibilities are: - safety - coordination • In zone or project management, technical support may be limited. • Dependent on line workers for technical support	• 1st line supervisor may be multi-skilled • Primary responsibilities are: - safety - coordination • Performs coaching role as workers accept responsibility for selected group activities	• 1st line supervision rests with team members • For previous supervisors: - Coaching activity extends to more than one work group - May perform inter-team coordination in selected support areas
Line Workers	• Technical expert on job • Can not rely on the supervisor to catch errors • Responsible to provide technical support	• Share responsibility for selected group activities: - work assignment - work process selection	• Assume leadership roles within work group • Participate in decision making and in process improvement • Interface with support functions and other work groups
Support Functions	• Changes in support are driven more by project management than by shift to multi-trade work	• Support interfaces configured to accommodate self-directed functions • HR functions including compensation and performance review adjusted to accommodate multi-skilling	• Support functions configured to interface with team leader • HR functions adjusted to teams • Compensation and performance review incorporate team performance
Benefits	• Improved coordination of trades in multi-trade process	• Better use of personnel resources • Fewer supervisors	• Improvement in process and productivity through worker participation • Better work environment

Table 1. Changes to Organizational Elements

Leading and Sustaining Multi-Skilled Work Groups

Deliverable 3

Competency Identification and Assessment Selection



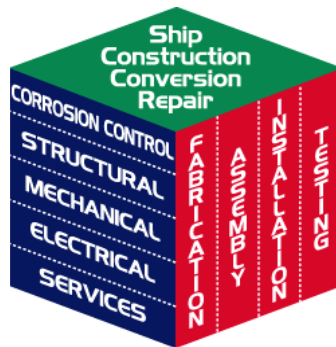
Project 9-98-1

The National Shipbuilding Research Program / Maritech ASE

June 2000

Leading and Sustaining Multi-Skilled Work Groups

Competency Identification and Assessment Selection



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June 2000

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DELIVERABLE 3:

Competency Identification and Assessment Selection

1. Introduction

The Overall Project

The primary objective of this project is to improve the competitiveness of U.S. shipyards through the development of effective production leadership and multi-skilled work groups. Production work groups are defined for this project as groups or teams (terms are used synonymously) of two or more workers that function on the job to carry out production activities. Multi-skilled groups are composed of members that possess journey-level technical skills in more than one trade. Self-directed teams are led by one of the members (as opposed to outside supervision) and possess some degree of autonomy.

Work groups are in limited use in shipyards, while other progressive manufacturing organizations have been using them for years. However, there is no baseline of the leadership or team member competencies applicable to the shipbuilding/ship repair industry, nor is there a compendium of best practice in teaching those skills.

This project will analyze and extrapolate current industry experience in multi-skilled groups to identify various group types and applications. The project will then define the competencies needed for both group leaders and group members, conduct an assessment of the identified competencies, and develop a pilot training program. The last part of the project will be a practical demonstration of the process by training a pilot group and then evaluating the functioning of the group.

Deliverable 1

The first project deliverable reported on two activities – a literature search and survey – conducted to gather information on current practice and experience with leading and sustaining multi-skilled work groups in the U.S. shipbuilding and ship repair industry and in broader industrial applications. The literature search was conducted to provide insight into developing theory and the research that has been conducted with respect to forming, leading and sustaining multi-skilled work groups. The survey was based on the information and concepts uncovered by the literature search. Shipyards, and other industries with success using work groups or teams, were included in the survey.

The focus of the literature search was conducted electronically using the internal and web-search resources of the University of Virginia and on site at the library of the Darden Graduate School of Business Administration at the University of Virginia. Psychological, engineering, economic, education and human resource databases were accessed. In addition to these resources, the National Shipbuilding Research Program (NSRP) reports were accessed electronically through the NSNet documentation center at the University of Michigan Transportation Research Institute (UMTRI).

Seven shipyards and five representatives of other industries completed the survey. Although numerically the shipyard participation represents a very small segment of the total number of shipbuilding and ship repair yards in the country, the respondents include five of the six largest yards and represent a very large proportion of the total workforce employed in the industry. The information was further rounded out by discussions with personnel from three government yards and visits to several smaller yards engaged

primarily in commercial work. The industries responding represented a diversity of applications; all have successful self-directed production work teams.

Deliverable 2

Deliverable 2, Phase 1 Report, reported on the final two activities of the first project phase. First was the identification of multi-skilled work group and leader types and their applications to shipbuilding. The second task was to identify the elements and characteristics necessary to sustain successful multi-skilled groups. Both of these activities based their conclusions on the data gathering that was previously undertaken and reported in Deliverable 1.

The primary types of work groups applicable to shipbuilding identified in Deliverable 2 included:

- Multi-Skilled Work Groups: These groups are made up of individuals who have skills that permit them to perform the work of more than one trade.
- Multi-Trade Work Groups: These groups have workers from more than one trade under the direction of a single supervisor, who organizes and directs the work.
- Self-Directed Groups: Self-direction implies participation of the work group members in decisions affecting the group and its assigned work.

The introduction of multi-trade work groups and a move toward self-directed teams have organizational change implications for workers, supervisors, work management and support functions in shipyards. The resulting organizational adjustments are summarized in tabular form in **Appendix A**.

Deliverable 2 discussed four key elements critical for implementing changes from traditional trade-based organizations to one based on work groups or teams:

- Conducive Operations: Work teams are most productive when used on operations that include a range of tasks, some complex, which can benefit from initiative, cooperation, and flexibility.
- Time and Resources: For shipyards to successfully pursue self-directed teams requires a strong order book and a willingness to invest some present gains to build a sustainable future. The alternative, which will suit most shipyards, is to accept incremental steps with a determination to hold each gain until circumstances are right to make the next step (wave riding).
- A Healthy Market: The productivity improvements that result from a multi-skilled team approach are best realized by yards with a relatively stable work force attributable to long-term programs, such as multi-ship navy contracts.
- Individual Worker Skills: Successful multi-trade work groups and self-directed work teams each have the underlying assumption that individual workers have sufficient shipbuilding/ship repair skills to perform reliably without close trade supervision.

In addition to the elements mentioned above, other factors were identified in Deliverable 2 that are key to the successful implementation and sustaining of work groups in shipyards. These are:

- Upper and middle management commitment
- Design and planning of the team process
- Coordination with support functions, such as material and documentation, and human resources
- Training of group members and leaders

This Report

Deliverable 3 reports on the results of the first two tasks of Phase 2 of the project. Phase 2 is entitled “Develop Production Work Group Leaders and Participants” and the objective of this part of the project is

to develop training materials that will help prepare work group leaders and members to function effectively within a work group.

The first task of Phase 2 addresses identifying appropriate competencies (knowledge, skills and abilities) for leaders and members of multi-skilled work groups. The approach to the competency identification process includes both an analysis of data collected in Phase 1 and the use of a commercial competency-ranking tool for leaders and group members. The second step in Phase 2 is to select an instrument to assess the identified competencies of group leaders and members. This process includes an examination of commercially available assessment instruments to determine if an appropriate instrument can be purchased.

Deliverable 2 identified three primary types of work groups in shipyards: multi-skilled, multi-trade and self-directed teams. These groups may co-exist within an organization as team development is instituted or may be limited to a single type at a particular point in time. In some cases, a group may be in transition, or have as a goal the shift from one type to another. This was the case with the group chosen for the Phase 2 pilot study at NASSCO; they were a multi-skilled group with the goal of moving toward self-direction.

2. Work Group Competencies

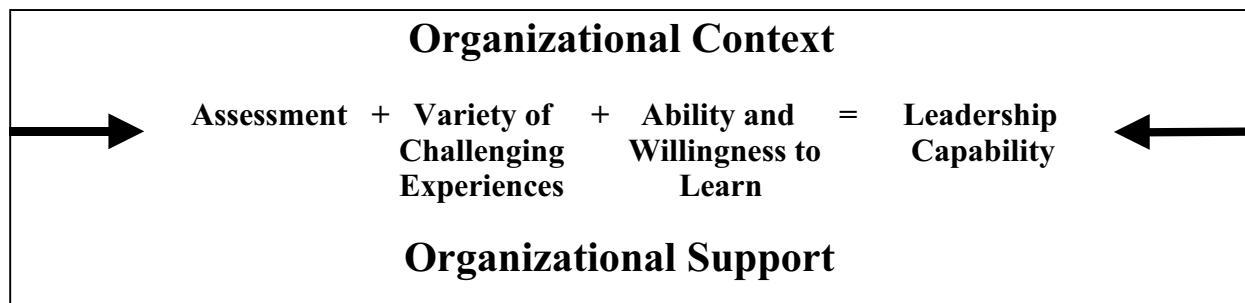
Introduction to Competency Identification

The formal study of competencies has been in existence since the 1970's. The move toward competency identification in organizations has become increasingly important in recent years due to vast amounts of organizational change. Changes such as downsizing, acquiring, restructuring and reengineering have caused organizational leaders to scrutinize everything from their mission and vision to the roles that individual employees play within their organizations.

An increased understanding of what creates superior performance in a particular job and the knowledge, skills and abilities expected of employees in those jobs have been the result of competency identification. In addition, organizations have begun to link their competencies to human resource systems such as selection, training and development, performance management, and succession planning.

To successfully lead and sustain multi-skilled work groups, development of employees who play a leadership role must take place. Any member within the work group, not just the person with the title "team leader," can assume leadership responsibilities. Because of this, it is important for all members of the team to have ongoing opportunities for development.

The Center for Creative Leadership (CCL) is a nonprofit educational institution that provides research, publication, and education on the topic of leadership development. CCL offers the following model to describe the process of leadership development:



The arrow that leads into the model symbolizes the non-technical competencies that the organization has identified for a job or a family of jobs. Competencies can be defined as "a unique configuration of skills, behavior, attitudes, beliefs and knowledge required for superior performance in a specific situation."¹ Competencies are a very important aspect of the leadership development process and they need to be determined and understood before the process of development can begin.

Work Group-Related Technical Competencies in Shipbuilding and Ship Repair

The study of competencies has traditionally centered on technical knowledge, skills and abilities that are necessary for the job. There is a recent, growing focus on the non-technical competencies that exist within jobs. Examples of these non-technical competencies are flexibility, goal orientation, and decision-making.² Technical skills associated with the move to multi-skill and self-directed work groups were addressed in the project's Phase One report. For the worker, technical skills do not change in kind but may change in quality. The worker must be secure enough in the trade to perform independently and to provide process counsel to group leaders as required. The 1st line supervisor exercises competencies related to the product and to the people being supervised.

The move into multi-trade work groups initially requires an increase in product-related skills. These are the skills needed to ensure safety, proper sequencing of process, and to build and maintain credibility with the work group. Although the product skills are in theory available to the work group from other members, anecdotal evidence from shipyards and survey data from other industrial activities³ indicates that the 1st line supervisor must have broad product-related skills in the area being supervised.

Non-Technical Competencies in Shipbuilding and Ship Repair

The need for competency identification within the fluctuating work environment in the shipbuilding and repair industry is warranted. The industry has not been immune to organizational challenges. It has been reformulating processes, restructuring the workforce and upgrading tooling to meet or exceed that in use by industry leaders. The movement toward multi-skilled work groups in shipbuilding can also be considered a significant organizational change.

NSRP Project 9-96 identified⁴ four groups of non-technical competencies as applicable to the shipbuilding /ship repair work force. These four groups are:

- communication skills
- personal work ethic
- interpersonal skills
- thinking skills

The groups were comprised of sixteen separate competencies. In Phase One of this project, selected competencies from the 9-96 project were joined with competencies for teams and team leaders identified in the literature search and used in the survey of shipbuilding and industrial applications. The surveyed competencies are shown in Table 1.

Table 1: Competencies included in the survey of production work teams

coaching	communications	conflict resolution	delegation
diversity awareness	goal setting	leadership	listening
meeting effectiveness	negotiation	problem solving	project planning
team building	time management	trust building	

The survey asked which of the skills were currently included in training for team members and for team leaders. The top six topics are given in Table 2. Five of the top six areas for shipyard training were the same for both leaders and group members.

Table 2: Top six training topics for shipyard work group leaders and members

Work Group Leaders	Work Group Members
team building	team building
listening	communication
communication	problem solving
problem solving	listening
conflict resolution	meeting effectiveness
coaching	conflict resolution

The top six in the industry lists were very similar except “listening” did not appear in the lists for either work group leaders or members and “trust building” appeared in both.

For the project, we considered it useful to determine if the topics being trained by shipyards were the most appropriate for employees leading and participating in work groups that were progressing toward self-directed status. The fact that the surveyed industries, all of which had successful work groups, agreed closely with the shipyard training was encouraging. However, we wanted to perform a more detailed identification of competencies necessary to lead and sustain work groups.

Approach to Competency Identification

A variety of methods for non-technical competency identification have been developed over the last 30 years. Organizations have the option to either develop or buy their models and there are pro's and con's with each of these possibilities. When an organization decides to develop their competencies, they usually hire an outside consulting firm to conduct a job analysis and determine relevant competencies. There are many firms in existence that are able to conduct such an analysis. The benefit of this method is that the competencies are tailored to the organization and specific jobs or families of jobs. However, the downside is that once the competencies are selected, organizations usually don't put the model through a rigorous testing and validation process to determine if they do in fact accurately represent those jobs.

Organizations also have the option to buy their competency model. The positive aspect of this approach is that these models have already been validated and they usually include an assessment instrument. On the other hand, the potential drawback with this method is that the model is not developed for a specific organization and the competencies tend to fit a broad category of jobs such as "middle manager" and "senior manager."⁵

During the literature search and survey conducted during Phase One, project team members in NASSCO's Training & Development (T&D) Department addressed the question of competency identification. They identified three possible approaches:

- Internal model development using primarily shipyard resources
- Internal model development using the assistance of an outside consulting firm
- Tailoring an existing model to meet the needs of NASSCO

Creating an internal model based on the project members' research and knowledge of NASSCO was quickly determined to be too labor intensive. Furthermore, the internal resources to support that effort were not sufficient.

To explore the possibility of developing a competency model with the assistance of an outside consulting firm, the project members attended a presentation given by Development Dimensions International (DDI). During the presentation, the members determined that even using the tools of an outside consulting firm, the process would still require too many staff resources. In addition, this process was cost prohibitive.

Tailoring an existing model offered the best prospect, but first it was necessary to find a model that was compatible with, or adaptable to, the prototype competency information developed in Phase One of the project. In the second quarter of 1999, the project members determined that Target Training International (TTI) offered a method that fit the project needs. The attraction of TTI was that they had recently developed a competency model and assessment tool based on several years of research and study. TTI determined that while some organizations were able to make the time commitment for internal staff to develop a competency model, or the financial commitment to hire an external consultant, many were not. As a result, they developed the "Competency-Based Position Analysis," which meets the needs of organizations like NASSCO. Internal training professionals administer the tool, analysis is done by TTI, and results are obtained in a fairly short amount of time. In addition, the tool is relatively low in cost. Thus, NASSCO partnered with TTI and has been using this tool for this project and throughout the organization for the past year.

Competency-Based Position Analysis – The Process

The Competency-Based Position Analysis is based on a patented methodology that identified the "DNA" structure of a set of 20 non-technical competencies that are highly compatible with the competencies identified by research in Phase One. The DNA competencies are shown in Table 3.

Table 3. DNA Competencies

Presenting**	Creativity/Innovation
Political Adeptness	Written Communication**
Persuasion	Negotiation
Customer Service*	Futuristic Thinking
Leadership/Management*	Problem Solving/Decision Making**
Flexibility*	Empathy

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Interpersonal Skills*	Conflict Management**
Employee Development/Coaching**	Goal Orientation*
Planning/Organizing*	Continuous Learning*
Teamwork**	Personal Effectiveness*

* Competency included in either the Project 9-96 foundation competencies or the current project survey

** Competency included in the top six work group training topics (Table 2)

The term DNA is used to describe the “hard wiring” of each competency that makes it unique. This hard wiring includes skill, behavior, attitude, knowledge, beliefs and intelligence.⁶ The competencies that are a part of the TTI model resulted from years of research and debate conducted by their team. A unique aspect to this model and process is the focus on the position, which is discussed below.

The process for administering the Competency-Based Position Analysis involves three main steps. To better understand the focus and outcomes of each step, the main activities are listed below.

- **Step One:** Complete the questionnaire
- **Step Two:** Clarify issues and validate performance
- **Step Three:** Integrate information into human resource systems

Step One – Completing the Questionnaire

During this step, no more than ten and no less than three employees individually complete a 104-item questionnaire (Appendix B). The employees completing the survey should be staff who currently hold the job and one or more people who supervise the job. In addition, people who have held the job in the past, or who are very familiar with the position, can contribute. The questionnaire can be completed on-line using the Internet or it can be done in a paper and pencil format.

The way in which the employees respond to the questionnaire determines the prioritization of the list of 20 competencies. The employees never see the list of twenty; rather, their answers back them into the list of twenty. The top five competencies in the prioritized list are highlighted in the final report. These top five later become the focus for incorporation of the competencies into human resource systems.

As the employees complete the questionnaire, they are told they will be thinking of three things as they consider their answers. The first is how the work is currently being performed; the second is how the employee would like the work to be performed; the third is how the work should be performed. The employees are continually reminded to focus on the third approach as they complete the questions.⁷

Step Two – Clarifying Issues and Validating Performance

There are two groups of activities that take place within this step. The first activity involves a review of the results to determine if there is general agreement among the individuals or disagreement. If there is agreement, the facilitator gathers the group and reviews the results with them. Then, the group operationally defines the top five competencies to personalize them to the position and the organization. Each of the five competencies includes a one-sentence definition and several bullet points for further description. The facilitator takes the group through a simple voting process to determine which of the bullets best describes that competency (Appendix C).

If the disagreement is significant enough, a facilitator reconvenes the group to discuss the position and eventually come to agreement through a consensus process. It is suggested that the facilitator take one questionnaire and walk the group through each item. The facilitator allows enough discussion that issues can surface and be clarified, but manages conversation so one answer is agreed to for each question. Then, the questionnaire is re-scored, the consensus results are shared with the employees, and the operational definition process takes place.

The second set of activities in step two focuses on validation. These activities must take place prior to integration of the competencies into the human resource systems. The validation process determines that employees in the job exhibit superior performance because they utilize the top five competencies while performing their jobs. This information can be gathered through interviews and then compared to the performance of people in the position who don't perform as well. When it is determined that the top five

competencies are necessary for superior performance, the competencies are validated and can be incorporated in a variety of Human Resources systems.⁸

Step Three – Integrating Competencies into Human Resources Systems

In the final step, the information generated in steps one and two is incorporated into the selection, training, performance management, and succession planning systems. The Competency-Based Position Analysis report includes a section of interview questions that are written based on the top five competencies. After the competencies are validated, these questions could be easily incorporated into the interviewing and succession planning processes. The competencies are also useful in determining training that is most appropriate for employees in a job or a family of jobs. Finally, the competencies can be used to reward employees through the promotion and salary increase process. If employees know what is expected in the non-technical aspect of their job, they will have an easier time in meeting those expectations.

Results of Competency Identification

Six steel team members and three team leaders at NASSCO were asked to participate in the competency identification process. These teams can be classified as multi-skilled work groups that have the goal of moving toward a self directed group. The team members were selected randomly and the leaders were selected based on the members of their work group who were asked to participate.

The team member group did not reach agreement on the top five competencies after the questionnaire was completed by individuals (Appendices D and E). The group reconvened and went through the consensus process in order to reach agreement (Appendix F). The team members met one final time to operationally define the top five competencies. These competency titles are shown in Table 4. A complete description of the competencies is found in (Appendix G).

Table 4. Top five competencies selected by team members and team leaders

Team members	Team leaders
Employee development/ coaching**	Teamwork**
Teamwork**	Employee development/coaching**
Conflict resolution**	Personal effectiveness*
Planning/Organizing*	Empathy
Personal Effectiveness*	Planning/Organizing*
	Interpersonal skills*

* Competency included in either the Project 9-96 foundation competencies or the current project survey

** Competency included in the top six work group training topics (Table 2).

The team leaders did reach agreement during their initial survey process. The team leaders had two competencies of equal value for fifth place and both are shown in Table 4. The team was reconvened to review their results (Appendices H and I) and complete operational definitions on their top five competencies (Appendix G).

The top five lists introduce two topics not included in the shipyard work group training survey and reorder some of the others. The new competencies are personal effectiveness and empathy, which are an important addition to those already identified. Reordering of the list of existing competencies is likely to happen any time the specific needs of a new group are considered.

3. Selection of an Assessment Instrument

Approach to Instrument Selection

The Center for Creative Leadership's (CCL) model for leadership development (depicted on Page 4) indicates that employee assessment, following competency identification, is the next phase in the process. There are multiple methods for assessing employees against competencies. These methods include performance appraisal, 360-degree feedback, feedback from customers, interviews, assessment center experience, and/or self-assessment.

For the purposes of this project, 360-degree feedback was selected as the method for assessment. This approach allows the employee to assess him or herself and to be able to compare that data to the anonymous feedback received from their supervisor, direct reports, peers, and customers. There are several benefits of the 360-degree feedback process; the employee receives feedback from different viewpoints, many behaviors can be rated, the anonymity in the process tends to lower defensiveness, and the feedback supports the employee development process.⁹

The 360-degree assessment tool developed by TTI to compliment their Competency-Based Position Analysis was selected for the project's assessment phase. The reports will be customized so that they focus on the top five competencies identified for group leaders and members. The assessment tool and results of the 360-degree assessment process will be discussed in Deliverable 4.

Endnotes

¹ *The DNA of Performance*, Fronk and Bonstetter, Target Training International (TTI)

² Ibid

³ *Employee Opinion Survey, 1996*, Pacific Gas and Electric Company, San Francisco, CA; Not Published

⁴ *Assisting U.S. Shipyards to Develop and Maintain a Skilled Trades Workforce*, NSRP Project 9-96-1&2

⁵ *Russ Moxley Interview*, Center for Creative Leadership (CCL)

⁶ *The DNA of Performance*, Fronk and Bonstetter, Target Training International (TTI)

⁷ Ibid

⁸ Ibid

⁹ *Tools for Developing Successful Executives*, Center for Creative Leadership

Appendix A: Changes to Organizational Elements

	Multi-Trade Workgroups	Multi-Trade, Multi-Skilled Work Groups(with worker participation)	Self-Directed, Multi-Skilled Teams
Management Structure	• Single upper-level manager • Trade group-related manager (structural, mechanical) • Project or zone manager	• Single upper level manager • Trade group related manager (structural, mechanical) • Project or zone manager	• Single upper level manager • Trade group related manager (structural, mechanical) • Project or zone manager • Supervises team activities
1 st Line Supervision	• 1st line supervisor from one of the component trades • Primary responsibilities are: - safety - coordination • In zone or project management, technical support may be limited. • Dependent on line workers for technical support	• 1st line supervisor may be multi-skilled • Primary responsibilities are: - safety - coordination • Performs coaching role as workers accept responsibility for selected group activities	• 1st line supervision rests with team members • For previous supervisors: - Coaching activity extends to more than one work group - May perform inter-team coordination in selected support areas
Line Workers	• Technical expert on job • Can not rely on the supervisor to catch errors • Responsible to provide technical support	• Share responsibility for selected group activities: - work assignment - work process selection	• Assume leadership roles within work group • Participate in decision making and in process improvement • Interface with support functions and other work groups
Support Functions	• Changes in support are driven more by project management than by shift to multi-trade work	• Support interfaces configured to accommodate self-directed functions • HR functions including compensation and performance review adjusted to accommodate multi-skilling	• Support functions configured to interface with team leader • HR functions adjusted to teams • Compensation and performance review incorporate team performance
Benefits	• Improved coordination of trades in multi-trade process	• Better use of personnel resources • Fewer supervisors	• Improvement in process and productivity through worker participation • Better work environment

Appendix B:

TTI Competency Questionnaire

The competency questionnaire currently used by Target Training International (TTI) can be viewed by double-clicking on the Adobe PDF document icon below if you have Adobe Reader v.3.0 or later. If you need Adobe Reader, it can be downloaded free from their website: www.adobe.com.

The current survey questionnaire included in this Appendix is not the exact survey that was used for the project interviews. TTI was in the process of modifying the survey when the project started, so an older version was used for the project. The key differences in the current survey are:

- There is no longer a reference to whether each question will apply to the position in the future
- The current survey highlights the top 7 competencies vice the top 5, and 23 total competencies are included in the list vice the original 20.
- Some of competency categories that included multiple competencies, such as “management/leadership” were broken out separately.



[**NOTE:** The item is not available in this file.]

Appendix C:

Summary of Competencies for Members and Leaders

The team leader competencies are shown on pages 7 through 11 of the Adobe PDF document object below. Double-clicking on the icon below will open the document if you have Adobe Reader v.3.0 or later.



[**NOTE:** The item is not available in this file.]

The team member competencies are shown on pages 6 through 10 of the Adobe PDF document object below. Double clicking on the icon below will open the document if you have Adobe Reader v.3.0 or later.



[**NOTE:** The item is not available in this file.]

Appendix D: Members' Initial Competency Rankings

Hierarchy of Competencies

The competencies required for superior performance are prioritized based on the analysis of responses to the questionnaire. Where there were multiple respondents to the questionnaire, the list represents a composite average of all responses. The top competencies represent a significant relationship to superior performance.

Hierarchy of Competencies

1. **Personal Effectiveness**
2. **Teamwork**
3. **Continuous Learning**
4. **Planning/Organizing**
5. **Goal Orientation**
6. **Employee Development/Coaching**
7. Conflict Management
8. Interpersonal Skills
9. Empathy
10. Flexibility
11. Problem Solving/Decision Making
12. Leadership/Management
13. Futuristic Thinking
14. Customer Service
15. Negotiation
16. Persuasion
17. Written Communication
18. Political Adeptness
19. Creativity/Innovation
20. Presenting

Appendix E:

Members' Clarification of Position Issues

Clarification of Position Issues

The distribution of competency ranking clarifies individual differences in the hierarchy of competencies when the questionnaire is completed by multiple respondents. The chart illustrates the composite hierarchal listing of competencies as well as the distribution of individual respondent rankings.

	HIERARCHY OF COMPETENCIES	R1	R2	R3	R4	R5	R6	R7	R8	R9
1	Personal Effectiveness	6	3	4	1	1	3	2	10	3
2	Teamwork	2	4	1	9	4	1	9	3	1
3	Continuous Learning	5	1	6	4	6	2	4	7	9
4	Planning/Organizing	11	5	3	5	2	7	3	13	7
5	Goal Orientation	8	6	7	3	5	5	7	9	12
6	Employee Development/Coaching	1	2	2	16	15	4	1	2	19
7	Conflict Management	7	17	20	7	3	8	6	1	5
8	Interpersonal Skills	4	13	10	14	9	11	10	5	14
9	Empathy	3	15	9	15	13	12	5	4	17
10	Flexibility	14	8	16	2	16	9	12	8	8
11	Problem Solving/Decision Making	10	10	11	8	10	6	13	14	16
12	Leadership/Management	15	14	13	10	7	10	16	12	6
13	Futuristic Thinking	13	9	8	6	11	15	14	17	15
14	Customer Service	12	7	19	11	19	18	15	11	4
15	Negotiation	9	11	14	19	18	14	8	6	20
16	Persuasion	19	16	12	13	8	17	18	16	13
17	Written Communication	20	19	5	20	20	19	11	20	2
18	Political Adeptness	18	18	18	12	14	13	17	15	11
19	Creativity/Innovation	16	12	15	17	17	16	20	18	18
20	Presenting	17	20	17	18	12	20	19	19	10

Note: **R1, R2**, etc. refer to each rater. Scores above 9 indicated disagreement. Significant differences between respondents' ranking of the top competencies are best reconciled before integrating the competencies into selection and performance management systems.

Appendix F:

Members' Final Competency Rankings

Hierarchy of Competencies

The competencies required for superior performance are prioritized based on the analysis of responses to the questionnaire. Where there were multiple respondents to the questionnaire, the list represents a composite average of all responses. The top competencies represent a significant relationship to superior performance.

Hierarchy of Competencies

- 1. Employee Development/Coaching**
- 2. Teamwork**
- 3. Conflict Management**
- 4. Planning/Organizing**
- 5. Personal Effectiveness**
6. Empathy
7. Continuous Learning
8. Problem Solving/Decision Making
9. Interpersonal Skills
10. Goal Orientation
11. Futuristic Thinking
12. Leadership/Management
13. Creativity/Innovation
14. Negotiation
15. Persuasion
16. Political Adeptness
17. Presenting
18. Customer Service
19. Flexibility
20. Written Communication

Appendix G: Steel Department Team Competency Analysis Results

Team Members	Team Leaders
1. <i>Employee Development/Coaching – Facilitating and supporting the professional growth of others</i> • Expresses confidence in others' ability to perform • Encourages initiative and improvement • Acknowledges and praises improvements • Trains, coaches and mentors others to develop • Views mistakes as opportunities for learning	1. <i>Teamwork – Working effectively and productively with others</i> • Respects team members and their individual perspectives • Makes team mission and objectives a priority • Meets agreed-upon deadlines on team assignments and commitments • Shares responsibility with team members for successes and failures • Supports team decisions • Provides constructive feedback to team and its members
2. <i>Teamwork – Working effectively and productively with others</i> • Respects team members and their individual perspectives • Shares responsibility with team members for successes and failures • Keeps team members informed regarding projects • Supports team decisions • Provides constructive feedback to team and its members • Responds positively to feedback from team members	2. <i>Employee Development/Coaching – Facilitating and supporting the professional growth of others</i> • Expresses confidence in others' ability to perform • Encourages initiative and improvement • Gives new, difficult and/or challenging work assignments • Acknowledges and praises improvements • Trains, coaches and mentors others to develop
3. <i>Conflict Management – Addressing and resolving conflict constructively</i> • Listens to gain understanding of issues from different perspectives • Assists people to move from adversarial positions to a common ground • Strives to settle differences equitably • Negotiates tough agreements without damaging relationships	3. <i>Personal Effectiveness – Projecting self- control, confidence and composure in the management of emotions, time, energy and performance</i> • Controls emotions and maintains composure in stressful situations • Manages time and priorities to achieve objectives • Confident in their ability to achieve goals • Admits mistakes and works to avoid repeating them • Has a personal stake in achieving success, and takes ownership of outcomes
4. <i>Planning/Organizing – Utilizing logical, systematic and orderly procedures to meet</i>	4. <i>Empathy – Identifying with and caring about others</i>

Team Members	Team Leaders
<i>objectives</i> • Works effectively within established time frames and priorities • Utilizes logical, practical and efficient approaches • Prioritizes tasks for optimum productivity • Develops procedures, processes and systems for order, accuracy, efficiency and productivity	• Demonstrates genuine concern for others • Respects and values people • Advocates for the interests, needs and wants of others • Demonstrates cross-cultural sensitivity and understanding
5. <i>Personal Effectiveness – Projecting self-control, confidence and composure in the management of emotions, time energy and performance</i> • Controls emotions and maintains composure in stressful situations • Manages time and priorities to achieve objectives • Confident in their ability to achieve goals • Admits mistakes and works to avoid repeating them • Accepts personal responsibility for achieving personal and professional goals	5. <i>Planning/Organizing – Utilizing logical, systematic and orderly procedures to meet objectives</i> • Works effectively within established time frames and priorities • Utilizes logical, practical and efficient approaches • Prioritizes tasks for optimum productivity • Monitors implementation of plans and makes adjustments as needed
	6. <i>Interpersonal Skills – Effectively communicating, building rapport and relating well to all kinds of people</i> • Demonstrates sincere interest in others • Treats all people with respect and consideration • Respects differences in the attitudes and perspectives of others • Listens, observes and strives to gain understanding of others

Appendix H: Leaders' Competency Rankings

Hierarchy of Competencies

The competencies required for superior performance are prioritized based on the analysis of responses to the questionnaire. Where there were multiple respondents to the questionnaire, the list represents a composite average of all responses. The top competencies represent a significant relationship to superior performance.

Hierarchy of Competencies

1. **Teamwork**
2. **Employee Development/Coaching**
3. **Personal Effectiveness**
4. **Empathy**
5. **Planning/Organizing**
6. **Interpersonal Skills**
7. Continuous Learning
8. Conflict Management
9. Leadership/Management
10. Goal Orientation
11. Problem Solving/Decision Making
12. Flexibility
13. Persuasion
14. Futuristic Thinking
15. Political Adeptness
16. Written Communication
17. Presenting
18. Customer Service
19. Negotiation
20. Creativity/Innovation

Appendix I: Leaders' Clarification of Position Issues

Clarification of Position Issues

The distribution of competency ranking clarifies individual differences in the hierarchy of competencies when the questionnaire is completed by multiple respondents. The chart illustrates the composite hierarchal listing of competencies as well as the distribution of individual respondent rankings.

	HIERARCHY OF COMPETENCIES	R1	R2	R3	R4	R5
1	Teamwork	1	1	1	1	1
2	Employee Development/Coaching	2	2	2	3	2
3	Personal Effectiveness	4	3	3	6	12
4	Empathy	12	7	4	2	3
5	Planning/Organizing	5	11	5	7	4
6	Interpersonal Skills	11	6	6	4	5
7	Continuous Learning	7	4	11	5	10
8	Conflict Management	6	5	10	15	6
9	Leadership/Management	9	9	7	13	7
10	Goal Orientation	16	13	8	8	8
11	Problem Solving/Decision Making	13	10	12	11	9
12	Flexibility	10	8	16	12	15
13	Persuasion	8	16	9	18	14
14	Futuristic Thinking	14	14	13	14	11
15	Political Adeptness	17	15	15	10	13
16	Written Communication	3	19	17	20	18
17'	Presenting	15	18	14	17	17
18	Customer Service	20	20	19	9	19
19	Negotiation	18	17	20	16	16
20	Creativity/Innovation	19	12	18	19	20

Note: **R1, R2**, etc. refer to each rater. Scores above 9 indicated disagreement. Significant differences between respondents' ranking of the top competencies are best reconciled before integrating the competencies into selection and performance management systems.

Leading and Sustaining Multi-Skilled Work Groups

Deliverable 4

Phase 2 Report:

Develop Production Work Group Leaders and Members

Project 9-98-1

The National Shipbuilding Research Program / Maritech ASE

October 2000

Leading and Sustaining Multi-Skilled Work Groups

Phase 2 Report: Develop Production Work Group Leaders and Members

Compiled at
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October 2000

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DELIVERABLE 4:

Phase 2 Report

1. Introduction

The Overall Project

The primary objective of this project is to improve the competitiveness of U.S. shipyards through the development of effective production leadership and multi-skilled work groups. Production work groups are defined for this project as groups or teams (terms are used synonymously) of two or more workers that function on the job to carry out production activities. Multi-skilled groups are composed of members that possess journey-level technical skills in more than one trade. Self-directed teams are led by one of the members (as opposed to outside supervision) and possess some degree of autonomy.

Work groups are in limited use in shipyards, while other progressive manufacturing organizations have been using them for years. However, there is no baseline of the leadership or team member competencies applicable to the shipbuilding/ship repair industry, nor is there a compendium of best practices in acquiring those skills.

The project is organized in three phases with several tasks associated with each phase. The first phase analyzed current industry experience in multi-skilled groups to identify and extrapolate various group types and applications. The first part of the second phase then defined the competencies needed for both group leaders and group members. This report covers the remaining tasks of the second phase, which are an assessment of members of a steel assembly team at NASSCO on the selected competencies, and the development of a pilot training program. The last phase of the project will be a practical demonstration of the process by training a pilot group and then evaluating the functioning of the group. This report is the fourth deliverable associated with the project.

Deliverable 1

The first project deliverable reported on two activities – a literature search and survey – conducted to gather information on current practice and experience with leading and sustaining multi-skilled work groups in the U.S. shipbuilding and ship repair industry and in broader industrial applications. The literature search was conducted to provide insight into the research that has been conducted with respect to forming, leading and sustaining multi-skilled work groups. The survey was based on the information and concepts uncovered by the literature search. Shipyards, and other industries with success using work groups or teams, were included in the survey.

Deliverable 2

Deliverable 2, Phase 1 Report, reported on the final two tasks of the first project phase. The first was the identification of multi-skilled work group and leader types and their application to shipbuilding. The second task was the identification of the elements and characteristics necessary to sustain successful multi-skilled groups. These tasks based their conclusions on the literature search and survey information reported in Deliverable 1.

Deliverable 3

Deliverable 3, Competency Identification and Assessment Method Selection, reported on the results of the first two tasks of Phase 2 of the project. The objective of this part of the project was to develop training materials to help prepare work group leaders and members to function effectively within a work group.

The first task of Phase 2 addressed identifying appropriate competencies (knowledge, skills and abilities) for leaders and members of multi-skilled work groups. The approach to the competency identification process included both an analysis of data collected in Phase 1 and the use of a commercial competency-ranking tool for leaders and group members. The second step in Phase 2 was to select an instrument to assess the identified competencies of group leaders and members. This process included an examination of commercially available assessment instruments to determine if an appropriate instrument could be purchased.

This Report

Deliverable 4 reports on the results of the final two tasks of Phase 2: Assess Leader and Group Competencies (Task 2.3), and Develop Training Materials (Task 2.4). The objective of Task 2.3 was to conduct an assessment of the selected competencies for team leaders and members, using the assessment instrument selected in the previous task. Task 2.4 included the selection and development of appropriate training materials to be used in the pilot training program that will be implemented in Phase 3.

2. Competency Assessment

Approach to Competency Assessment

Deliverable Three discussed a variety of approaches to assessment. These included performance appraisal, 360° feedback, feedback from customers, interviews, assessment center experiences, and/or self-assessment. The project initially selected 360° feedback as the method of choice. The primary reason for this decision was that an assessment tool was available from Target Training International (TTI) to be used in tandem with the competency analysis used as the pre-assessment instrument (Deliverable 3). The project members felt that this was an attractive option due to the cohesiveness between the two tools.

Further analysis, however, indicated that 360° feedback might not be the best approach for all team members. There were two reasons for this:

First, only six team members from NASSCO's Steel Team participated the Competency Based Position Analysis, which identified the top five competencies for team members (Deliverable 3). For the entire Steel Team to benefit, it was decided that all team members should be involved in the assessment and training and development activities. With this decision, the initial number of six team members participating in the project would now grow to twenty-nine.

Second, the logistics to administer any 360° assessment are somewhat involved (this will be discussed shortly). To maintain the project schedule, it did not appear possible to successfully incorporate 29 team members into the process.

Due to these factors, it was decided that the team members would be assessed via a performance review process rather than a 360° feedback tool. However, the project retained an interest in using TTI's 360° assessment tool and decided that since, at this stage of the project, only two team leaders were involved, to use 360° feedback for the leaders. The Discovery tool could be easily administered to these leaders and produce useful feedback on their performance of the top-rated competencies.

The Assessment Process

Team Member Assessment

The project developed an assessment tool (*Appendix A*) to determine current performance of team member on the top competencies (Employee Development/Coaching, Teamwork, Conflict Management, Planning/Organizing, and Personal Effectiveness [See Deliverable 3]). Using the tool, the team leaders assessed and gave feedback to each of the team members on their respective teams. They used a numerical ranking of one to four (One = Always Exhibits; Two = Often Exhibits; Three = Rarely Exhibits; Four = Never Exhibits) on the performance of each of the five competencies and also provided comments. After the team leaders completed the written feedback (*Appendix A*), they reviewed their feedback with each team member.

Team Leader Assessment

The 360° Discovery tool was administered to the team leaders to gain insight into their current performance on the leader top competencies (Teamwork, Employee Development/Coaching, Personal Effectiveness, Empathy, Planning/Organizing, and Interpersonal Skills [See Deliverable 3]). The 360° Discovery tool was customized by the supplier (TTI) and the feedback forms included five questions for each of the top six competencies (*Appendix B*). Each team leader received feedback from each other, their supervisors, peers, and team members. Each person providing feedback responded to the exact same set of thirty questions and the feedback from peers and subordinates was anonymous.

The tool was administered by first meeting with the team leaders to explain the process and distribute the forms. They were given approximately one week to complete the form on themselves, each other as peers, and to distribute one form to their immediate supervisor and two forms to additional peers. The second step was to gather ten team members to provide feedback as subordinates (five for each team leader). A thirty-minute meeting was held where instructions were provided, questions answered, and quiet time outside of the yard given for them to complete their feedback. Once all the forms were completed, they were mailed to TTI for scoring and analysis. TTI provided a comprehensive report for each team leader as well as a booklet to assist in the interpretation of results. The project coordinator met with the leaders individually and reviewed the results with them in a private session. (A minimum of three peers is required to protect the anonymity of the feedback. Unfortunately, only two peer forms were turned in for each team leader by the deadline. Due to this situation, the peer feedback is not included in their reports).

Assessment Results

Team Members

Of the twenty-seven team members, twenty-five received feedback from their leaders. An error took place in the duplication of the assessment forms and two of competencies, conflict management and planning/organizing, were not assessed. When the error was noted, the project coordinator talked with the team leaders and received some verbal feedback on the performance of these two competencies by team members.

The feedback received was generally positive. Comparing these results with anecdotal evidence, it appeared that the team leaders were reluctant in several cases to provide constructive feedback. With only one response point, it is unclear whether the team members were indeed performing successfully on the measured competencies or if the team leaders were skeptical of the process and weren't completely honest in their ratings.

Team One had eight of the 13 members scored as one's (Always Exhibits) for each competency rated. The other five members were given two's and three's (Often Exhibits and Rarely Exhibits) and comments indicated that room for improvement existed. For this team, the weakest areas were Employee Development and Coaching and Teamwork. For Team Two, none of the 12 team members received ratings of "one" on all competencies, each being evaluated at two (Often Exhibits) on some competencies. Very few constructive comments were given for Team Two. The distribution of the grades and the difference in grading approach between the two leaders, made it difficult to isolate those competencies that were weaker for each and both teams.

Team Leaders

Interpreting the results of the team leaders' 360° assessment is somewhat involved, however, the participant workbook (*A Guide to Understanding Your Survey Results*) that accompanies the feedback report provided by the supplier is quite useful. The evaluation process basically consists of asking for "is performing" and "should be performing" responses on questions relating to the competencies being measured. From these responses a difference or "gap size" is calculated. The 'gap size' is the numeric difference between how often a behavior occurs and how often the behavior is expected or needed and is used to identify perceived strengths and weaknesses.

Gap size is presented somewhat differently for "boss" and for peer and subordinate ratings, but the basic rule is, the larger the gap the greater the perceived weakness. In the peer and subordinate ratings, averages are calculated. A gap of .39 or less indicates exceptional performance. A gap of .40 to .79 relates to decent/normal performance while .80 to .99 suggests a mild desire for change. A gap of 1.00 or more indicates a strong desire for change from this rating group. Finally, a "reversal" score can be given which indicates that the team leader is performing above and beyond the expectation for that competency or they need to perform the competency to a lesser degree.

The feedback report is divided into four main sections – Category Report, Individual Practices, Overview Report, and Summary Report. The purpose of the Category Report (*Appendix B, Page 1*) is to give an

overall picture of how the team leader was rated in each of the top competencies (Selection of top competencies was discussed in Deliverable 3). The Individual Practices Report (*Appendix B, Pages 2 -- 5*) breaks down each of the top competencies by listing the average response to each of the thirty questions. Both of these reports include the following information: The average of the gap sizes from each rating group by competency and individual question, a bar graph displaying the average gap sizes, and a gap size distribution chart. The distribution chart indicates how many people scored the team leader with a reversal, gap of zero, gap of one, gap of two, etc. The distribution chart is particularly important for the team leader to examine. They need to remember that one cannot please all of the people all of the time. Because the distribution table displays how many people scored each of the gaps, they can determine which are the most important areas for improvement according to most of the people and which areas are desired for improvement by just a few.

The Overview Report (*Appendix B, Page 7*) includes a summary of the team leader's areas of greatest strength (smallest gap size) and areas that need the most amount of development (greatest gap size). This section includes lists from the boss, peer group and subordinates. Finally, the Summary Report (*Appendix B, Pages 8 -- 10*) contains prioritized lists of each of the thirty questions from smallest to largest gap size. A list is provided based on the boss rating, peer group ratings and subordinate ratings.

The Category and Overview Reports are useful in determining the results of the assessment. The Category Report of one team leader indicated that there is general agreement between the individual, his boss and his subordinates in the performance of the top competencies. In general, the feedback indicates he is performing effectively in these competency areas. On the other hand, the second team leader had greater discrepancy between his self-ratings and those of his respondents.

Following is a summary of the variation in response: First, Employee Development/Coaching was the only competency in which there was agreement between the individual, his boss and subordinates. The second, third and fourth competencies (Teamwork, Interpersonal Skills, and Planning/Organization) results showed agreement between the leader and his boss but subordinates felt there was a need for improvement. Fifth, Personal Effectiveness indicated that the leader's boss believed there is a need for improvement while the individual and subordinates felt comfortable with performance of this competency. The results of the sixth competency, Empathy, indicated that the leader perceived his performance as effective while his boss and subordinates felt that improvement was needed.

The Overview Report provides a summary of the greatest areas of strength and competencies most needing development. Results for the team leaders are shown on the following pages.

Team Leader Number One – Rated by Boss

Strength/ Weakness	Question	Competency	Gap Size
Strength	Identify developmental needs	Coaching	0.00
Strength	Promote personal and professional growth	Coaching	0.00
Strength	Identify issues limiting team effectiveness	Teamwork	0.00
Strength	Contribute to team effectiveness	Teamwork	0.00
Strength	Follow-through on team commitments and responsibilities	Teamwork	0.00
Weakness	Treat people with respect, courtesy and consideration	Interpersonal Skills	2.00
Weakness	Demonstrate cross cultural sensitivity and understanding	Empathy	1.00
Weakness	Identify with difficulties of others	Empathy	1.00
Weakness	Demonstrate resiliency in bouncing back from setbacks	Personal Effectiveness	1.00
Weakness	Demonstrate initiative and sense of purpose in pursuit of goals	Personal Effectiveness	1.00

Team Leader Number One – Rated by Subordinates

Strength/ Weakness	Question	Competency	Gap Size
Strength	Demonstrate an understanding of self and others	Interpersonal Skills	0.20
Strength	Utilize orderly and systematic methodologies to meet objectives	Planning/ Organizing	0.20
Strength	Project strong confidence in their own abilities	Personal Effectiveness	0.20
Strength	Train, coach or mentor others	Coaching	0.25
Strength	Identify issues limiting team effectiveness	Teamwork	0.25
Weakness	Function effectively in adverse circumstances	Personal Effectiveness	1.00
Weakness	Communicate and relate effectively with all kinds of people	Interpersonal Skills	1.00
Weakness	Encourage, support and acknowledge efforts to improve	Coaching	1.00
Weakness	Identify with the difficulties of others	Empathy	0.80
Weakness	Take responsibility for own actions	Personal Effectiveness	0.80

Team Leader Number Two – Rated by Boss

Strength/ Weakness	Question	Competency	Gap Size
Strength	Promote personal and professional growth	Coaching	0.00
Strength	Encourage, support and acknowledge efforts to improve	Coaching	0.00
Strength	Identify issues limiting team effectiveness	Teamwork	0.00
Strength	Contribute to team effectiveness	Teamwork	0.00
Strength	Follow-through on team commitments and responsibilities	Teamwork	0.00
Weakness	Demonstrate resiliency in bouncing back from setbacks	Personal Effectiveness	3.00
Weakness	Go out of their way to help others	Empathy	2.00
Weakness	Develop detailed plans to meet objectives	Planning/ Organizing	2.00
Weakness	Utilize orderly and systematic methodologies to meet objectives	Planning/ Organizing	2.00
Weakness	Plan for optimum utilization of resources	Planning/ Organizing	2.00

Team Leader Number Two – Rated by Subordinates

Strength/ Weakness	Question	Competency	Gap Size
Strength	Train, coach or mentor others	Coaching	0.00
Strength	Take responsibility for own actions	Personal Effectiveness	0.20
Strength	Project strong confidence in their own abilities	Personal Effectiveness	0.25
Strength	Function effectively in adverse circumstances	Personal Effectiveness	0.25
Strength	Encourage, support and acknowledge efforts to improve	Coaching	0.60
Weakness	Demonstrate initiative and sense of purpose in the pursuit of goals	Personal Effectiveness	1.60
Weakness	Treat team mission and objectives as a high priority	Teamwork	1.60
Weakness	Utilize orderly and systematic methodologies to meet objectives	Planning/ Organizing	1.40
Weakness	Follow-through on team commitments and responsibilities	Teamwork	1.40
Weakness	Take personal or professional risks for others	Empathy	1.20

3. Training and Development

Identifying Training Needs

The assessment results were analyzed to identify training needs based on areas of strength and needed development. It was difficult to isolate consistent and specific areas of weakness for team members and leaders. In the case of one team leader, the questions with the biggest gap rated by both his boss and subordinates were within the competencies interpersonal skills, empathy, and personal effectiveness. The second team leader's weaker areas rated by both his boss and subordinate were personal effectiveness, planning/organizing and empathy.

In addition, employee development/coaching and teamwork were also identified by question(s) with a large gap by one of the rater groups. Therefore, all six competencies were mentioned as areas for development. Due to the lack of clarity around specific areas needed for development in both team leaders and members, it was decided that training would be provided for everyone in all six competencies.

Selecting Training Materials

Over the past five years the NASSCO Training & Development Department has developed a catalog of courses in the topics of leadership development, personal development and quality tools. Several of the objectives for these course objectives directly related to the top member and leader competencies. The courses have been offered internally to all NASSCO employees. However the majority of the Steel Team had not taken the opportunity to attend the courses.

As a result, an in-house training program was created and delivered specifically to the Steel Team. All of the courses were two hours in length and held over a period of three days. The following is a list of the courses and the competencies addressed:

Class Title	Competency Addressed
Workstyles (Leadership 7)	Interpersonal Skills and Empathy
Coaching (Leadership 5)	Employee Development/Coaching and Teamwork
Team Dynamics (Quality 8)	Teamwork and Employee Development/ Coaching
Effective Negotiation (Leadership 11)	Conflict Management
Time Management & Goal Setting (Personal Development 1, Parts 1 & 2)	Personal Effectiveness, Planning/Organizing and Teamwork

4. Summary

The assessment processes employed in this phase of the project met with only limited success in identifying the specific training needed by individuals to better perform as leaders and members of teams. The method used for the team members provided only a single evaluation for each team member and it appears that each team leader making the assessment applied the criteria somewhat differently. The 360° assessment used with the leaders appears to provide more information but is much more resource-intensive to administer. The results are difficult to evaluate, being limited to only two people.

The next deliverable (Final Report) will include an evaluation of the effectiveness of the training. The training evaluation was intended to include four elements or levels (based on the Kirkpatrick¹ method):

Level One, *Reaction*, measures how participants felt about the training experience and can be considered a customer satisfaction survey. This type of evaluation is commonly known as a “smile sheet” and is completed by participants immediately after the training has concluded.

Level Two, *Learning*, measures the extent to which participants increased their knowledge, improved their skills or changed their attitude. Written pre and post-tests are commonly used to measure Level Two.

Level Three, *Behavior*, provides data on the extent to which job behavior changed and the degree to which training transferred back to the job.

Level Four, *Results*, measures the organizational results that occurred due to the training (i.e., increased output, improved quality, decreased costs, increased profit/ROI and/or improved sales and safety statistics).

¹ Donald Kirkpatrick, PHD, Professor Emeritus, University of Wisconsin

Appendix A:
Team Member Assessment
Non-Technical Competencies

1. *Employee Development/Coaching – Facilitating and supporting the professional growth of others*

- Expresses confidence in others' ability to perform
- Encourages initiative and improvement
- Acknowledges and praises improvements
- Trains, coaches and mentors others to develop
- Views mistakes as opportunities for learning

On a scale of 1 – 4, rate the degree to which the employee performs this competency:

1 = Always Exhibits	2 = Often Exhibits	3 = Rarely Exhibits	4 = Never Exhibits

Comments: _____

2. *Teamwork – Working effectively and productively with others*

- Respects team members and their individual perspectives
- Shares responsibility with team members for successes and failures
- Keeps team members informed regarding projects
- Supports team decisions
- Provides constructive feedback to team and its members
- Responds positively to feedback from team members

On a scale of 1 – 4, rate the degree to which the employee performs this competency:

1 = Always Exhibits	2 = Often Exhibits	3 = Rarely Exhibits	4 = Never Exhibits

Comments: _____

3. *Conflict Management – Addressing and resolving conflict constructively*

- Listens to gain understanding of issues from different perspectives
- Assists people to move from adversarial positions to a common ground
- Strives to settle differences equitably
- Negotiates tough agreements without damaging relationships

On a scale of 1 – 4, rate the degree to which the employee performs this competency:

1 = Always Exhibits	2 = Often Exhibits	3 = Rarely Exhibits	4 = Never Exhibits

Comments: _____

4. Planning/Organizing – Utilizing logical, systematic and orderly procedures to meet objectives

- Works effectively within established time frames and priorities
- Utilizes logical, practical and efficient approaches
- Prioritizes tasks for optimum productivity
- Develops procedures, processes and systems for order, accuracy, efficiency and productivity

On a scale of 1 – 4, rate the degree to which the employee performs this competency:

1 = Always Exhibits	2 = Often Exhibits	3 = Rarely Exhibits	4 = Never Exhibits

Comments: _____

5. Personal Effectiveness – Projecting self-control, confidence and composure in the management of emotions, time, energy and performance

- Controls emotions and maintains composure in stressful situations
- Manages time and priorities to achieve objectives
- Confident in their ability to achieve goals
- Admits mistakes and works to avoid repeating them
- Accepts personal responsibility for achieving personal and professional goals

On a scale of 1 – 4, rate the degree to which the employee performs this competency:

1 = Always Exhibits	2 = Often Exhibits	3 = Rarely Exhibits	4 = Never Exhibits

Leading and Sustaining Multi-Skilled Work Groups

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Comments: _____

Appendix B:

Sample 360° Discovery Tool

The Discovery Feedback Report customized for NASSCO by Target Training International (TTI) can be viewed by double-clicking on the Adobe PDF document icon below if you have Adobe Reader v.3.0 or later. If you need Adobe Reader, it can be downloaded free from their website: www.adobe.com.

The Discovery Feedback Report is divided into four main sections:

- Category Report (Page 1)
- Individual Practices Report (Pages 2 – 5)
- Overview Report (Page 7)
- Summary Report (Pages 8 – 10)



"360 Feedback
Sample.pdf"

[**NOTE:** The item is not available in this file.]

For more information about the
National Shipbuilding Research Program
please visit:

<http://www.nsrp.org/>

or

<http://www.USAShipbuilding.com/>