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**Program Managers' Competencies: A Consideration of Project
Management Competencies on the Specific Case of the Land
Reserve Modernization Project at Meaford, Ontario, Canada**

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September 2006**

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THE LAND RESERVE MODERNIZATION PROJECT AT MEAFORD,
ONTARIO, CANADA**

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Submitted in partial fulfillment of the requirements for the degree of

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ABSTRACT

Project management has passed through various stages over time, evolving in order to better meet the needs of particular projects. At present, the scope of program management covers a significant number of situational and sequential activities. That necessitates a series of specific project manager competencies in order to implement projects successfully in terms of cost, schedule, and performance. Several studies have been made in this field, resulting in various outcomes. Among them Dr. Owen Gadeken's research, published in 1997 in the Army R&D magazine, summarizes the competencies of outstanding program managers based upon preceding studies analyzing successful defense program managers. The present report uses the case of the Land Reserve Modernization Program (LRMP) at Meaford, Ontario, Canada, in order to explore the competencies identified in the aforementioned research. The LRMP was a large infrastructure program consisting of four projects, the first of which was the implementation of a militia training support center at Meaford. This report analyzes the LRMP project at Meaford in terms of the program manager's competencies and explores them by highlighting the events that necessitated those competencies.

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I. INTRODUCTION

A. BACKGROUND

In the middle of the 20th century, a new managerial discipline called project management had begun to develop. In the early 1960s companies and organizations experiencing diversification and varied product lines, started understanding the benefits of organizing work around projects, across various functional divisions and assigning the administration of the whole work to one person, the Project Manager (PM)¹. PMs thus became responsible not only for the technical matters of the project but also for financial issues as well as for scheduling themes. They had to deal with many challenges. The traditional management approach could not cover sufficiently this emerging reality. Its emphasis upon the stable working environment, consistent climate, continuity, simplicity, clear organizational structure and responsibility matching authority, had little to do with the environment that the PM had to deal with. Hence there was a need for a multidimensional discipline to cover all the issues of managing a project.

Project management can be viewed as a process with two broad aspects: sequential and a situational. The sequential aspect refers to the orderly specific phases of a project's life cycle, from its genesis up to its closing. The situational aspect comprises all the necessary activities (such as planning, team creation, control, corrective action, leadership etc) that are repeated in each phase of the sequential process so as to ensure the effective implementation of it and the successful transition to the next phase.

The importance of the project management has historically been noted also by the Department of Defense (DoD) for its systems procurement which has traditionally been considered among the most important and difficult of

¹ J. Aaron Shenbar and Dov Dvir. Innovations-Project Management Research, Project Management Evolution: Past History and Future Research Directions, 2004, p. 57.

assignments. The acquisition, deployment and support of systems with the magnitude and complexity required by the DoD, necessitated the effective application of program management and inserted the PMs in front of unique and difficult challenges.

This difficult and complex environment brought about the identification of certain competencies that PMs must possess in order to cope with it successfully. The issue of PMs competencies has attracted much interest in the management literature with many research studies having been made with various findings. While technical and management expertise are considered important skills, an emerging view places the leadership competencies of the PM in a primary position. In an attempt to identify these competencies Dr. Owen Gadeken ,based upon research studies that had been conducted by DoD educational institutions, summarized in his article “Project Managers as Leaders : Competencies of Top Performers”² the behavioral attitudes that distinguished outstanding Defense Community PMs from their contemporaries.

Large infrastructure projects are a common form of complex projects and are usually led by a sponsor and include other players such as regulators, users, affected parties, government officials, and a range of contractors, each with objectives which respond to particular incentives.³The “Land Reserve Modernization Project” concerns the design and construction of training facilities by the Canadian Department of National Defense (DND) of Canada. In the past, political sensitivity in DND’s discretionary spending allowed the Department to maintain infrastructure and resources in areas that were not of direct interest to the Canadian Armed Forces and particularly to the Army. However severe budget curtailments made it impossible for the Army to continue to maintain and use its entire existing infrastructure. In addition, the interchangeability concept between the reserve and regular forces that were espoused, raised a new need

² Owen C. Gadeken. Army RD&A Magazine. Project Managers as Leaders: Competencies of Top Performers. January- February 1997.

for infrastructure to support the reserve forces. To cover these needs, the Land Reserve Modernization Project was decided upon and was comprised of four training centers spread across the country. The Militia Training Support Center (MTSC) at Meaford, Ontario, was the first of these centers and is a characteristic example of a complex construction project in today's changing environment that must conform to existing Government regulations and policies.⁴

B. PURPOSE

This project makes an analysis of PMs competencies and based upon the relative article of Dr Gadeken about top performing PMs competencies, attempts to explore them in the particular case of MTSC at Meaford, Ontario.

C. RESEARCH QUESTIONS

For the implementation of this project research, the following primary and subsidiary research questions were established:

1. Primary

- How are the competencies of top-performing project managers highlighted in the case of MTSC at Meaford?

2. Subsidiary

- What are the competencies of top-performing PMs according to Dr. Owen C. Gadeken's article, published in 1997 by the Army RD&A magazine?
- Are all of these competencies highlighted in the case of MTSC?
- Are there any points in the case of MTSC concerning PMs' competencies that are not covered by Dr. Gadeken's relevant article?

³ Brian Hobbs and Roger Miller. Proceedings of PMI Conference 2002, The Strategic Front End of Large Infrastructure Projects: A Process of Nesting Governance, 2002, p. 41.

⁴ LCol. Foreman. Project Management Casebook. Land Reserve Modernization Project: The Future of the Army Infrastructure. Project Management Institute, 1998, pp.133-134.

D. SCOPE AND LIMITATIONS

The project addresses the field of PMs' competencies in the broader area of program management. Thus the case of MTSC is analyzed only from the perspective of PMs' competencies.

Although consideration of the literature is made, the analysis of this project is based upon the findings of one study regarding the competencies of PMs. Dr Gadeken's study that is used here however, is based upon other studies that were conducted on Defense PMs and is considered among the most important works on PM behavioral competencies.⁵

E. METHODOLOGY

The project first provides a background in order to show the extent and the dimensions of program management. It continues with a review of the recent literature focusing on the PMs competencies and their importance in the project's success. It then transitions to Defense PMs competencies, describing Dr Gadeken's relevant article. The article, based upon other studies conducted by Defense educational institutions, summarizes the results concerning the leadership skills of top-performing project managers. In order to explore these competencies in practice, the MTSC case is used as a vehicle and it is described hereafter. It follows the analysis of the case which explores the required competencies one-by-one by highlighting the events of the case which necessitate the respective competence. Finally, the project ends with conclusions from the analysis and relevant recommendations.

F. BENEFITS OF STUDY

The results of this study can benefit PMs by broadening and deepening their knowledge about the required competencies over specific events in order to enable their use in similar circumstances in their future projects.

⁵ Lynn Crawford. The Frontiers of Project Management Research. PMI Research Conference 2000. Profiling the Competent Manager. Project Management Institute Inc 2002, p. 157.

G. ORGANIZATION OF STUDY

- Chapter I: Identifies the purpose of the project, the primary and subsidiary research questions as well as the methodology and the benefits of the research.
- Chapter II: Presents a brief evolution of program management over the time and describes a conceptual model which visualizes and integrates the dimensions of program management. It mentions DoD's perspective as to what is program management and why they use it. It then focuses on one of the elements of program management, the PMs' competencies, making a literature review and emphasizing the importance of them in project success.
- Chapter III: Offers an overview of Dr Gadeken's article on competencies of top-performing PMs.
- Chapter IV: Introduces the case of Land Reserve Modernization Project at Meaford, Ontario. It describes how this need emerged, the requirements, the organizational framework, the strategy for its implementation, the major events, and the program management challenges.
- Chapter V: Analyzes the case of MTSC at Meaford, Ontario, from the perspective of PMs' competencies as they are stated in chapter III, highlighting the facts that necessitate the respective competencies.
- Chapter VI. Summarizes the conclusions from the analysis and makes recommendations to project managers for their use in future projects. It also identifies areas for further research.

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II. BACKGROUND

A. THE EVOLUTION OF PROJECT MANAGEMENT

Project management is a relatively young discipline. In the middle of the past century, business and organizations started realizing the benefits of organizing work around projects and integrating it across the various functional divisions and departments. A project can be used for a product development, construction, product improvement, system deployment, process creation, process reengineering, new service initiation, software development and etc. The roots of modern project management are visible in the second half of the 19th century, a time when complexity started rising in the business world. The first large project in the United States (US) was the transcontinental railroad which was begun in the early 1870s. The railway construction venture, as well as other large industrial projects that arose later, confronted business leaders with the task of organizing the labor of thousands of workers and the manufacturing and assembly of unprecedented quantities of raw material.⁶

By the turn of the century, Frederick Taylor was studying the way that people worked, and demonstrated that work can be improved when it is analyzed and its fundamental parts are studied. His associate, Henry Gant, studied the order of work operations. His work diagrams, with task bars and milestone markers depicting the sequence and duration of the activities of a process, proved to be such a useful analytical tool that it remained virtually unchanged for the rest of the century. The US's effort to build the atomic bomb during World War II – the Manhattan project – was the most complicated project ever undertaken up to that time. Although in the Manhattan project, network scheduling or work breakdown structure may not have been used, the principles of organizing, planning, and direction that characterize modern project management were certainly displayed.⁶

⁶ Shenbar and Dvir, pp. 57-58.

In the 1950s, during the Cold War, large and complex projects necessitated new project management approaches. The Air Force Intercontinental Ballistic Missile program and the Navy Polaris program, led to the development of the System Support Contractor approach and the Program Evaluation and Review Technique (PERT), respectively. At the same time, Dupont developed the Critical Path Method (CPM) for construction projects that, together with PERT, became almost synonymous with project management for the next decade and can be characterized as the “scheduling era.” During the 1970s, organizations realized that they had to run projects requiring the integration of many different disciplines and thus emphasis was given to team work and on how a team could perform as a united entity. In the next decade, a turn was made towards uncertainty reduction. The challenge for managers was now to make secure decisions that would endure over time and against uncertainties. In the 1990s, the dominant approach was to simultaneously integrating people and tasks and realizing goals and means concurrently and interactively, rather than sequentially and separately. Finally, in the 2000s, three new trends emerged: adaptation, strategic focus, and globalization. The first has the meaning that one size does not fit all, and thus organizations must adapt their project management techniques to the particular project type. The second has the meaning that program management must be business-oriented and must connect projects with the broader business strategy. The third refers to globalization, with the meaning of increasing number of projects run by teams spread across the world.⁷

B. PROJECT MANAGEMENT DIMENSIONS

As it seems from the history above, project management has, over time, passed through various phases, evolving and adopting different approaches to more effectively administer projects. At the present time, the magnitude of project management can be well depicted by using a model. The essentials that

⁷ Shenbar and Dvir, pp. 58-59.

comprise this model can be synopsized, as seen in Figure 1, as: common vocabulary, teamwork, project cycle, and project management elements.

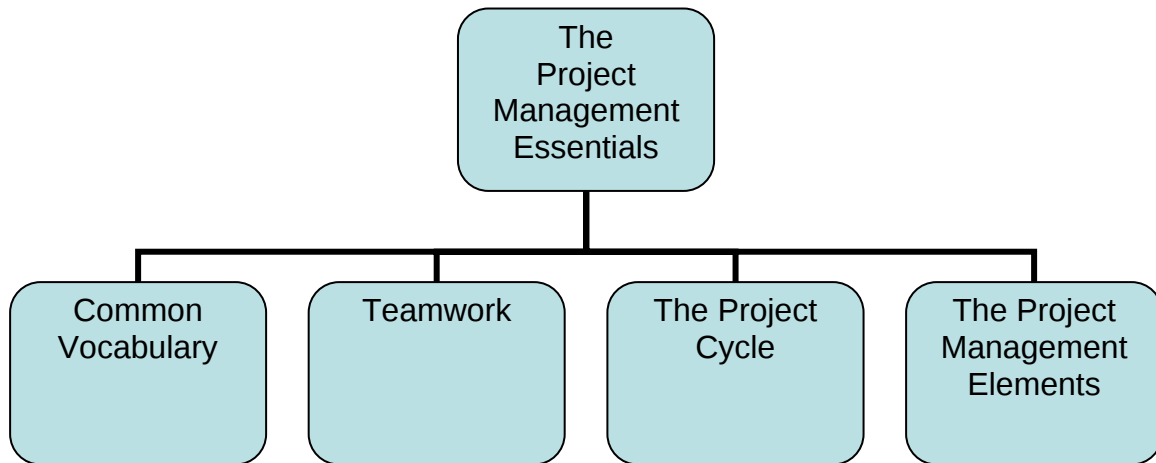


Figure 1. The Project Management Essentials
(After: Forsberg Kevin, Mooz Hal, Cotterman Howard. Visualizing Project Management. A Model for Business and Technical Success. John Wiley & Sons, Inc, 2000, p. 27)

The above essentials must fit together and have a particular interdependence, as depicted in Figure 2. The common vocabulary and teamwork form the pillars of the model, whereas the project cycle (represented by the axle) and the project management elements (represented by the rotating wheel) constitute respectively, the sequential and situational aspect of project management.

Due to the various trends that prevailed during this time, as well as the global and the temporary aspects of projects, the definition of a common vocabulary is necessary in order to enable an effective communication among all of the people who deal with a project. All terms, acronyms, and jargon that is being used must constitute a common comprehensible language in order to avoid misunderstandings, conflicts, and destruction of cooperation.

Teamwork, the collective effort for the achievement of common goal, is also fundamental to the success of a project. Effective teamwork requires, apart from the common goal, mutual respect, acknowledged interdependency, shared rewards, team spirit, and energy.⁸

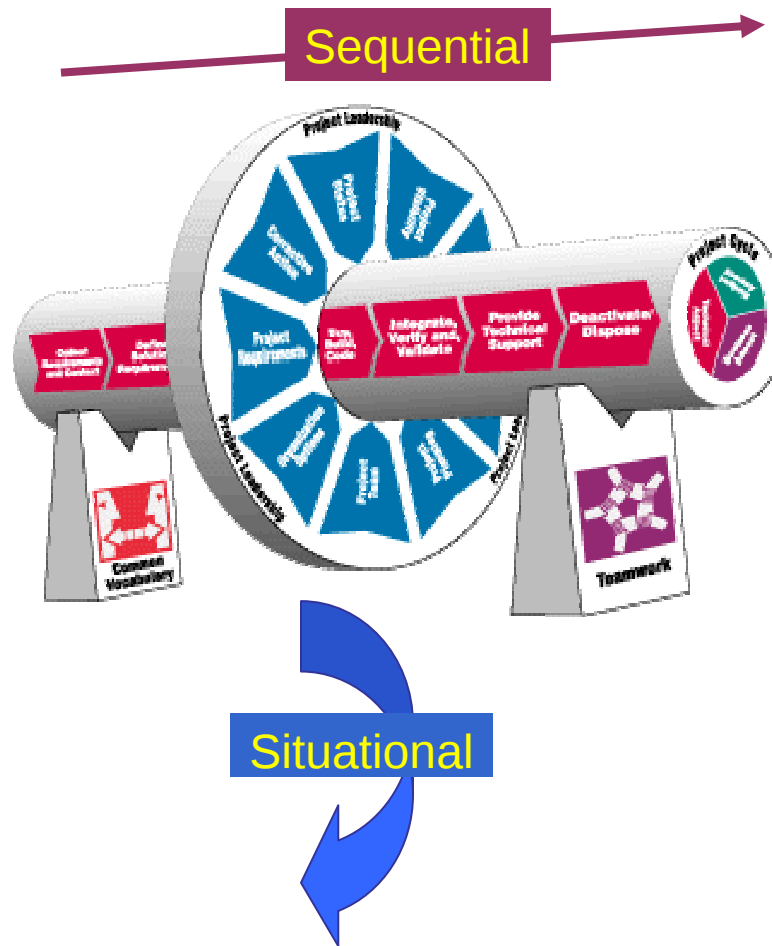


Figure 2. Program Management Model
(After: Forsberg K, Mooz H, Cotterman H. Visualizing Project Management. A Model for Business and Technical Success. John Wiley & Sons, Inc, 2000, p. 44)

The sequential aspect of project management, which is represented by the axle in the model, includes the various phases that a project passes through

⁸ Kevin Forsberg, Hal Mooz and Howard Cotterman. Visualizing Project Management. A Model for Business and Technical Success. John Wiley & Sons, Inc, 2000, p. 29.

from its genesis through its termination. These are found in the literature with various names, among them are: study, implementation, and operations,⁹ or initiating, planning, executing & controlling, and closing.¹⁰ All of these phases constitute the life cycle of a project and they each have three aspects: cost, schedule, and technical performance.

Because cost, schedule, and performance can not be optimized simultaneously, effective management is required to run a program throughout its life cycle. The situational aspect of project management, which is represented in the model by the rotating wheel, concerns the techniques and tools of the management elements that are applied in each phase of the project cycle so as to ensure effective implementation and the successful transition to the next phase. Application is situational, which means that the techniques and tools must be applied responsively in each phase, depending upon the particular team and the specific circumstances. The management elements necessary in every project are generally related to requirements, organization, teams, planning, risk, control, visibility, status, corrective action and leadership.⁹

The initial definition of requirements is of paramount importance as it affects significantly the successive route of the project. Techniques such as decomposition analysis and resolution, requirements traceability and accountability, in combination with systems engineering methods, are used to address project requirements. Requirements may also be added at any point the project cycle, but their impacts need to be carefully managed. Depending upon the particular project, an appropriate organization structure is required in order to promote the necessary teamwork and communication. There is no

⁹ Forsberg et al, pp. 30, 38-39.

¹⁰ A. Warren Opfer, J. Timothy Kloppenborg and Arthur Shriberg. Proceedings of PMI Research Conference 2002. Project Leadership – Setting the Stage. 2002, p. 420.

single “best” structure that fits all projects and the initial concept may change as the project progresses. A matrix organization, with integrated product teams, is the most usual organization structure.

Teams are necessary to staff the structure and must consist of personnel with specific skills and knowledge required by the needs of the particular phase of the project. Teams may also evolve as the project passes through its various phases. Through the planning element, the requirements of the project are converted into specific tasks which are then assigned to the teams and include corresponding resources and delivery schedules. Risk management is strongly related to the planning element in order to identify, evaluate, and handle the risks of the various activities and decisions. Because events usually do not happen as they have been planned, project control is required that comprises a control authority, a control mechanism, and standards. The visibility element refers to all of the techniques that are used by the project team for gathering and disseminating all the relevant information to ensure effective communication. It encompasses various management styles, such as management by walking around (MBWA), information centers, and electronic techniques, such as video teleconference and must be designed so that it fits into the particular organizational structure and the current phase of the project.¹¹

Project status refers to the measurement of progress and includes performance, cost, and schedule assessment against the plan in order to detect possible variations. Earned value management (EVM) is a technique that is used for this purpose. Detected variations need corrective action in order to return the project to the predetermined plan. This may require overtime, different technical approaches, altered quality control processes, new leadership, etc. Finally, the leadership element generally refers to the ability to inspire and motivate the project team in order to promote the desired effect. It is the most important element of project management because it holds all the other elements

¹¹ Forsberg et al, pp. 40-43.

together and ensures their correct situational use. It focuses on doing the right thing at the right time and it depends upon the skilful application of the various techniques included in the aforementioned elements of program management.¹¹

C. DOD AND PROJECT MANAGEMENT

As it was stated in Chapter I, the importance of project management has long been realized by the DoD and it is used for its systems procurement, which is considered among the most important and complex assignments.

For the DoD, program management is:

The process whereby a single leader exercises centralized authority and responsibility for planning, organizing, staffing, controlling, and leading the combined efforts of participating/assigned civilian and military personnel and organizations, for the management of a specific defense acquisition program or programs, throughout the system life cycle.¹²

The program manager is the:

Designated individual with responsibility for and authority to accomplish program objectives for development, production, and sustainment to meet the user's operational needs. The PM shall be accountable for credible cost, schedule, and performance reporting to the Milestone Decision Authority (MDA). (DoDD 5000.1)¹³

The structural unit of program management in DoD, the Integrated product team (IPT) is defined as the:

Team composed of representatives from appropriate functional disciplines working together to build successful programs, identify and resolve issues, and make sound and timely recommendations to facilitate decision making.¹⁴

¹² DAU Glossary 12th Edition.

¹³ Ibid.

¹⁴ Ibid.

DoD uses program management because:

Program management provides for a single point of contact, the program manager, who is the major force for directing the system through its evolution, including design, development, production, deployment, operations and support and disposal. The program manager while perhaps being unable to control the external environment, has management authority over business and technical aspects of a specific program. The program manager has only one responsibility- managing the program and accountability is clear.¹⁵

D. PROGRAM MANAGERS' COMPETENCIES

1. The Importance of PMs' Competencies

As it was stated above, project leadership is the most important element of project management. History has confirmed that without effective leadership, teams are likely to deviate from sound practices and follow high-risk shortcuts, placing the project in danger.¹¹ Many organizations do not manage projects well and many of projects fail. The lack of leadership is considered a primary reason for project failure. The results of a survey conducted by Zimmerer and Yasin on senior project managers (Zimmerer and Yasin 1998) clearly identify negative leadership factors as a cause of project failures.¹⁶ Another research effort that analyzed the results of previous studies that were made concerning project success, revealed that almost all of the factors that contribute to the success of a project fall directly upon the competence of PM.¹⁷

Furthermore, some industry research from Gartner showed that poor project manager competency was responsible for 60% of project failures. The need for developing effective project managers is critical because project failure or success can be vital to organizational success; the competency of project managers is crucial to project success. A distinction must be made however, between techniques and managerial effectiveness. The various techniques such

¹⁵ DAU. Introduction to Defense Acquisition Management. 2003. p.19.

¹⁶ Opfer et al, p. 415.

¹⁷ Crawford, p. 154.

as Total Quality Management (TQM), Management by Objectives (MBO), Management by Walking Around (MBWA), Management by Exception (MBE), Six Sigma, and so on, although they can assist, they alone can not ensure managerial effectiveness, which is a manager's proficiency in a repertoire of knowledge, skills, and abilities that result in project success.¹⁸

PMs are often trained in the “hard skills” – the technical and managerial aspects of project management- such as setting objectives, how to split up a complex project, and develop Gant charts, critical path analysis, resource allocation, risk management, but the “softer”, people skills, are frequently overlooked. However, many times the success of a project rests upon the understanding of both people and management issues, rather than just technical issues. As it was stated by a PM who had experienced training courses on the “soft skills:”

I now assess project work differently; - I acknowledge colleagues' concerns and issues better. Skilful listening now helps me understand better. I now understand from the stakeholder map, who has the power and influence to help me achieve results quicker. I thought that project management was all about process, I know now that's just one side of the coin. It's also key to be able to influence and persuade the team members.¹⁹

Concern for PM competencies is evidenced not only through research on project success, but also through the development of relevant standards. These standards generally fall into two broad categories: those relating to what PMs are expected to know, and those relating to what PMs are expected to be able to do. The Guide to the Program Management Body of Knowledge (PMBOK Guide) and the Australian National Competency Standards for Project Management are the most popular of the above categories.

¹⁸ Sharlett Gillard and James Price. International Journal of Management, Vol. 22 No1. The Competencies of Effective Project Managers: A Conceptual Analysis. March 2005. p. 49.

¹⁹ George Cowie. Industrial and Commercial Training. Volume 35-Number 6. The Importance of People Skills for Project Managers. 2003. pp. 256, 258.

2. Literature Review

There are various research methodologies identified in the literature, such as case studies, surveys, experiments, action researches, and combinations of them related to the field of PMs competencies with a variety of findings and categorizations.²⁰ The findings of three interesting studies are presented below.

Table 1. Competencies of Effective Project Managers

Goal and Action Management	Human Resources Management
-Diagnostic Use of Concepts	-Managing Group Process
-Efficiency Orientation	-Use of Socialized Power
-Proactive	Directing Subordinates
Leadership	-Developing Others
-Self-Confidence	-Use of Unilateral Power
-Use of oral Presentations	Focus on Others
	-Stamina and Adaptability

(From: Gillard Sharlett, Price James. International Journal of Management, Vol. 22 No1. The Competencies of Effective Project Managers: A Conceptual Analysis.2005, p. 49)

According to one perspective, effective PMs must display ten competencies that can be grouped into five clusters (Table 1) related to: Goal and Action Management, Leadership, Human Resource Management, Directing Subordinates, and Focus on Others.

Another research, based upon selective literature research studies and making a chronological distinction between the studies (four of them were

²⁰ R. Jack Meredith. Proceedings of PMI Research Conference 2002. Developing Project Management Theory for Managerial Application: The View of a Research Journal's Editor. 2002, pp. 48-51.

conducted prior to 1995 and the rest after 1995), concluded that the competencies of effective project managers are the ones that are shown on Table 2, in order of the frequency with which they are mentioned.

Table 2. Project Manager Competence Identified in the Literature-Ranked by Frequency of Mention

All Studies (N = 8)	Pre-1995 Studies (N = 4)	Post-1995 Studies (N =4)
Leadership, Planning (Integrative), Team Development	Leadership, Planning (Integrative), Strategic Direction, Team Development, Technical Performance	Leadership, Monitoring & Controlling (Integrative), Planning (Integrative), Team Development, Communication
Communication, Technical Performance	Communication, Decision-Making & Problem Solving, Stakeholder Management (Parent Organization)	Stakeholder Management (Parent Organization), Technical Performance, Organization Structure, Project Definition
Organization Structure, Stakeholder Management (Parent Organization), Strategic Direction	Monitoring & Controlling (Integrative), Monitoring & Controlling (Cost), Monitoring & Controlling (Scope), Monitoring & Controlling (Time), Organization Structure, Stakeholder Management (Client), Team Selection	Administration, Stakeholder Management (Client), Stakeholder Management (Other), Decision-Making & Problem Solving, Monitoring & Controlling (Cost), Planning (Specialist- Cost), Planning (Specialist- Time), Strategic Direction
Monitoring & Controlling (Integrative)	Administrative, Monitoring & Controlling (Risk), Planning (Specialist- Time), Project Definition, Stakeholder Management (Other)	Team Selection, Closing (Integrative), Monitoring & Controlling (Quality), Monitoring & Controlling (Risk), Monitoring & Controlling (Scope)

Decision-Making & Problem Solving, Monitoring & Controlling (Cost), Planning (Specialist-Time), Project Definition, Stakeholder Management (Client)	Closing (Integrative), Monitoring & Controlling (Quality)	Monitoring & Controlling (Time)
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(After: Lynn Crawford. The Frontiers of Project Management Research. Profiling the Competent Manager. Project Management Institute Inc 2002. p. 159)

It is interesting to note that the leadership factor is consistently ranked higher in both prior to and after 1995 studies.

Finally, other interesting research on the project leadership element emphasizes three different aspects: the individual, the team and the organizational. These three aspects are interdependent; they can not stand alone and must work in concert to be fully effective.²¹

As individual leaders, effective PMs must possess a series of personal characteristics which result to: establishing vision, creating change, unleashing talent and personal values that energize all groups. The characteristics are strong interpersonal skills, ability to motivate through high energy, and a strong desire to lead. Effective PMs also display negotiating skills, ability to resolve intergroup conflicts, communication skills, and information processing abilities.²²

Effective PMs must also build and effectively run teams. This entails setting a clear sense of mission, understanding relevant interdependencies, creating cohesiveness and trust among the members, as well as creating a shared sense of enthusiasm.

²¹ Opfer et al, pp. 416-418.

²² Ibid., pp. 416-418.

The effective team leader is usually a social architect who understands the intersection of organization and behavioral variables and can foster a climate of active participation and minimal dysfunctional conflict.²³

The organizational aspect relates leadership with structural and cultural considerations. The PM must not only understand the structure and the culture of the organization within which he works, he also views specific projects from a “big picture” perspective: as part of a larger system, as the system itself and its components. PMs also need the support of top management. Senior management must adjust the climate and the environment so as to promote leadership. It needs to set clear policy, direction, and guidance, and provide visible and vocal support to PMs and their projects.²⁴

Among the various research literature, Dr Owen Gaden’s work is considered one of the most important on the behavioral competencies of PMs.²⁵ It is based upon studies made on PMs in the US and UK armed forces and identifies the behavioral attitudes that distinguish outstanding PMs from their peers. Because of its importance and its relevance within the Defense Community, it has been selected for use in this project and is presented in the next chapter.

²³ Opfer et al, pp. 416-418.

²⁴ Ibid., pp. 416-418.

²⁵ Crawford, p. 157.

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III. THE COMPETENCIES OF PROGRAM MANAGERS

A. INTRODUCTION

This chapter describes Dr. Owen Gadeken's approach to the competencies of top performing project managers as it was published in his relevant article in 1997 in the Army RD&A Magazine.²⁶ The above approach was supplemented with his successive work presented in the Project Management Institute (PMI) research conference of 2000.²⁷ The term PM for the purpose of this project refers to either Project Manager or Program Manager, although the first has a narrower meaning referring to a specific project, whereas the second has a broader meaning referring to a program that may consist of various projects.

As was mentioned in Chapter II, projects that fail do so largely due to PMs' competencies. Although the traditional view of project management emphasizes the technical and managerial competencies, an emerging view in this field places the leadership competencies of PMs at a primary position. This is becoming more apparent since PMs operate in a changed environment in the organizational, technological, and political dimensions. PMs have to deal with both technical and managerial issues, and they have the overall responsibility to get their people do the right thing at the right time which calls for leadership. Depending upon his specialty and hierarchical position a PM, usually has to acquire a range of skills starting with technical, continuing to managerial, and then to leadership, as depicted in Figure 3. The demand for transition from one kind of competency to the other, as the roles change over time, becomes significant and many times PMs fail to recognize this need during their careers.

²⁶ Owen C. Gadeken. Army RD&A Magazine. Project Managers as Leaders: Competencies of Top Performers. January- February 1997.

²⁷ Owen C. Gadeken. The Frontiers of Project Management Research. PMI Research Conference 2000. What the United States Defense Systems Management College Has Learned From Ten Years Of Project Leadership Research. Project Management Institute Inc. 2002.

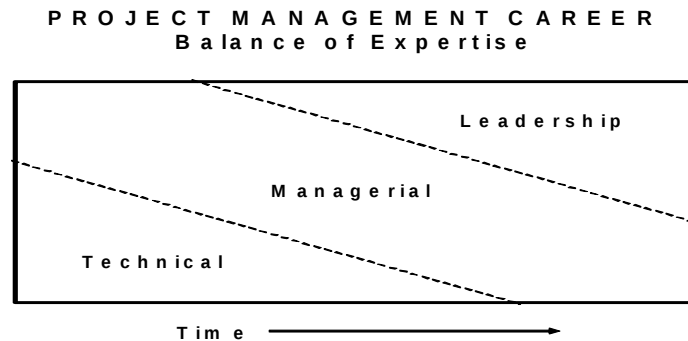


Figure 3. Project Management Career: Balance of Expertise
(From: Gadeken, Owen C. Army RD&A Magazine. Project Managers as Leaders: Competencies of Top Performers. January- February 1997)

Making an analogy, the PM's position looks similar to how Texas Mayor Erik Johnson described the work of being a large city mayor:

Being a mayor is like walking on a moving belt while juggling. Right off you've got to walk pretty fast to stay even. After you've been in office a short time, people start throwing wads of paper at you. So now you've got to walk, juggle, and duck too. Then the belt starts to move faster, and people start to throw wooden blocks at you. About the time you're running like mad, juggling, and ducking stones, someone sets one end of the belt on fire. Now if you can keep the things you are juggling in the air, stay on the belt, put out the fire, and not get seriously injured, you've found the secret to the job.²⁸

The Mayor's situation resembles many of the circumstances that Defense PMs have to deal with such as budget curtailments and requirements changing; cost, schedule, and technical constraints; incidents and accidents; political sensitivities, etc.. The question that arises is: what are the leadership competencies that will enable a PM to pass successively through these difficulties? In an attempt to identify these competencies, Dr. Owen Gadeken

²⁸ Gadeken. The Frontiers of Project Management Research. p. 99.

summarized the findings of five studies that were conducted by Defense Educational Institutions. The first two were performed by the Defense Systems Management College (DSMC) and the three follow-on validation studies were conducted by the Air Force Institute of Technology (AFIT) and the Naval Postgraduate School (NPS). All of these studies were based upon the assumption that the best way to identify the competencies of the best project managers is to analyze a group of outstanding project managers to find out what makes them so effective.²⁹

B. THE COMPETENCY APPROACH

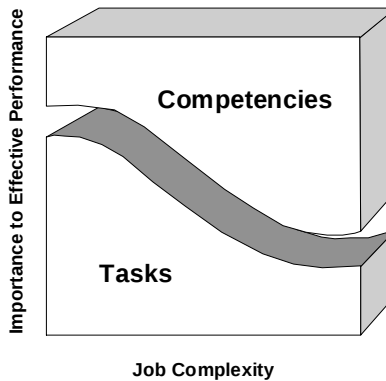
Every job can be described by: tasks and personal competencies. Tasks are a breakout of a job itself and are defined as the minimum or threshold requirements for acceptable performance. Competencies refer to what the person adds to the job that allows him to perform in an outstanding manner. They may be traits, attitudes, skills, or motives. Thus in any job, competencies are what superior performers do that enable them to attain superior performance.³⁰

As it is shown in Figure 4, the more complex the job is, the more important the personal competencies are. This becomes clear by analogy, comparing, a capable pilot with a fighter ace. The basic skills of flying that a capable pilot demonstrates can be analyzed using a task analysis methodology. By contrast, what a fighter ace does is vastly more complex, and can not be easily addressed by the task analysis.

²⁹ Gadeken. Army RD&A Magazine.

³⁰ Ibid.

THE MORE COMPLEX THE JOB ...



... THE MORE IMPORTANT THE COMPETENCIES

Figure 4. Job Complexity and Competencies
(From Gadeken, Owen C. Army RD&A Magazine. Project Managers as Leaders: Competencies of Top Performers. January- February 1997)

This is where the competency analysis is needed to identify the attitudes and characteristics that result in such outstanding performance.

Likewise, the job of PM in Defense acquisition is complex; as such it necessitates the use of competency analysis. That is why the DSMC researchers chose the competency approach instead of task analysis or the panels of experts used in the past. Using critical incidents, interviews, and follow-up surveys, the research process can go further than what the theories contend and identify exactly what the best PMs actually do. Past studies have also shown that job experts often have wrong perceptions as to what PMs really do that makes them experts in their job. One of these studies was conducted in General Electric Company on product development managers. The study first gathered opinions from a new product development experts' panel and afterwards interviewed and surveyed top performers from different divisions. As

shown from the findings depicted in Table 3, only one competency that was mentioned by the experts' panel was actually confirmed. However, two additional competencies were also identified.

Table 3. The Competencies of New Product Development Managers

Necessary Competencies of New product Development Managers (What the Experts thought)	Necessary Competencies of New product Development Managers (What the Research found)	Remarks
Senses trends and identifies opportunities	Senses trends and identifies opportunities	Confirmed
Take risks	-	Not Confirmed
Is creative- able to generate new product ideas	-	Not Confirmed
Has knowledge of manufacturing processes	-	Not Confirmed
-	Has skill in informal influence	Additional
-	Has skill in facilitating groups	Additional

(After: Gadeken, Owen C. The Frontiers of Project Management Research. What the United States Defense Systems Management College Has Learned From Ten Years Of Project Leadership Research. Project Management Institute Inc. 2002, p.102)

The process of competency research consists of the following steps:

1. Interviews

- 3 hours focused on 3-5 critical incidents chosen by each project manager
- In-depth reconstruction of actual events
- Emphasis on what each project manager thought, said, and did throughout the process
- Systematic coding of all transcripts for key behaviors

2. Surveys

- Behaviors grouped into competency themes

- Large group project managers asked to rank competencies
- Extra “dummy” competencies added as distracters

The above process identified the characteristics that distinguish the top-performing PMs from their peers, focusing precisely on job-related skills, rather than upon abstract theoretical concepts.³¹

C. THE COMPETENCIES OF TOP-PERFORMING PROJECT MANAGERS

Building the DSMC research of Gullen and Gadeken (1990), subsequent studies converged on a common set of competencies that characterize top-performing PMs. The conclusions that arose are the following:

1. Strong Commitment to a Clear Mission

The best PMs are primarily mission-focused and results-oriented. They have a sense of personal ownership of their project and they feel a sense of commitment, dedication, and enthusiasm that spreads throughout the project team, stakeholders, and support organizations. An Air Force PM describing the goal to his team said:

Remember your primary mission. Keep saying that to yourself. Your job is to field a system that will put electrons on the enemy. Everything else is incidental to that and not important.³²

2. Long-Term and Big-Picture Perspective

Top-ranked PMs interpret the facts from a broader perspective and make decisions with the mission in mind the mission and the consequences their decisions may have in the future. As an Army PM mentioned, a PM must have a:

Big-picture focus – keep the whole effort, along with the people involved, in focus, not letting the day-to-day details and tasks become more important than the overarching goal.³³

³¹ Gadeken. *The Frontiers of Project Management Research*. pp. 103-104.

³² Ibid. pp. 103-104.

³³ Ibid. pp. 103-104.

3. Systematic and Innovative Thinkers

Outstanding PMs have the ability to understand their complex work environment. They can see through the complexities and formulate an appropriate organizational structure which will promote sound decision making, innovative and creative ideas, and solutions to problems. In our current acquisition culture, PMs must think “out of the box” in order to provide systems with high value for the money expended. As Admiral Carlisle Trost (a former Chief of Naval Operations) said:

Figuring out what is going on in a complex world is the heart of leadership. Otherwise leaders are defeated by events they do not understand.

An Army PM also stated that:

If something is not prohibited by the law or regulation or can be waived, and it will benefit your project, then do it! Push the system until it cries out in pain to get what is needed to make your project successful!³⁴

4. Find and Empower the Best People

The best project managers can work with and via others. They emphasize finding the most skillful and knowledgeable personnel for their teams and delegate real authority to them. Below is what two PMs stated respectively:

The first thing you do is get the right people. My contractors have made an observation. They told me I don't have many people here, but the ones I've got are terrific. And, that's exactly the way they were picked.

I believe that is for the PM to know the unique capability of each staff member, and then ensure that each staff member is placed in the position that will make the best use of those capabilities. The PM must then understand what it takes to motivate these individuals to the point that each achieves more than he or she thought possible.³⁵

³⁴ Gadeken. The Frontiers of Project Management Research. pp. 103-104.

³⁵ Ibid. pp. 105-106.

5. Selective Involvement in Project Issues

Top-performing PMs are not personally involved in every matter; they usually focus on areas of strategic importance, leaving the administrative and technical details to their subordinates. This is apparent from the critical incident interviews cited in the DSMC research. Among the 285 critical incidents that were mentioned PM interviews, over half referred to four areas: contracting; personnel management; test and evaluation; and acquisition strategy. As an Army and an Air Force Colonel said respectively:

You must realize, you can't do everything yourself. People are your most precious asset...

And:

My role in the restructuring was to task the organization, to work with the user, and with the contractor to come up with this program. I never got involved with the details. That is not my job.³⁶

6. Focus on External Stakeholders

Apart from creating efficient teams in the internal environment, effective PMs are also greatly interested in networking with the external customers and support organizations. They are able to identify from a large number of external stakeholders, the key players and what are their motives. According to the opinion of two Army PMs, respectively:

The project manager is always operating outside of his controlled environment. In fact, very seldom is a project manager huddled around with all the people just from his project office.

And:

Without cooperation from the large number of people and organizations who make up the acquisition process, no project will go forward.³⁷

³⁶ Gadeken. The Frontiers of Project Management Research. pp. 105-106.

³⁷ Ibid. pp. 105-106.

7. Thrive on Relationships and Influence

PMs do not have formal authority over the various external stakeholders and thus they must cultivate appropriate relations with them in order to be able to influence and turn them in favor of their project goals. A Navy PM who traveled overseas to resolve a problem and develop a relationship with his customers said:

I made this trip to Scotland as a damage control effort, if you will, to talk to one squadron people and that kind of thing. To talk to them after having spent a lot of time and being kind of a nuisance to everybody...with these modifications which now didn't work. My credibility was zero. I tried to restore our credibility. We really want to help them out. I think they were surprised to see a four-striped Captain come all the way from Washington DC to talk about their problems.³⁸

This is how another army PM acted to prevent a potential budget curtailment to his program:

I finally recognized that I needed heavy hitters with more influence and authority than I had, so I set up a meeting with the Program Executive Office, the head of procurement, my staff, an attorney advisor, and the Army's contract policy expert. In other words, I had to go in there and literally stack the deck in terms of influence and independent representatives who would vouch for what I had said.³⁹

A PM from the United Kingdom, confronting difficult situations at a joint program with the US Navy, used the following way to get over them:

I would tread on people's toes because the US project manager didn't want me to speaking directly to his folks who are in the Pentagon, although I couldn't work without that. So I got around that by holding the meetings in the British Embassy and inviting him to come to our "foreign territory." Whatever happened, I would just

³⁸ Gadeken. The Frontiers of Project Management Research. pp. 105-106.

³⁹ Ibid. pp. 105-106.

look for a way around it... it just became a game actually, of trying to unravel all the pressure groups.⁴⁰

8. Proactively Gather Information and Insist on Results

Outstanding PMs continually search for and assess information that may impact their projects; they are result-oriented. This is one technique a PM used to gather information and assess its accuracy:

At this meeting, I asked the contractor what they knew about the subcontractor status. You know, where precisely are they? What are their plans to do this? With each answer, I would just ask one question, I would just ask one question deeper than that. When they started to stutter, I knew they were in trouble because I shouldn't be able to go that one level deeper and ask a question they can't answer.⁴¹

D. THE RELATIVE IMPORTANCE OF COMPETENCIES

A further analysis of the aforementioned results - by means of statistical comparisons on the frequency data of each competency - showed that the following competencies:

- Strong Commitment to a clear mission
- Thriving on relationships and Influence

were demonstrated relatively more often by the outstanding PMs.⁴² The DSMC study of UK Defense PMs (Gadeken 1991) showed that UK PMs favor analytic competencies more than interpersonal skills.⁴³

Last, a comparison that was made between PMs and managers of other functional areas within the acquisition framework (budgeting, contracting, logistics, engineering), showed that there is a different perception in the importance of specific competencies. The results appear in Table 4 below. They show that functional managers ascribed more importance to technical expertise,

⁴⁰ Gadeken. The Frontiers of Project Management Research. pp. 105-106.

⁴¹ Gadeken. The Frontiers of Project Management Research. pp. 107-108.

⁴² Ibid. pp.102, 107.

⁴³ Ibid. pp.102, 107.

attention to detail, and creativity, while PMs gave greater importance to sense of ownership, political awareness, and strategic influence than did the managers of the other functional areas. An interesting issue that emerges from the above results (also confirmed by Gadeken 1989) is that the transition from functional manager to program manager may be conceptually difficult. This is of great importance to the DoD, where most of the PMs come from the ranks of engineers and scientists.⁴⁴

⁴⁴ Gadeken. *The Frontiers of Project Management Research*. pp.107-108.

Table 4. The Relative Importance of Competencies

(After: Gadeken, Owen C. The Frontiers of Project Management Research. What the United States Defense Systems Management College Has Learned From Ten Years Of Project Leadership Research. Project Management Institute Inc. 2002, pp.109)

SURVEY VALIDATION OF PM COMPETENCIES

Competencies	RANK ORDER OF IMPORTANCE	
	Program Managers (N = 128)	Other Acq. Professionals (N = 225)
SENSE OF OWNERSHIP/MISSION	1	17
LONG-TERM PERSPECTIVE	2	6
MANAGERIAL ORIENTATION	3	2
POLITICAL AWARENESS	4	21
OPTIMIZING	5	5
RESULTS ORIENTATION	6	8
SYSTEMATIC THINKING	7	3
INNOVATIVENESS/INITIATIVE	8	11
FOCUS ON EXCELLENCE	9	9
ACTION ORIENTATION	10	10
RELATIONSHIP DEVELOPMENT	10	14
coaches others	12	12
PROACTIVE INFORMATION GATHERING	13	15
STRATEGIC INFLUENCE	14	23
creativity	15	3
self control	15	13
INTERPERSONAL ASSESSMENT	17	18
collaborative influence	18	16
CRITICAL INQUIRY	18	24
positive expectations	20	24
technical expertise	21	1
interpersonal sensitivity	22	22
attention to detail	22	7
ASSERTIVENESS	24	20
efficiency orientation	25	18
directive influence	26	26
competitiveness	27	27

IV. THE LAND RESERVE MODERNIZATION PROJECT AT MEAFORD, ONTARIO, CANADA

A. INTRODUCTION

This chapter describes the Land Reserve Modernization Program (LRMP) of the Canadian Department of National Defense (DND), in order to be used as a vehicle for the exploration of PMs' competencies that were reviewed in the previous chapter. Large and complex infrastructure projects are frequently undertaken. They involve usually many participants - such as users, counselors, regulators, and design and construction companies - that should operate according to Government regulations and policies. As such they provide suitable cases for the exploration of PMs' competencies. The chapter describes how the DND reacted to Government restraints in providing new training facilities for its personnel and focuses on the circumstances and challenges that the project team faced during the implementation of the Militia Training Support Center (MTSC) at Meaford, Ontario, Canada.

Due to past political sensitivities regarding National Defense spending, the DND could afford to maintain infrastructure and facilities in areas that were not of direct interest to the Armed Forces' operational activities, particularly Army. However, severe budget curtailments made it impossible for the Army to fully maintain its infrastructure. Moreover, the Army's commitment to the total force concept (interchangeability between the regular and the reserve forces) brought about a reallocation of resources and the need for new infrastructure for the reserve forces. The meeting the above needs is a characteristic example of a complex project that had to be implemented in a complicated environment, one enmeshed in Government rules and policies.⁴⁵

⁴⁵ Foreman. p. 133.

B. THE BIRTH OF LRMP

1. Background

The Army reserve forces have never had the appropriate resources to maintain a proper training level. However, the Government's White Paper and the Army's total-force concept increased the role of the military reserves, and DND had to maintain a well-trained reserve to support the regular force. Thus, the idea of training in centralized, fully-equipped centers was created. To implement this concept, the LRMP was approved, which involved the planning, construction, manning, and equipping of four separate MTSCs, at Meaford, Valcatier, Gagetown, and Wainwright. The MTSC at Meaford, Ontario, was the first center to be implemented and became the lead project.⁴⁶

2. Project Requirements

The infrastructure, equipment, and manning of the MTSC at Meaford had to support a maximum training load of two-thousand-five-hundred soldiers per week. A combat team arriving with its personal gear had to be at the combat field within an hour, fully-equipped (including vehicles) and ready to perform operational training. The MTSC also had to be located within three hours' distance from the majority of the reserve units. The old military training area at Meaford (MRTA) on Georgian Bay in Ontario, known also as "The Tank Range," met this requirement and thus was selected as the most appropriate site for construction of the new training center. The area--covering 17,500 acres--included limestone cliffs, rolling open ground, dense brush, a lake, and 22 kilometers of shoreline all of which made it ideal for training. The MRTA had been extensively used during World War II, the Korean War, and up through the late 1960s. It closed from 1970 to 1973, and since then had been used occasionally by militia, regular, cadet, and police forces for live firing and training at an increasing rate.⁴⁷

⁴⁶ Foreman. p. 133.

⁴⁷ Ibid. p.134. and "Land Force Central Area Training Centre Meaford." Retrieved June 14, 2006 from http://www.meaford.com/atc_background.html.

The MTSC project was approved in April 1992, at a budgeted cost of \$105 million (\$ Canadian). Political considerations mandated that implementation must bolster the depressed construction industry in Southern Ontario. Another requirement was that the project be done in parallel with the training activities at the site.⁴⁸

3. Scope

Since the old MRTA was virtually a “bare bones” site, the project team had to build a whole town from scratch, including new infrastructure, municipal services, roads, and buildings. The scope of the project included:

- Water supply, sewage, and storm sewer systems and treatment plants;
- Complete road system, associated municipal services, landscaping, electrical lighting, power substation, and distribution;
- Supply and target storage building and vehicle maintenance facility;
- Command administration building, modular quarters (3 buildings), and fire hall;
- New dormitory buildings (2), drill hall, messes, dining hall building, POL building, vehicle wash and ablutions facility; and
- Renovations to existing Transport building, Canadian Forces Exchange System (CANEX) building, medical unit, and three dormitories.⁴⁹

It also included construction of barracks blocks, lecture facilities, ammunition storage bunkers, and 1,000-man stand-alone camp facilities to accommodate peak loads during the summer period. Apart from the load of

⁴⁸ Foreman. p.134. and “Land Force Central Area Training Centre Meaford”.

⁴⁹ “Meaford Land Reserve Modernization Project.” Retrieved June 14, 2006 from <http://www.delcan.com/prod/index.php?id=187>.

2,500 men per week, the MTSC had to support 250 permanent-party personnel, and a fleet of 300 combat training vehicles.⁵⁰

4. Organization

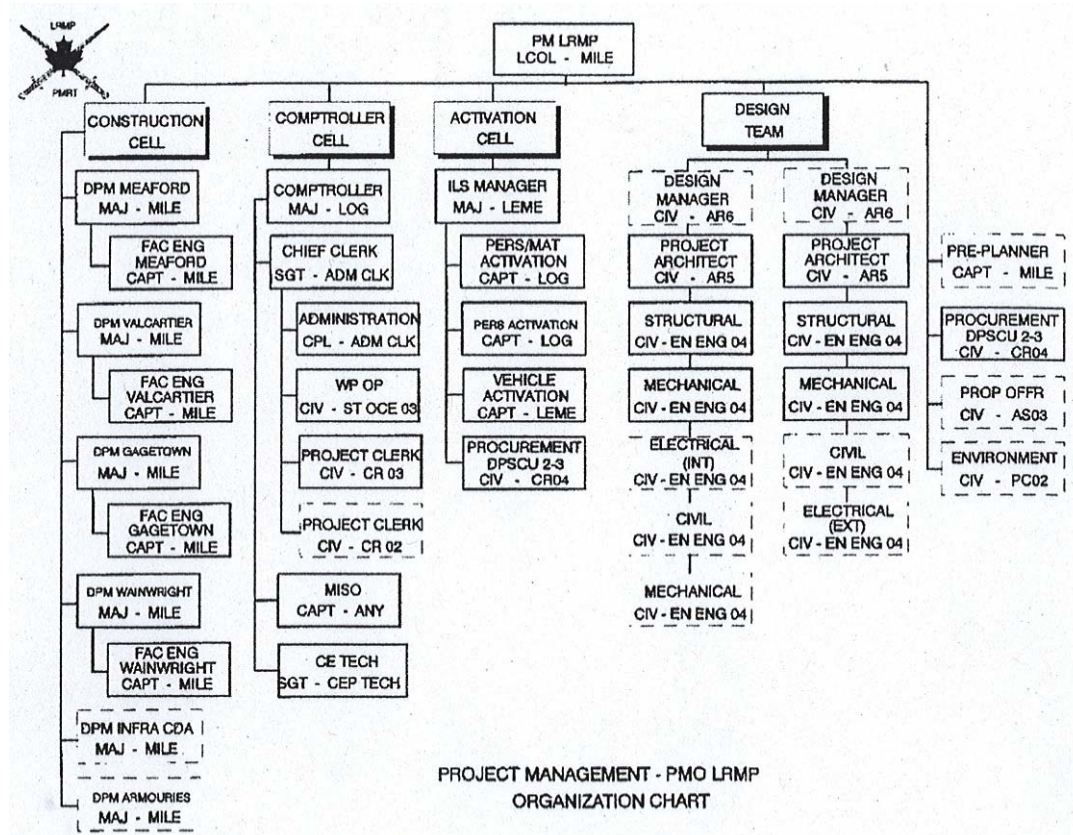


Figure 5. LRMP PMO Organization Chart
(From: Foreman. LCol. Project Management Casebook. Land Reserve Modernization Project: The Future of the Army Infrastructure. Project Management Institute, 1998, p. 138)

An independent, self-accounting, and self-contained project team was created for the LRMP. Its organization chart is shown in Figure 5 and its mission was to put four fully manned and equipped similar MTSCs in place.

C. SCHEDULING AND COST CONTROL

The project team developed the work breakdown structure (WBS) of the project, the initial levels of which are shown in Figure 6.

⁵⁰ Foreman. p. 134.

Appendix 3



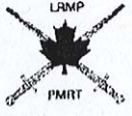
PROPERTY AND ROW	SITE DEVELOPMENT	MUNICIPAL/ UTILITIES SYSTEMS	NEW BUILDINGS /FACILITIES	EQUIPMENT	TEMPORARY CONSTRUCTION	CONSTRUCTION MANAGEMENT	DESIGN	MEAFORD PERSONNEL	PMO PROJECT MANAGEMENT
Acquisitions	Demolitions	Water Treatment Plant	CE/Transport	Training Equipment	Temporary Site Development	Tender Call and Award	Preliminary Design	Staffing	Coordinate Related Projects
ROW	Site Clearing and Leveling	Sewage Treatment Plant	CANEX	Commercial Vehicles	Temporary Site Services	Construction Contract Administration	Detailed Design	Training	Coordinate Ex-Project Tasks
Maintenance	Roadways	Hydro Substation	Medical Unit	MIL/DA	Temporary Accommodation	Consultant Supervisory ASSISS(CSA)	Acceptance	Service Contracts	Project Management Support
	Parking	Natural Gas Substation	M153 Quarters	Communications and ADP		Site Management and Coordination			PMO General Administration
	Parade Square		M155 Quarters	Warehousing and Furnishings		Project Insurance			External Reporting
	Sports Field		M156 Quarters	Tools and test Equipment		Inspection			Manage Project Contingency
	Utilities Distribution System			Initial Provisioning and Spares		Quality Assurance			
	Fencing			Setup					
	Landscaping								
	Hydro Powerline								

Figure 6. Work Breakdown Structure
(From: Foreman. LCol. Project Management Casebook. Land Reserve Modernization Project: The Future of the Army Infrastructure. Project Management Institute, 1998, p. 139)

The overall project schedule is shown in Figure 7. A consultant was retained for cost control and scheduling, and the schedule and accounting systems were made compatible with the DND's financial information systems. Team meetings, held monthly in the PMO office in Ottawa, enabled timely decision making and firm control of expenditures.

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A sample project status report is shown in Figure 8. Decisions were managed by variance and this was considered the most effective way of dealing with the situation.⁵¹



Expenses as at end Jul 95									
Category	Budget	Expend Auth	Contractural	Paid to Date	Incurred to date	Forecast to complete	Forecast Final Cost	Period Change	Budget Variance
DSGN/CSA/CONST MGT	12900.6	12779.5	12731.1	12385.3	12377.1	419.3	12796.4	132.1	104.2
CONSTRUCTION	79591.1	58509.1	56597.8	54759.9	54474.8	4287	58761.8	317.7	20829.2
EQUIPMENT	3508.8	4232.3	4247.4	3924.9	3924.9	579.4	4504.3	28.3	4004.6
INTERIM ACCOMODATION	372.0	369.1	369.1	369.1	369.1		369.1		2.9
PMO MGT/ADM - DESIGN	739.7	714.3	714.3	714.3	714.3		714.3		25.4
PMO MGT/ADM - IMPLEMENT	2158.3	1902.5	1902.6	1498.3	1632.5	565.6	2198.1	32.7	-39.8
PM's CONTINGENCY	1516.0	125	125	29.4	29.4	1486.6	1516		
PROJECT TOTALS	105786.5	78631.8	76687.3	73681.2	73522.1	7337.9	80860.0	510.8	24926.5
	100.0%	74.3%	72.5%	69.7%	69.5%	6.9%	76.4%	0.5%	23.6%

Figure 8. Project Status Report
(From: Foreman. LCol. Project Management Casebook. Land Reserve Modernization Project: The Future of the Army Infrastructure. Project Management Institute, 1998, p.140)

D. DESIGN IMPLEMENTATION

1. Contract Strategy

The project required construction of a total of 33 different facilities, the designs for which were split among consultants, the Public Works & Government Services Canada (PWGSC), and in-house designs. Most of the facilities required full design development from scratch, whereas others adapted previous designs on that the particular site. Some contracts were also awarded for both design and construction. In accordance with the Government's policy, which was intended to bolster the depressed economy of southern Ontario, all of the local firms needed to have equal access to the work. This resulted in having one

⁵¹ Foreman. pp. 135, 136.

prime consultant, managed by the PWGSC, and 26 different subconsultants. The subsequent competition that was developed led to realizing the best value for the money spent.⁵²

2. Design Considerations

The facilities had to be functional and their designs had to fulfill minimum military requirements without redundancies. That meant that a businesslike and commercial approach had to be adapted to provide the minimum military operational requirements. The facilities' designs had to minimize construction cost, as well as operational and maintenance cost throughout their life cycles. Many times, however, designers and users lost sight of their goal of satisfying the minimum military requirements with the least life-cycle cost, and thus constant vigilance and value engineering by the PM was imperative in order to keep within the restrictions.⁵³

In addition, the project management team had to consider reusing the Meaford design at the other MTSCs. Adapting the design for future use, without missing the particular requirements of the site at Meaford, was a real challenge for the team. Another challenge for the project team and their contractors was starting with a virtually "bare bones" site at Meaford. A project of this size had not been undertaken by the Army since the 1950s. A series of design issues dealing with the pre-existing austerity, the uniqueness of the military requirements, the dimensions and the weight distribution of the combat vehicles, the requirement for barracks rooms without doors, etc., forced designers to confront unique challenges. The multiple activities and contracts at the site also comprised a permanent challenge for the project team.⁵⁴

3. Design Review

The design review process was burdensome since three different levels of review of the original work were mandated. In order to control the situation, the

⁵² Foreman. pp. 134, 135, 137.

⁵³ Ibid. pp. 134, 135, 137.

⁵⁴ Ibid. pp. 134, 135, 137.

PM was directly involved and used some of the traditional roles of management. Team building, intimate cooperation, and the application of the 80-percent solution enabled timely development of the designs and meeting the deadlines.⁵⁵

E. CONSTRUCTION

1. Contract Strategy

Construction contracts were awarded to eight major contractors and several subcontractors. The project team had, as in the award of the design contracts, to assure that the local contractors were capable and competent to participate. Despite the team's intention, the contracts were awarded to firms from the London area because of union boundaries. Contract award eventually went to eight major contractors and their respective subcontractors. All contracts were awarded by the DND's construction agency--the Defense Construction Canada (DCC)--which created a special on-site supervision team. Consultant supervisory assistance (CSA) on-site, was undertaken by the prime design consultant/subconsultants. The main objective of the project team was to achieve the best value for money, using the DCC's team and the prime consultant's services. The PM used a team approach in order to deal with the large number of drawings and change orders. To keep on top of the issues, daily on-site meetings and monthly team construction meetings were held, with team members delegated to make decisions as needed. It was determined that builders were most interested in the construction issues. However, resolving the operation and maintenance issues needed more cooperation among contractors, designers, and suppliers to minimize life-cycle cost.⁵⁶

The construction contracts were awarded through fixed-sum bid-build DCC public tender. Due to the depressed Ontario economic environment, competition increased and the tender for the majority of the contracts ended up of 23 percent below the estimated project budget. However, three contractors sacrificed too much profit margin and eventually went bankrupt; this affected ten

⁵⁵ Foreman. pp. 134, 135,137.

⁵⁶ Ibid. pp. 135-137.

of the thirty-three major construction contracts. In all cases the bonding companies assumed their responsibilities; some adopting of a “time is money” attitude, with quick team action, expedited the projects. It is worth noting, however, that all the bonding companies were brought in after the major cash flow had occurred. If this had not happened, the situation might have been different.⁵⁷

2. Supervision-Quality Management

On-site contract management and the quality control were separate responsibilities. Contract inspection and administration at the site was performed well by the DCC site engineers and inspectors, with staffing sufficient most of the time. Quality of oversight, however, occasionally resulted in acceptance of substandard work. The subsequent restoration work caused schedule creep, delays in occupancy, and additional costs when contentious remedial work occurred after occupancy of the facilities.⁵⁸

As stated above, the prime design consultant and subconsultants were also obligated to provide on-site supervisory assistance (CSA). The DCC on-site inspectors needed assistance with interpretation of the design documents, on-site problem resolution, and adaptation of designs related to the work-change orders. However,

the consultant felt that they bore limited liability for the constructability of the design documentation, and that they required little involvement in daily site construction activity. As a result efforts to mitigate or correct design misinterpretations, errors, or omissions became adversarial between consultants and the DCC site inspectors. Timely, effective communication and cooperation between the DCC inspectors and consultants deteriorated, causing construction delays on-site. Inevitably the Project Manager became personally involved in negotiating and constructively resolving issues, restoring effective team communication and

⁵⁷ Foreman, pp. 135-137.

⁵⁸ Ibid. pp. 135-137.

providing leadership. A more formal approach to the “partnering concept” may have improved the commitment of all parties toward mutual conflict resolution during construction.⁵⁹

During the construction work, the MTSC continued to operate as a training facility, which was also a source of conflict. As more new facilities were occupied, the level of training activity increased. At the beginning, the facility users had understood and accepted that the construction works had priority over the training activities. However as the time passed and the project progressed, they needed continuous reminders of on-site priority.

The conflicting site functions were caused by the convergence on site of two different chains of command with entirely different functions, objectives, and priorities. Anticipation of the conflict and early planning by preparation of a written agreement of site priorities assisted in ameliorating site management for the project manager.⁶⁰

3. Schedule-Time Management

In many instances, schedules were not achieved because of bad management by the contractors. Occupancy delays of between three and twelve months occurred in many facilities. Some contractors minimized resources on-site, and three of them, due to insufficient profit margin, declared bankruptcy (which affected ten out of the thirty-three construction contracts). While bonding companies assumed their responsibility and completed the projects, this brought about a large number of warranty and quality issues. It also increased the potential for more defects emerging after the warranty period, thereby affecting the serviceability of the facilities, and their maintenance and operating costs.⁶¹

Furthermore, the construction projects were awarded through fixed-price contracts that provided no opportunity for the PM to expedite the schedule. The Government contract regulations precluded time, or schedule-based incentives

⁵⁹ Foreman, pp. 135-137.

⁶⁰ Ibid. p. 137.

⁶¹ Ibid, p. 137.

or penalties. The only amount that could be claimed was the cost that the owner may incur due to occupancy delays attributable to the contractor. Thus the PM could not provide important motivation or penalties, beyond moral persuasion, to expedite the contractors' activities. The user therefore suffered from delays in beneficial occupancy.⁶²

F. MANNING AND EQUIPMENT

Apart from the construction work, the project team was also responsible for establishing the manning levels and providing the appropriate stores and equipment. Gathering equipment, recruiting new personnel, and allocating them within DND is a time-consuming, difficult task that usually entails a long-lasting paper chase. To carry out these duties, the activation cell of four men went far beyond its job description, by making its own warehousing/equipping operation at a national level. It gathered equipment and stores that had been declared surplus from the closure of other DND units, in particular from Canadian Forces Europe. This saved \$4 million and proved to be so successful that it was used to accumulate stores for the three other MTSCs in the LRMP.⁶³

G. FINAL REMARKS

The MTSC at Meaford was eventually established one year ahead of schedule and 23 percent under budget, saving \$21 million. Provision of dedicated PM resources from the outset was considered to be of primary importance to this outcome. Continuous communication among the PMO, prime consultant, contractors, PWGS, and DCC helped the project team to overcome the many difficulties encountered. Several major requirement changes and more than 1000 alterations in design were made. However, despite the unstable situation of many consultants and contractors and the tight economic environment of the construction industry, no dispute went to arbitration. Control of cost and schedule also proved to be a significant element in managing the situation. The factor that contributed most to the project outcome, however, was

⁶² Foreman. pp. 136, 138.

⁶³ Ibid, pp. 136, 138.

considered to be the desire and willingness to get things done on the part of the PMO, users, DCC, PWGS, consultants, and contractors.⁶⁴

⁶⁴ Foreman. p 141.

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V. ANALYSIS

A. INTRODUCTION

This chapter analyzes the case of the LRMP that was presented in the previous chapter from the perspective of PMs' competencies. It explores one-by-one the competencies of top-performing PMs that were identified in Chapter III, by highlighting the events of the case that necessitated the respective competence.

As was stated in Chapter III, outstanding PMs demonstrate the following eight competencies:

- Show a strong commitment to their mission
- Have a long-term and big-picture perspective
- Are both systematic and innovative thinkers
- Find and empower the best people for their project team
- Are selective in their involvement in project issues
- Focus on external stakeholders
- Thrive on relationships and influence
- Proactively gather information and insist on results
- The above competencies are explored below.

B. LRMP - PM COMPETENCY ANALYSIS

1. Strong Commitment to Their Mission

One point that highlights this competency is the austere restriction on the requirements of the project. As stated in Chapter IV, the facility designs of MTSC at Meaford had to meet the minimum military requirements without redundancies. The commercial and businesslike approach of the design companies had to be adapted strictly to the military requirements. The design solution needed to optimize the capital construction costs and take into consideration the operational and maintenance costs in order to achieve the minimum life-cycle cost. In reality, however, it was noticed that designers and end-users often lost sight of achieving the goal of the minimum military requirements at the lowest life-cycle costs. The

situation where users ask for more than they really need, “gold-plating” the project, while the contractor on the other side tries to add extra features to the designs for greater profit, is a common occurrence. Hence, constant vigilance and value engineering were required by the PM in order to keep users and designers under the restrictions. This researcher believes that such continuous vigilance presumes commitment and dedication, on the part of the PM, to the mission of the project. It is a way of presenting the personal interest and dedication of the PM and serves to convey this spirit to the project team, users, and contractors as well. Value engineering also presumes clear vision of the objectives and an assessment of the designs in order to identify which features give real value according to these objectives, and which are useless or redundant and must be avoided. It presumes, therefore, a mission- and results-oriented PM who strives for the desired and specific outcome. Without the PM’s results-orientation and mission-focus, the designs and the solutions given would probably have exceeded the minimum military requirements, with subsequent cost consequences.

Furthermore, as stated in the previous chapter, the single most important factor that led to the successful outcome of the project was considered to be the desire and willingness to get things done on the part of the user, PMO, consultants, contractors, PWGSC, and DCC. It is the belief of this researcher, however, that among the above affected parties, it is the PMO, and especially the PM, that broadcasts and conveys the vision, the spirit, and the rhythm to the other parties and sets the directions. Thus it can be inferred that the dedication and the willingness of the PM was of great importance to the accomplishment of the mission.

2. Long-Term and Big-Picture Perspective

This competency enables the PM to act with an eye toward the future and consider the consequences of his decisions. As mentioned above, designers and end-users often lost sight of achieving just the minimum military requirements and wanted to add more. It is the belief of this researcher that the

ultimate aim here was to design functional training facilities for the militia, but with the minimum life-cycle cost. Thus, the necessity for the PM to keep the long-term aim in mind was of great importance, so that the designs and the solutions given met the real requirements and the ultimate purpose, avoiding additions and extravagance that would have added extra cost, but no real value to the mission.

The LRMP was to create four similar MTSCs at different areas across the country. Thus, in delivering the infrastructure of the MTSC at Meaford, the project team remained mindful of an overall objective to reuse the facility designs in the future MTSCs that were to be constructed in the other areas. This requirement highlights the need of seeing the project from a broader perspective, from a systems perspective--just as the project of MTSC at Meaford was within the broader frame of the LRMP. The facilities-design considerations for future sites, however, were not allowed to hinder the satisfaction of the particular requirements for the site at Meaford, and this was a real challenge for the PM who had to fulfill the current requirements in combination with the further perspective of the program regarding the future training support centers. The achievement of this challenge, however, would save cost and time, as the current designs could be used in the future with little adaptations, avoiding duplication of work and redesign from scratch.

3. Are both Systematic and Innovative Thinkers

This competency enables PMs to understand the complex environment within which they must work and provide a structure that promotes sound and creative decision-making. As stated in the previous chapter, daily site meetings and monthly construction meetings enabled the team members to keep ahead of the issues, as they were empowered to make decisions on the spot. In addition, monthly meetings at the PMO office in Ottawa enabled decisions to be made in time and keep control over the expenditures. These facts imply that the PM had established a process of resolving problems and controlling the situation by applying a combination of teams, empowerment, and time-specific meetings. In order to deal with the large number of designs, the PM also enforced the 80%

solution. The numerous designs, in conjunction with the imposed system that required three levels of review of the originator's work, made the situation both cumbersome and difficult to meet the deadlines. By adopting the 20/80 rule (the Pareto principle), the PM created a decision-making frame focusing upon those designs that could have the greatest impact on the project.⁶⁵

Furthermore, the PM had to act in a complex environment considering the number of contractors and subcontractors, the government policy and the users, the number of facilities and the multiple jobs that had to be implemented as shown by the WBS, and the overall schedule in Figures 6 and 7, respectively. The PM needed to understand the order and the interdependence of the various tasks to be done. Critical activities needed to be accomplished on time and with no "slack time," so as not to cause schedule slippage. This necessitates a systematic way of monitoring and thinking by the PM so that the schedule is kept under control, as well as innovative thinking to resolve potential problems that emerge during the project. The bankruptcy of some contractors is a characteristic event that necessitates innovative thinking in order to deal with the situation and keep the project going. As stated in Chapter IV, due to tight competition, some contractors submitted low bids, which they later proved to be unable to afford, and which bankrupted three of them. This affected ten of the thirty-three major construction contracts. Although the bonding companies assumed and completed these contracts, the situation became complicated, bringing about a large number of warranty issues, occupancy delays, and a higher probability of the occurrence of latent defects in workmanship.

Jobs do not always proceed as planned, and as stated in the preceding chapter, cost and schedule control proved to be the link that brought all things together. This highlights the necessity of Earned Value Management (EVM) and a structure for monitoring the cost and progress, in contrast with the plans. To assist in controlling the cost and scheduling at Meaford, a consultant was

⁶⁵ Richard B. Chase, Robert F. Jacobs and Nicholas J. Aquilano. Operations Management for Competitive Advantage. 11th edition. McGraw-Hill Irwin. p. 610.

retained and the accounting systems were made compatible with DND's financial information system. Monthly meetings were held at the PMO office in Ottawa in order to keep control of the progress and cost, and to make relative decisions. Managing these decisions by variance proved to be the most effective way to deal with the situation. From the sample report in Figure 8, it also seems that costs were tracked, in terms of what was budgeted, what was paid, what was incurred and what was forecast to complete the project.

Creative also can be described in the way that the PM team accomplished the requirement of equipping the MTSC at Meaford. As stated in Chapter IV, apart from delivering the infrastructure, the PM was also tasked with the manning levels and providing all the necessary stores and equipment to make the facility work. Though it is not clear if it took direction from the PM, the activation team proceeded on its own warehousing operation at a national level, gathering stores and equipment that was surplus from the closure of other DND facilities and, in particular, the Canadian Forces Europe. This idea saved \$4 million (\$CDN) out of a \$7.5 million budget, and was proved so successful that it was used for equipping the other three MTSCs.

4. Find and Empower the Best People for Their Project Team

In order to deal with the myriad of issues inherent in using many contractors/subcontractors, consultants, and designs, the PM used the team approach. It was considered that only through team building and intimate cooperation, were the tight deadlines achieved. The daily site meetings and the monthly team construction meetings kept ahead of the issues, as the team members were delegated authority to make the necessary decisions. It was also considered that the strength of the success was attributed to having dedicated project-manager resources from the outset;⁶⁶ that implies efficient and dedicated teams within the PMO office that effectively negotiated the project issues with which they dealt.

⁶⁶ Foreman. pp. 135, 139.

A characteristic example of effective teamwork is the way that the activation cell resolved the equipping requirement for the functionality of MTSC. Although obtaining new manpower and equipment within DND is a thankless and endless paper chase most of the time, the four-man activation cell went far beyond expectations and accomplished this work while saving \$4 million out of the \$7.5 million budgeted. Extending the issue to a national level, the team gathered stores and equipment declared surplus from other DND facilities across the country, a successful idea that was also used to stockpile stores for the three other future MTSCs. It is the belief of this researcher that this activity required substantial effort and coordination and is a sign of an effective team that possessed the appropriate members and authorizations to act.

On the other hand, incompetent or unqualified persons can have an adverse effect on the quality and effectiveness of work. As stated in Chapter IV, the number of inspectors determined by the DCC was adequate for the majority of the time, but their quality was sometimes suboptimal. That caused the quality of the accepted work to occasionally fall below standard, and as a result the owner suffered beneficial occupancy delays or additional costs for post-occupancy remedial work. Sometimes the PM has no direct control in the selection of the team members, as in the above situation where the DCC determined the members of the on-site supervision/inspection team. However, it can be alleged that a prudent PM, via appropriate networking and interpersonal skills, might wield indirect influence on the appropriate authority in order to achieve the best composition of this critical teams. As stated in related research:

Although organizational support is a factor that can be addressed by people other than the project manager, a competent project manager could be expected to understand that support of the organization is required to enhance the likelihood of project success and use interpersonal and other skills to achieve it. The competent project manager can exert influence over the way in which project team is structured and how it relates to the structure of the parent organization and others. Team selection draws together factors relating to capability and experience of the project

manager and team for the project and is therefore a factor that is directly concerned with project management competence.⁶⁷

5. Are Selective in Their Involvement in Project Issues

This competency enables the PM to get involved in selective areas and leave the details to his subordinates. One area in which the PM was involved was the control of the design development. The design development at Meaford was undertaken by one prime consultant with twenty-six different sub-consultants, and the system imposed three different levels of review for the original designs. Considering the complexity of the situation, as stated in the previous chapter, the PM was directly involved in controlling the situation, usurping some traditional management roles such as teambuilding and intimate cooperation. He also applied the 20/80 rule (Pareto principle), which highlights the need for selective involvement. Given the numerous issues that emerged during the project, the focus on the more critical and important ones that have the greatest impact, enabled the PM to keep control of the situation and react in a timely manner, and kept him from becoming “lost” in day-to-day details.

Furthermore, as mentioned above, the PM had established a process that included daily on-site meetings and monthly team meetings, delegating to the teams the decisions over the details and everyday minor issues on the site, thus keeping the work going. He did, however, hold once-a-month meetings in the PMO office in Ottawa to keep control of the cost and make decisions on an expectation basis.

The on-site conflicts comprised another area that in which the PM was personally entangled. The prime consultant, apart from the development of the designs, also had the obligation for supervisory assistance, while the DCC had undertaken the on-site contract administration and inspection. The DCC inspectors often required the involvement of the prime consultant in resolving site condition problems or in interpreting design documents, but the latter felt that

⁶⁷ Crawford. p. 154.

they bore limited liability for the constructability of the design documentation, and were not willing to get involved in the daily construction works. This was a source of conflict, and sometimes the communication and cooperation between the DCC and consultant personnel deteriorated, causing delays in the progress of work. The PM inevitably became personally involved in negotiating and resolving the above on-site differences, restoring effective team communications, and providing leadership. It was considered that a more formal approach to the partnering concept and common goals might have improved the commitment of the cooperating parties to mutual conflict resolution.⁶⁸ That implies that the concept of common goals and partnership was insufficiently developed on site.

6. Focus on External Stakeholders

This competency enables the PM to network with the external customers and support organizations, and to identify the key players and their motives. The MTSC was operating as a training facility while construction was in progress and thus the training units and facility users were unavoidably involved during the project. Their interest, however, was in the training activities and they were little concerned about the progress of the project. This was proven by the need for frequent reminders about the priority of the on-site activities, even though they had been informed from the outset that the construction works were of prime priority. However, having determined the potential attitude of this stakeholder, a written agreement was prepared early on that stated the priority of the on-site activities; this comprised a helping tool for the PM to manage the situation. This event highlights the importance of identifying the interest and the potential stance of each stakeholder in order for the PM to take timely, appropriate measures and handle them adequately for the successful execution of the project.

The government was also another interested party in this project, and was concerned with fostering the depressed economic environment of southern Ontario by giving equal access to the local companies. Thus, the PM had to be

⁶⁸ Foreman. p 136.

cautious in fulfilling this policy and the project team had to ensure that the local companies were able to compete for all the contracts. This resulted in having one prime consultant for the design development, with twenty-six sub-consultants and eight prime contractors for the construction, with their respective subcontractors--a complicated situation at best.

The DCC was an additional player in the project. Since it had undertaken the on-site inspection and quality control responsibility, its role was important for the technical performance of works and thus it must have been of particular interest to the PM. As stated above, although the number of the inspectors was adequate, their quality was at times suspect. This occasionally resulted in the acceptance of substandard work, with the attendant negative consequences in cost and schedule (delays in occupancy, extra cost for remedial work, etc). As stated above in the team selection issue, it is the belief of this researcher that exerting influence on DCC by the PM, and insisting on quality inspectors on-site, could have alleviated, or at least mitigated, this problem.

7. Thrive on Relationships and Influence

Many times PMs do not have formal authority over the various stakeholders and thus the development of relationships and networking becomes essential in influencing them favorably toward the project's objectives. The requirement that the MTSC continued to operate as a training facility during the construction works necessitated the creation of good relationships between the two different chains of command that were on-site, the facility users, and the PM team. These two commands had different objectives, functions, and priorities and there was no formal authority between them, except a written agreement for the priority of the on-site activities. This researcher believes that developing good relationships with the user facilities would have enabled the PM to wield influence in resolving the conflicts.

Another point related to the issue of relationships is that the government regulations precluded time- or schedule-based contract bonuses or penalties. The PM thus could not provide significant incentives or penalties, beyond moral

persuasion, to the contractors, in order to improve their schedule, cost, or performance. This event demonstrates the importance of having good relationships with the contractor, since sometimes it seems the only means to exert influence.

In addition, as stated in the previous chapter, it was considered that the constant flow of communication among the PMO, prime consultant, PWGSC, contractors, and DCC enabled the team to overcome the significant hurdles placed in its path. It is the belief of this researcher that this constant flow of communication cannot be achieved without the existence of good relationships between the PMO and the other stakeholders. It is essential that the PM strive to create collaboration, favorable relationships, and trust and openness among the interactive parties to the extent possible, in order to maintain open lines of communication. It is remarkable also, that despite the tight economic environment and the unstable state of many contractors and design consultants, no dispute went to litigation, although more than 1000 design changes and several alterations in requirements occurred.

8. Proactively Gather Information and Insist on Results

As stated above, there was a constant flow of communication between the PMO and the other affected parties, which implies a two-way flow of information, both formal and informal. Monthly meetings were set for assessing information on expenditures, project status, and making decisions. From the status reports (Figure 8), it seems that a kind of EVM was applied, identifying the variances from the plan and making decisions based upon the current results.

The requirement that the MTSC operate as a training facility in parallel with the construction works, was a potential point of conflict and highlights the need for proactive action. The two different chains of command that were functioning on site, users and PMO, had different functions and priorities. As more facilities were handed over to users, the training activities increased, and this often caused an obstacle in the progress of construction works. Anticipation of this situation and early planning by the preparation of a written agreement

regarding the priority of the on-site works assisted the PM in handling the conflicts. The necessity of being proactive became apparent in this situation. If this conflict had not been foreseen and the written priority agreement had not been prepared in advance, it may have been more difficult for the PM to resolve the conflict, with possible negative consequences to the schedule.

Another point that highlights the proactive gathering of information is related to the selected contractors. Due to the depressed economic environment of the region, government policy required the involvement of local companies. Although all contracts were awarded by the DCC, the project team had to ensure that local contractors were allowed to compete for all the contracts.⁶⁹ However, due to the tight competition, three contractors gave tenders that they could not afford and eventually went bankrupt, giving up 10 out of 33 construction contracts. Although the bonding companies that were responsible for these companies assumed their obligations and took action, this researcher believes that a thorough pre-award investigation of the above companies could have prevented these negative incidents. Gathering information about the market prices and the financial situation of the companies, would have permitted a cost-price analysis that could have identified the rationality of the offered prices and the capability of the candidate companies to efficiently carry out their assigned works.

⁶⁹ Foreman. p. 135.

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VI. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

Program management has undergone a continuous evolution over time, reaching the present with a considerable number of responsibilities. The contemporary PM has to undertake various management activities throughout the life cycle of a program, from the genesis of a program, through its various phases, up to its termination. These management elements are related to requirements, organization, teams, planning, risk, control, visibility, status, corrective action, and leadership, with the last being the most important among them.

Successful program management requires a series of specific competencies. Many studies have been made in this field, resulting in various conclusions. Of particular importance and therefore presented thoroughly in this research, is Dr. Gadeken's study based on Defense Community studies which addresses the competencies of outstanding PMs. According to this research, the best PMs demonstrate the following competencies:

- Show a strong commitment to their mission
- Have a long-term and big-picture perspective
- Are both systematic and innovative thinkers
- Find and empower the best people for their project team
- Are selective in their involvement in project issues
- Focus on external stakeholders
- Thrive on relationships and influence
- Proactively gather information and insist on results

The above competencies, which are the subject of the first subsidiary research question of this report, were explored in the LRMP case. That case is a characteristic example of a large infrastructure project with the associated complexity regarding number of involved parties (contractors, subcontractors,

users, government, etc.), the quantity of works to be accomplished, and many other relevant issues. The project concerned four militia training support centers; the first was at Meaford and was analyzed in this research. The analysis of this project, answers the primary research question of how competencies of top-performing project managers are highlighted in the case of MTSC at Meaford.

As shown, all the aforementioned competencies of outstanding PMs were illustrated by events that occurred at the LRMP, answering thus the second subsidiary research question.

The severe restrictions of project requirements, highlighted the need for strong PM commitment to the mission. Constant vigilance and use of value engineering for keeping the designs within the minimum military requirements and minimum life cycle cost, showed his commitment, dedication, and clear vision of the mission. As stated also in Chapter III, the willingness of the affected parties to get things done contributed significantly to the project outcome, which presumes the respective commitment and willingness on the part of the PM to both convey this sense of professionalism and foster motivation.

The vision of the ultimate purpose of the project, and the need for reusing the designs of the MTSC at Meaford for future MTSCs, highlighted the need for a long-term and big-picture perspective. A firm view of the ultimate purpose of the project enabled the PM to set directions that kept the design development within the real requirements, while avoiding unnecessary additions and features. The MTSC at Meaford was the first of the four projects comprising the LRMP, and considering this big-picture perspective led to development of designs that could be used for the subsequent MTSCs, thus saving in the future cost, duplication of work, and time.

A series of events highlighted the need for systematic and innovative thinking. The daily construction meetings at the site, the use of teams with the appropriate empowerment, the monthly meetings at PMO in Ottawa for progress and cost control, and the imposed 80% solution, show the systematic way in

which the PM kept things going. In addition, a consultant was retained for cost and schedule control and a kind of EVM was applied to keep track of the expenditures. Management by variance proved to be the most effective way of dealing with the situation. The large number of activities necessitated systematic monitoring so that critical activities were implemented on time and did not delay successive ones. Innovative thinking was necessary when things did not evolve as planned so that timely resolution of the issues would be accomplished. The bankruptcy of three contractors was an example of such a situation. The way in which the activation cell attained its mission--saving \$4 million (\$ CND) out of \$7.5 million budgeted—could also be considered innovative.

The importance of selecting the right people for the teams and giving them appropriate empowerment was also highlighted. The PM used the team approach at LRMP, providing necessary authorizations through daily and monthly meetings. Only through team building and intimate cooperation were the deadlines achieved, and with success achieved through dedicated project management resources available from the outset. Judging from the result, a characteristic example of an effective team was the activation cell within the PMO. On the other hand, the inadequate inspectors within the DCC supervision team, and the adverse effects in quality of the accepted work, could be seen as an ineffective team.

The complexity of the situation necessitated selective PM involvement directly in order to keep control in important areas and yet not get lost in the day-to-day details. The PM was directly involved in design development, since the large number of participants (prime consultant, 26 subconsultants) and the imposed system of three-level design reviews, caused a complicated and time-consuming process. The occasional on-site conflicts between the DCC inspectors and the design consultant were another issue where the PM became personally involved, providing negotiation and resolution in order to avoid delay. It is likely that a greater emphasis on the common goals from the outset of the project would have ameliorated this situation. The adoption of the 20/80 rule also

indicates the PM's general attitude of prioritizing the issues and focusing on the most important ones that had the greatest impact. The PM was personally interested in control of expenditures and work progress, holding monthly meetings in his office, at the same time, routine details were resolved by the empowered teams during daily meetings.

Consideration of the external stakeholders was also another competency that emerged during this analysis. Government, local companies, training units, and DCC were interested, each having its own unique stake in the project. The PM had to satisfy the government's policy of fostering the depressed economic environment of Southern Ontario by assuring equal access to local companies. He had to handle the training units that were conducting training activities during the implementation of the project, so that they did not hinder progress. Anticipation of their possible attitude led to the preparation of an early written agreement providing priority to the on-site activities. In addition the PM had to deal with the DCC, which provided its own inspectors for the supervision and quality of the works being implemented.

Lack of formal authority over the aforementioned stakeholders also highlighted the importance of effective networking and creating relationships for exercising influence. Good relations with the permanent personnel of the MTSC at Meaford were necessary to facilitate the PM's resolution of on-site conflicts with the training units and keeping the priority on the project activities. Networking could help the PM achieve better on-site quality inspection by the DCC. The absence of contract schedule incentives necessitated good relations with the contractor. The insolvency of many contractors and the tight economic environment was another matter that heightened the need for good relations with the contractors. It seems that these relationships were at a satisfactory level, since no dispute ever went to litigation despite the large number of changes in design and several alterations in requirements.

Last, the competency of gathering information proactively and insisting on results was also necessitated by events. The constant communication between

the PMO and affected parties implied a respective two-way flow of information. The monthly meetings helped to quickly identify the variances from the plan and made for timely decisions based upon the current situation. Another result of proactive action was the preparation of the written on-site priority agreement. In retrospect, an adequate pre-award survey of the market and the candidate contractors could have prevented the contract defaults due to bankruptcy.

The analysis showed also that all the events of the LRMP at Meaford pertaining to PM competencies were addressed sufficiently by the framework of Dr Gadeken's research, thus answering the third subsidiary research question.

B. RECOMMENDATIONS

It is the belief of this researcher that knowledge is a basic element of success, with experience and judgment being two necessary supplements that reinforce it. The knowledge of the eight behavioral competencies that was presented and explored in this research is an important element within the scope of program management and a necessary means for success. The appropriate demonstration supported by personal expertise and judgment will help PMs realize successful outcomes in their future programs.

C. RECOMMENDATIONS FOR FURTHER STUDY

Relevant to this research, the following areas are recommended for potential further research:

1. Competency Assessment

As shown from this research, successful PMs must demonstrate a number of specific competencies. The assessment of a candidate PM's ability to show those behavioral attitudes when required is a difficult task. A potential research could explore the techniques and methods of assessing a candidate PM's abilities and suggest an appropriate process.

2. Competency Development

People differ in their competencies. An assessment of a candidate PM may show that he lacks or has an insufficient level of some critical competencies.

A method of developing personal abilities would be highly desirable. Useful research could be undertaken on what the available methods are and to what extent they can develop the needed competencies.

3. Program Manager Selection

As stated in the second chapter of this report, one of the latest trends in program management evolution is adaptation--meaning that one size does not fit all. Organizations must adapt their project management techniques to the particular project type. This necessitates the selection of the right person for the particular project. Further research could explore methods of PM selection and their ability to achieve this matching.

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