

PDH NOW

Project Management Techniques - II

Online Course (4 PDH)

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Couse Description

This course satisfies 4-hours of continuing education requirement for Professional Engineer license renewal.

Project Management Techniques-II is a second course that will greatly benefit new Project Managers, existing Project Managers, and Project Engineers serving industries, institutions and construction organizations. This course is a sequel to Project Management Techniques-I and is intended to improve your project management skills by illustrating several real-life situations that commonly occur with Project Managers. This course examines various ways in which mostly experienced, but sufficiently trained, PM's implemented certain concepts that assured a successful project. Course highlights include the following:

- Course prepared by same experienced Project Manager that produced Project Management Techniques-II, *not an academic*
- Various case studies that demonstrate how to communicate with management groups in different sized companies as well as team members and suppliers.
- Methods to develop relationships and utilize the principles of quality project management
- Specific techniques that are designed to gain an advantage when dealing with outside forces

Objectives

At the conclusion of this course, the student will be able to:

- Deal with various-sized engineering firms on a professional and personal level
- Recognize and implement the further definition of leadership
- Manage projects for local, national and multi-national companies
- Understand more clearly the definition and methods of decision making
- Respond to problems and complications with confidence
- Successfully function with different types and characteristics of project teams
- Spot opportunities for your firm and yourself to gain valuable experience for future projects and future promotions

How to Read this Course

The student is required to thoroughly read and comprehend the project history, accident explanation and subsequent investigation.

In order to complete the course, the student must pass the quiz in the final chapter of the course. It is recommended that the student keep these questions in mind as the course is read.

Topics Covered

Witness real life project scenarios and will discover methods for resolving problems and conflicts by utilizing both orthodox and (occasionally) unorthodox project management skills and techniques.

Grading

Students must achieve a minimum score of 70% on the online quiz to pass this course.

The quiz may be taken three times.

The student will be asked at the end of the quiz to attest that he or she has personally and successfully completed all chapters of instruction.

The quiz may be viewed in the final chapter of this course.

Couse Inquiry

This course is designed to be interactive. The student is encouraged to contact us to discuss any questions that arise while taking this course. All inquiries will be answered within two days or less. The reader can contact PDH*Now* as follows:

By Email: info@pdhnow.com

By Phone: 1-833-PDH*Now*9

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Introduction

This course in project management is a continuing attempt to improve the prospects for existing project managers and would-be project managers to manage a successful project. This course provides the student with a series of case studies of actual Project Managers and projects for which they were responsible. Project Management Techniques - I is not a prerequisite for this course which is meant to be a sequel, and is intended to broaden your knowledge about how successful projects are managed. Once you have completed this course, you will realize that there are no perfect projects, nor are you expected to be a perfect Project Manager.

This course is divided for all Project Managers into three important categories, which were previously defined in Project Management Techniques - I:

1. Leadership
2. Decision Making
3. Project Team

In each category there are two different case studies, and in each case study the Project Managers utilized certain techniques, mostly orthodox but some unorthodox, in order to bring the projects to successful conclusions. Regardless of the paths that were chosen by the Project Managers, their implementation of the core principles of quality project management proved to be a huge asset. You will also recognize that, although these Project Managers may have had different levels of experience, they all went about their business in a confident and professional manner.

The last part of each of these above three categories tries to give an interesting account of people that we either know or have read about who faced similar challenges in the sports world. The projects that each of them managed was simply their livelihoods. Through diligence, wisdom, and an understanding of those around them, they were able to be successful in their life's projects.

The fourth and last section of this course relates what actually took place following a major fire at a large manufacturing plant. In this case study, the Project Manager went beyond anything that he was obligated to do, resulting in a great savings to the plant as well as significant future benefits to his engineering firm and to himself.

Dealing with Engineering Firms

Small and Local Firms

Occasionally a Project Manager may receive a telephone call with a surprising and completely unexpected message. A PM received such a phone call late one summer afternoon after successfully completing a rather large project in a nearby city. The caller was the president of a mid-sized engineering firm that was in the expansion mode and had just received a verbal commitment from the vice president of a large North American industrial company to provide engineering services for the company's new Greenfield project. However, there was one stipulation prior to the company issuing a

formal contract to the firm; they must be willing to hire the Project Manager of the company's choosing, who happened to be this particular PM. This individual, who had previous experience with the company as a PM, would also be able to furnish substantial production expertise – a quality that was lacking within the engineering firm's organization.

A meeting time was established within a few days of the phone call at the engineering firm's offices, at which time the PM met both the president and vice president of the engineering firm – no representative from the industrial company was present. The PM listed previous involvement in various projects, particularly those related to the industrial company. The management of the engineering firm furnished a basic list of activities that they had performed since their starting the firm about ten years earlier. The meeting was going smoothly and issues of the firm's work hours, office space, lines of communication, payroll dates and reporting procedures were discussed and quickly resolved. When the subject of payment to the PM finally came up, however, the meeting became slightly contentious.

Be Humble, Be Prepared

The PM was an independent contractor who was close to Social Security age and had been paying his own social security taxes and income taxes, had his own healthcare plan, and lived less than 15 miles from the engineering office. Although he exhibited his enthusiasm for the new project and the firm's role, he was in a strong position to negotiate a good rate from the engineering firm, since failing to hire this PM would jeopardize the firm's pending contract. The initial offer from the firm was quite low, in keeping with the engineering firm's policy. At this point wage negotiations began in earnest, and both the firm and the PM utilized their best arguments for winning the verbal, albeit peaceful, battle that ensued.

The PM's counter-offer was substantially higher than the firm's original offer and represented a figure that was more or less in line with the type of wage (or salary) that was customary for the project involved. His offer was immediately met with great resistance. After a few higher and lower numbers were brought forth, the PM then asked the firm's management to provide a copy of their proposal to the industrial company. The engineering firm apparently agreed to supply the requested information, although with some degree of reluctance and hesitation, and their proposal included the following information:

1. A summary of the total hours for the firm's Project Manager to complete the project;
2. All hourly rates that would be charged to the industrial company during the course of the project, including those for the Project Manager;
3. A summary (resumes) of the experience of the engineers, designers, and drafters who would be involved with the project;
4. Letters, memos, and emails linking the engineering firm to the financial success of the project;
5. Previous projects by the engineering firm either of a similar nature or with the industrial company, accompanied by any letters of commendation or criticism.

Take the Initiative

The PM took a day to analyze and evaluate the data from the firm's proposal, calculated the cost of personal taxes, healthcare, and other potential expenses and arrived at a number that was presented to the firm as a compromise. The PM's rate was sufficient to cover expenses, and to earn the PM a good income for the work performed. It also allowed the firm the opportunity to receive a net profit of more than thirty percent of the hourly rate that they would charge to the company, and this last remaining issue was accepted and adopted by both parties.

However, the PM quickly became aware of the reason behind the engineering firm's reluctance to share this proposal information. Buried in the proposal was a substantial number of hours plus accompanying rates for "administrative fees", meaning that the two owners of the firm would be "double-dipping" - collecting on the markups of the engineering team that was actually working on the project as well as direct billing the industrial company for work in which they were not directly involved. The compromise to this situation was to reallocate most of the owners' hours to the engineering group, including to the Project Manager, while the owners would bill the industrial company only for those hours that actually involved their work on the project.

Possess a Teachable Spirit

For a little over one year (actually 14 months) the Project Manager's assignment with this coastal engineering firm was to function as their PM on this local project that they had won with the low bid. The PM provided leadership and production expertise to the firm's in-house design team, being mindful of the fact that, due to its low-bid nature, the project would be under constant scrutiny by the firm's management.

During the course of the project the PM was diligent and respectful of the engineering firm's quest to do a good job and to make a decent profit, while at the same time leading the engineering group to provide a quality facility for the industrial company. As the individual with the most related experience on the project, the PM also felt duty-bound to protect the industrial company Owners' interests and ensure that the new facility would function properly and would ultimately provide the company with a decent profit margin for their new products. Because of the high-profile nature of the project within the company, and owing to the company's request that the PM furnish them with his production experiences for making their project a success, this created other issues not of the PM's making.

Despite his being required to routinely explain the purpose and function of the industrial company's operations to his project team, his efforts were not always met with wholehearted support and enthusiasm by the engineering firm's top management. While his production expertise was always met by the project team with appreciation, the Executive Management of the engineering firm would occasionally try to derail his efforts. Whether this action was due to his favored status with the industrial company or just the management firm's seeming lack of control over every output was never quite clear to the PM.

At one stage the firm's vice president countermanded one of the PM's recommendations for proper grounding design while the PM had been gone for a few days to visit a supplier. Upon his return and

having been made aware of the VP's action, the PM had challenged this design change, explaining to the VP why his design would be neither functional nor acceptable to the Plant Owners. Furthermore, the Project Manager suggested that they investigate the reasoning for the PM's recommendation with the Plant Owners. When the Plant Owners supported the PM's recommendation, explaining that traditional electrical grounding was ineffective due to the very high water-table in the plant, the matter was seemingly settled and the project proceeded.

However, there were other incidents that involved the engineering firm's VP and the PM. On another occasion while in an automobile with him and the firm's president (the other owner), the VP threatened to fire the PM on the spot for not billing the industrial company sufficiently during the previous month. The PM attempted to justify the lower billing month by explaining that two of the engineers on his project team had been on vacation that month, that no one had been available to replace them, and that billing should be quite strong in the coming month. The firm's president diffused the situation by explaining that the PM had come to him for additional support before the vacations occurred, but that nobody was available due to their small size and the critical nature of another project, thus again offering necessary support to the PM.

As the project was winding down, the engineering firm had decided to bid on another large, industrial project being planned in an adjoining state by an international company. Their confidence had been buoyed by the pending success of the existing industrial project. About two weeks before the very successful startup of the current project, the engineering firm was informed that they had been selected because they were not only the low bidder on this new project, but also in large part because of the firm's success with the project which was being concluded. The engineering firm, seemingly feeling that their capabilities were now sufficient to manage an industrial project of such size and scope, made no attempt to negotiate with the PM for the new project.

Be Flexible and Sincere

Meanwhile the PM had been directly contacted by the Owners from the industrial company to determine if he would be their contract Project Manager for a new industrial facility similar to the one being started up, which was two states away. The PM's decision was based partially on money (there would be no markup by any engineering firm in order to make a decent profit) as well as the integrity of the industrial company Owners. When he notified the engineering firm of his decision to work directly for the Plant Owners, but to support them for the next few months with their new industrial project until a replacement could be found, he was shown the front door quickly and without any kind of thank you for his efforts.

Following his rather ungrateful departure from the engineering firm, the PM spent two years on the new project, engaged with a larger and more experienced engineering firm, and completed another very successful project. His former engineering firm began its new project with a minimum of industrial expertise, struggled through the early phases of the large industrial project, and were finally relieved of their contract obligations after about six months. There are many lessons to be learned by the Project Manager as well as by the engineering firm and the industrial companies regarding these activities.

Summary: Whether functioning as a direct employee or as an independent contractor, a qualified Project Manager should always try to be in a position of strength in order to negotiate the best contract, whether with an engineering firm or with the company. Often a PM may be hired or retained primarily for his or her specific expertise in a commercial or industrial endeavor. Under the circumstances in which this PM was hired, and in spite of his enthusiasm and sincerity, he was always considered a liability in the eyes of the firm's management.

While taking the initiative and exhibiting a large degree of flexibility may be key factors in ultimately achieving success, the support of the firm's management is very critical. Obviously, the firm's vice president had much more personal ambition than concern for his employees and the project, and seemingly harbored a great deal of resentment toward the PM throughout the project. However, the PM never seemed to become discouraged, and maintained an open line of communication and cooperation with all parties involved.

Intermediate and Multi-National Firms

Bruce had been a Project Manager for a large industrial company with operations throughout the United States but had an enterprising spirit. Bruce felt that he could do better with his own company and decided to form an engineering and construction company that would service local customers with efficiency and quality. Starting out with just one other employee, Bruce worked 12 to 16 hours a day, and often six days a week. Bruce had a business background (degree also) and a good understanding of what was required to build his firm: work hard (to the point of sacrificing a normal lifestyle, find a niche market, and offer sincere and loyal service. Within five years Bruce was a successful entrepreneur with a monthly payroll of several hundred thousand dollars. Articles were written about Bruce and his successful company, and Bruce seemed to have discovered the methods for satisfying his customers. Then some of Bruce's mistakes and some outside events occurred which entirely changed the course of Bruce's company as well as his career.

In the process of expanding his company, Bruce had hired some employees who did not have the same set of ethics and loyalty that were needed to maintain quality relationships with the customers. In addition, Bruce had taken on larger and larger projects, which had resulted in increased financial burden and greater debt. Then, without any warning, one of his company's largest customers declared bankruptcy, setting up a long and costly court battle. Soon following that devastating news, one of his company's key personnel became grievously ill, leaving Bruce without the necessary support in critical areas of his business. Finally, in an effort to increase the magnitude of the company, one of his largest projects was grossly underbid and lost several hundred thousand dollars. This financial blow caused Bruce to drastically reduce his employee workforce and raised the possibility that he would face personal bankruptcy. To his credit, Bruce worked tirelessly over the next few years to pay off his creditors and never did consider declaring bankruptcy. At the end of that time in his life, Bruce closed his business and looked around for a company that might want to hire him.

No Time for Discouragement or Self-Pity

One of his former employees suggested that Bruce talk to a large multi-national engineering and construction company with offices in most of the United States as well as more than a dozen foreign

countries. Bruce called the HR Manager, who informed him that they did not have any immediate openings; however, one of their Southwest offices was expanding, and he would make arrangements for an interview. Bruce was not too enthused about making the trip, not even when the HR Manager called him back the next day and told him that the company would reimburse Bruce for the airfare, and that they would have a driver from the office there to meet with Bruce the following Monday outside the airport terminal. Although those issues had been resolved between the company and Bruce, he still did not feel comfortable about the interview, nor did he have the faith in his abilities after his recent business failure. Believing that the whole day just might be a waste of time, nevertheless, Bruce made his plane reservations and called the HR Manager's secretary to notify her of his travel plans.

Surprising Development

On Monday morning Bruce dutifully boarded an early morning flight to his destination, still feeling less than confident about the purpose of the trip. Once the plane landed and Bruce made his way into the terminal, he headed immediately for the terminal exit. Outside the terminal he spotted the company's car, and quickly walked over to it. Expecting to be greeted by a single driver, Bruce was totally shocked to see three men in business suits sitting in the large sedan. Each man greeted Bruce warmly and identified himself by name and position in the company. One was the Office Manager, or vice president, and the other two were the General Managers. Bruce was nearly overwhelmed by the surprise reception, but did his very best to keep his cool. That morning he was introduced to several employees, and was shown all of the company's latest tools, devices, and instruments that made them unique and gave them a worldwide advantage. Over lunch the Office Manager presented Bruce with an offer for employment and asked him to seriously consider it, because they would like him to start with them the following Monday. Bruce said that he would talk it over with his wife, bid them farewell, and boarded an early afternoon flight.

The very first thing that Bruce did, after he got back home and told his wife about his visit, was to call his former employee who had recommended the company originally. There were some surprising issues that had occurred since Bruce had called the company and requested an interview the previous week. On the Friday before Bruce arrived for his interview, the company had terminated a Project Manager for mishandling a major project that was being closely watched by most of the top executives in the company. Furthermore, management for the client had criticized the now dismissed PM for being uninformed about their industry and overall objectives as well as unresponsive to their requests for expedient service. The engineering firm's executives spent the rest of that Friday and much of the weekend trying to determine their course of action. Then they analyzed Bruce's resume, realized that he had a strong background in both project management and that specific industry, and had an offer prepared before they actually met with him. The only thing that could have prevented the company from presenting the offer to Bruce was either arrogance or indifference on his part; instead they found him to be likeable with a confident air of humility, so they made Bruce the offer. He accepted their offer the next day and began his new assignment the following week.

Assignment to An Ongoing Project

On the first morning of his new job, Bruce signed all of the necessary "new employment" documents and was introduced to many of the firm's employees, including the other top management members

that he had not met the previous week as well as most of the members of his new project team. That afternoon he met with the office's financial manager in order to develop a clear understanding of the financial and short-term status of his new project. What he learned from her was not very comforting; the project had only a few thousand dollars available to charge to the company, and the company had refused to authorize further funds – they were seriously considering cancellation of the contract with the firm and finding an alternative source. Later that afternoon Bruce met with several key individuals on the project team. Each engineer and designer gave a nearly similar answer when Bruce asked them what kind of problems they had encountered on the project; the previous Project Manager was "...in over his head", "...had little understanding of the industry", "...was prone to berate team members" in front of other team members and even top management, and never took any blame for any of his miscommunications or inadequacies.

New PM Makes It His Project

Bruce had learned several lessons from his experiences over the previous ten years as an entrepreneur, and the ten years before that as a highly regarded Project Manager. Whether functioning as a PM, or following his excursion into the area of starting and operating an engineering and construction company, he realized that being sincere with his clients and acknowledging when his firm occasionally did not have the necessary industrial or commercial experience were crucial to the success of his firm. Bruce brought that attitude with his new assignment as a Project Manager and, while that sometimes had caused political heartburn among his superiors, the customers had usually been patient with Bruce and his project team and had remained positively responsive. The following morning Bruce called the company's vice president, who was the company representative responsible for the success of the project, and introduced himself as the new Project Manager. Bruce arranged a meeting and flew to the company's mid-west office the next day to meet with the VP and other company executives. During the meeting some of the management members recognized Bruce from past projects, were comfortable with the new direction of the engineering firm, and agreed to authorize an extension to the firm's contract for several hundred thousand dollars.

During the ensuing months, as the eyes of the firm's top management were on Bruce and the project team, his performance became less scrutinized and the project activities became somewhat routine. Bruce had learned the critical lessons of a quality Project Manager: never take anything or anyone for granted; trust but always verify, and listen to ways in which he and the project team could improve. Bruce also became aware of the nuances of a large, multi-national engineering firm: practices, procedures, and politics. Very rarely in the first year did Bruce get involved in water cooler or coffee pot discussions. He preferred simple meetings, always pre-scheduled and usually one-on-one, with his team leaders, department heads, and other staff members such as the Financial Manager (a female) and the Director of Marketing (also a woman). The firm's portion of the project was completed successfully over the next several months. Bruce's management skills and client relationships were duly noted by the firm, and he was offered a promotion by the firm, which he accepted after completion of the project. However, the politics of such a large firm became overwhelming to Bruce and his senses of discipline and humility. He remained loyal to the firm throughout his short career with them, but was open to other opportunities that were presented to him.

Summary: One thing that usually escapes a quality Project Manager with a good track record is that he or she will often be exposed to new and greater opportunities. A Project Manager should always

have the faith that he or she will succeed where others may have failed. There is a common concept that a good executive can be just as good at another company, no matter where that executive has been or where he or she is going. Unfortunately, that philosophy is sometimes proven wrong; a CEO from a sporting goods company probably won't have an easy time trying to manage an oil company, or even a multi-national bank.

However, this same philosophy usually does apply to Project Managers, who might have a golf course as a project this year, a refinery next year, and a 20-story bank building the year after that. In addition to being a decision maker, a successful PM is a planner and a builder. Although a quality Project Manager always has a high value and should be open to opportunities, the very best thing that any PM should do is stay completely loyal to the present company, while being open to opportunities that may arise.

Defining Leadership

In a previous course, which is referenced as Project Management Techniques - I, there were numerous leadership characteristics that were used to define a quality Project Manager. While that course is not a prerequisite for this one, its emphasis on the personal values required by a successful PM will hold very true as you read through and study this course.

One of those leadership qualities that was not discussed in the previous course centered around a relationship between Head Coach Vince Lombardi of the Green Bay Packers and Bart Starr, his quarterback. Mr. Starr had been drafted in the 17th round in 1956 by Green Bay – at that time there were only 12 teams in the National Football League – and was used sparingly as a backup quarterback and in mop-up roles as the Packers struggled to a franchise low 1-11 record in 1958. In danger of losing their franchise, the Packers hired Mr. Lombardi in 1959 to help change the direction of the team and to salvage the franchise. Needless to say, no one could have predicted how much the fortunes of the Green Bay Packer franchise would change. In the period from 1961 through 1967 the Packers won five league championships, including three straight, and the first two Super Bowls. While that was considered one of the greatest turnarounds in professional sports history, nevertheless the late Paul Harvey would have said “...and now the rest of the story.”

Mr. Lombardi had a reputation as a perfectionist with a very volatile temper and a very short fuse. Midway through the 1959 season he had installed Mr. Starr as his starting quarterback, primarily due to what he considered Mr. Starr's leadership qualities, and the team completed the season somewhat successfully with a 7-5 record. During a pre-season practice the following year Mr. Lombardi was very vocal, being critical of nearly all of his players, including issuing a stern reprimand of Mr. Starr in front of the rest of the team. After practice Mr. Starr caught up with Mr. Lombardi in his office. He politely but firmly reminded Mr. Lombardi that he had asked Mr. Starr to be the leader of the team – in those days there were no headphones in helmets and quarterbacks called nearly all the plays. Mr. Starr then informed Mr. Lombardi that, in the future when he had a criticism of Mr. Starr, he should call Mr. Starr to the sideline or into his office and air his grievances in private. From that day forward Mr. Starr and Mr. Lombardi had a player-coach relationship that resulted in five league championships in a seven-year period. Mr. Starr not only became the leader of a great team, but was also awarded the Most Valuable Player for Super Bowls I and II.

As a Project Manager, one of your strongest qualities will be in the leadership role. Although you are expected to be a decision maker, not every decision that you make will be met with approval by executive management, and you may sometimes be criticized or even reprimanded. The same situation will hold true for those on your project team who are actually responsible for the numerous tasks that propel a project. You as a Project Manager would like to command the same respect that Mr. Starr received from Mr. Lombardi by having any dissatisfaction of your performance expressed to you only behind closed doors. This same philosophy should apply to those members of your project team whenever you are dissatisfied with their efforts or production on your project.

Summary: Leadership is both a way of life as well as a state of mind. Nobody is born with it, just like nobody is born with true discipline or humility. However, many people naturally develop the necessary skills for true leadership early in life through good parenting, personal experiences, and other tangible methods. Others may acquire it later in life through diligence and effort, including study and training. Irrespective of how you have managed to position yourself as a leader, know that leadership is one of the two or three greatest qualities of a Project Manager. As you go through this course in Advanced Project Management, you will note several other important qualities for a PM, although none is more important to the success of your project than strong leadership.

Dealing with Manufacturing Company Management

Mid-sized Companies

Following his moderately successful completion of a difficult multi-million dollar project, Sammy was asked by a similar-sized company to manage their new project. Over the next two months Sammy as the Project Manager was given the opportunity to meet with the team of executive managers who had the responsibility for scoping and developing the budget for the new project. The first meeting, which included Sammy and three company executives, occurred at the company's North American home office on a truly cold winter day. Once the meeting began and Sammy was introduced as the Project Manager, he was made aware of the scope details of the project. Their plan was to design and build a Greenfield plant in the southeastern United States that would receive unfinished products from a nearby plant, complete the manufacturing of those products, and non-destructively test those products. The finished and quality inspected products would then be shipped to all parts of North America. All of this was in his area of experience and expertise, and Sammy soon became comfortable with the project and the people describing it until the management executives on the team began to define the process that would be used for the production portion of the project.

A Subtle Warning

As the management team began to describe the method that they planned to utilize for the finishing process, Sammy quickly realized that this part of the project did not represent the industry standard and was not anything with which he was familiar. The standard industry process for finishing these products, whether they were long or short, square or round, was on an individual unit basis to maintain consistency and quality control. The company plan for preparing the products to be finished was a

continuous process that utilized an older technique which was inconsistent, did not follow industry quality control practices, and during the past forty years had been abandoned by similar companies as being not only obsolete but also too costly and quite fallible. The industry standard for the past several decades had been to bring the product up to a certain process temperature, usually between 1650°F and 1750°F, in a natural gas-fired furnace. Each product would then be individually discharged through a furnace exit door and into an enclosed quench unit, where the heated product would be quickly drenched with a high-pressure water spray.

Quickly estimating that this portion of the project would represent about 25% of the total project budget, Sammy was at first disbelieving, and then really dismayed. The scope was so contrary to any similar project in which the PM had been involved that he remained completely silent, choosing only to ask specific questions during the remaining discussions. Sammy was aware that a similar project had just been concluded at one of that company's other plants within the past six months. That facility was utilizing the latest technology, and was already operating very successfully. Listening carefully regarding this area of the project scope where the PM had many years of expertise and experience gave Sammy an uneasy feeling, but the management team was surely knowledgeable of the recently completed project at one of their other plants. Although he was feeling a certain amount of discomfort with this most critical scope of the project, Sammy believed that the management team very likely had good reasons for their decision.

Sammy's Concerns Were Temporarily Tempered

Toward the end of the four-hour meeting, the rationale for the company's scope for this new project became apparent. The company had a similar facility at one of their older North American plants which functioned seemingly quite well. Neither their Board nor their Executive Management had any interest in changing to a newer or different technology in their attempt to expand their product business model as well as the company's actual production.

The leader of the team – we'll call him Dave - was extremely pleasant and knowledgeable, and was the company's General Manager – Operations for all North American plants. The new Project Manager and he hit it off very well, and they met twice over the next thirty days to finalize the budget. One of the meetings occurred at the company's home office, while the second meeting was at a company's planned plant expansion site in the Southeastern U.S. After that second meeting, Sammy never saw Dave again. Just three days after his visit with the new PM, Dave died of a massive heart attack while playing in a pickup basketball game in his hometown. To say the least, the entire company as well as the new PM were devastated, not only by the sudden death of a middle-aged man who was a good friend to all that knew him, but also because of the uncertainty of the new project.

The Company Regroups

About two weeks after the initial shock waves surrounding Dave's death had subsided throughout his company, Sammy received a phone call from the company's vice president who had been involved with the company's most recent project the previous year. Stuart informed the new PM that the company wished to proceed with the project, that they still wanted Sammy to be the Project Manager, and that Stuart would be the new Company Representative for future activities. The PM was asked to finalize a

project schedule and a project budget by the end of the week which the VP could present to the Board of Directors at their next meeting.

Sammy worked on those two items practically from sunup until sundown for the next four days, talking to engineering firms, suppliers, and contractors who might be involved in the project. By the end of the week he had a project schedule that, with the exception of one major equipment supplier who later proved to be unreliable and several weeks late on deliveries, would prove to be very accurate. However, he was very apprehensive regarding the project budget. The PM adhered to the planned scope of the new facility as defined by the executive management team, but many outside changes had occurred. Some of the suppliers that had supplied the original equipment for the older facility were no longer in business, while others had raised their prices much higher to cover inflation as well as previous losses on marginal equipment. The final budget package which Sammy presented, including a somewhat abnormally high contingency, came in at slightly more than ten percent over the initial budget. Although this made it the highest capital project in the company at that time, the new Project Manager analyzed the numbers several times, but could never significantly affect a reduction in the bottom line.

The Project Moves Forward

Subsequently, Sammy submitted the project schedule and the project budget to the Company Representative with some trepidation. To the Company Representative's credit, he reviewed the package, accepted it with very few questions or changes, and submitted it at the next Board meeting. The project was approved in its entirety at the Board meeting and the new Project Manager was handed a project with which he did not have complete familiarity, would receive minimum guidance from others, and lacked total confidence that the project would achieve a high degree of success.

As the product preparation process was the most critical part of the project and represented a high percentage of the project's costs, one of the first actions by the Project Manager and the Company Representative was to seek out suppliers who claimed to qualify for their needs, including the one supplier who had provided the similar system at the company's other North American plant many years prior. Three seemingly credible suppliers were selected and individual meetings were scheduled with each. After those meetings that each lasted all day with the three potential suppliers, the Company Representative and the Project Manager reached the same conclusions; all three suppliers could probably satisfy the first phase of the preparation process, only the one supplier who had worked with the company prior could possibly satisfy the requirements of the second phase, and none of the three had the internal ability to satisfy the requirements of the third phase.

The PM and the representative then made the decision to work with the one supplier, which shall be designated hereafter as Acme, that had provided the prior product preparation system to the company. In order to provide the engineering for the balance of the project and to furnish oversight for the Acme portion of the project, Sammy and Stuart selected a local engineering firm to provide them with a qualified project team. The PM and CR then offered Acme the opportunity to enlist outside support of the company's choosing. The PM, project team, and Acme met with a third-party company that had over fifty years experience in how to efficiently process the products in order to improve the metallurgical and physical properties of that product.

Another Warning Sign

However, Acme refused to accept any help or support for two reasons: 1) they claimed to know as much about properly processing those products as the third-party company, and 2) anything that they might learn from the third-party company would not be held proprietary and might be used by Acme in future projects. Consequently, no real agreement was reached with Acme other than the basic fact that the company was removing the third phase of the project from their contract and would be purchasing that item separately. The company, cautiously supported by the Project Manager, felt that Acme would be the most logical supplier for the first and second phases of the preparation process. The PM was hoping that Acme could actually deliver the system design and the equipment that would satisfy their needs, based on their promises, their facility at the other company plant, as well as any support that the PM and the project team could provide.

A contract was drawn up by the company's legal department, accompanied by the Project Manager's very rigid specifications. The legal department developed a set of terms and conditions that appeared to be quite stringent as well as compensatory, and which later proved to be very prophetic. After much review and discussion, the contract was signed with Acme, the preferred, although somewhat suspect, system supplier for several million dollars. The PM and the project team knew that a big part of their workload would be the expectation for them to keep close watch on Acme's activities.

Acme was encouraged to submit preliminary drawings as soon as possible (within three months of contract signing), particularly for the design of the second phase equipment, so that Sammy and the project team could determine their specific capabilities in that area. In a little over eight to ten weeks after the official purchase order date, drawings started to trickle into the engineering group. Unfortunately, the drawings that they were receiving from Acme were mostly generic, illustrating systems that had been designed for previous customers over a thirty-year period. As expected, the Acme had a good knowledge of how to uniformly and consistently prepare the products to the specifications of the initial phase, and was able to provide a bill of materials which allowed the project team to design the necessary main building as well as the large control room that would be needed.

During the next six months, the supplier submitted certified drawings of the system that was designed to meet the specifications of the first phase. Although this was a very complicated system from an electrical and electronic standpoint, the Acme design seemed to be very logical and quite appropriate for a company that had been providing this type of system for nearly forty years. At no time did the Project Manager or any member of the project team have any qualms or express any serious doubts regarding Acme's abilities to successfully furnish this portion of the project.

Obvious Shortcomings

However, once the certified drawings for the second phase of the system started to arrive and be reviewed, the project team quickly realized that the supplier had huge deficiencies in its design, and Sammy immediately notified the Company Representative of his concerns. As described earlier, there was a certain amount of expertise that was necessary in order to achieve success for this phase of the product preparation. For instance, the pumps that Acme was proposing were inadequate in volume and of a lower pressure than was needed for a successful performance of the second phase. In addition, the

water nozzles on the manifold rings that Acme planned to utilize surrounding the hot product were essentially misdirected to the product; the PM and several of the project team knew from years of experience that the nozzles had to be at a reasonably precise angle in order to function properly and provide the optimum product. The analogy which was used was that of chopping down a large tree with an axe; if using a chopping blow perpendicular to the trunk, the tree may not fall anytime soon, whereas the use of an angular chop would much more quickly cause the tree to fall. Once this penetration occurred, the hot product almost immediately developed a much harder and tougher metallurgical structure; otherwise the only thing that the water was accomplishing was to cool the product to a near ambient temperature, thus having no effect on the product's metallurgical properties.

The CR was very clear in his instructions, again informing the PM that his job was not to design the system for the supplier, that Acme had refused the help that had been offered, and that they would have to suffer the consequences if they should fail to perform per the contract. The Project Manager felt that this was the incorrect approach by the company to a potentially serious problem, and that both the company and supplier could stand to lose financially. Although he voiced his objections about this company philosophy and expressed some serious reservations, the PM and the project team continued on with the project.

Investigation Launched

Over the period of the first six months of the project the Project Manager had become very well acquainted with the person who had been designated by the company to become the Manager of Operations for the new facility. During the next few weeks, and owing to his concerns as well as those of the PM regarding Acme's abilities, they made arrangements to visit the one North American plant which had Acme's product preparation equipment installed. Accompanying them on their visit were representatives from Executive Management and also two Quality Control personnel. After two days of close observations and review of the quality control records, the group came to the realization that the product yields were considerably lower than what had been reported. The implication was that the plant was losing a significant amount in terms of revenue and profit.

The company was immediately notified of this fact and launched an investigation into the plant's past and current activities. The PM felt personally exonerated that his concerns and those of his associates regarding this supplier had been justified. Nevertheless, Acme continued to insist that it was providing the design and equipment for the new facility necessary to meet company specifications and production requirements. The company, much to Sammy's consternation, maintained its "...let them fail, we'll sue them later" attitude and refused to allow the Project Manager or any member of his project team to offer the supplier any considerations for how to improve their systems. Conversely, the Acme was insistent on its expertise and ability to perform and continued to maintain its attitude that it was fully capable of fulfilling its contract. Regardless of what issues the Project Manager and his associate in Operations attempted to resolve, they were continually met with resistance.

However, when the so-called phase 2 drawings began to be received and reviewed, the project team quickly realized that the supplier had huge deficiencies in its design. Sammy immediately notified the Company Representative of his concerns, which included inadequate delivery systems and an exit system that would be very costly to operate and maintain. The CR again informed the PM that his job

was not to design the system for the supplier, that Acme realized the importance of providing a system that would meet company specifications, and that the terms and conditions of the contract with Acme were clearly defined. The only thing left for the PM to do was to alert the company to any potentially serious problems, and expressing his opinion that both the company and supplier could stand to lose financially. Although he voiced his objections to this company philosophy and expressed some serious reservations, the PM and project team were directed to continue on with the project.

During the next few months Acme issued certified drawings to the engineering group pertaining to the scope of the equipment which they would be supplying for the quench system. Acme offered no parameters for transferring water from their pumps to their open quench system, nor for any flow controls, pressure regulators, or safety shutoff valves. Furthermore, their open quench system would allow water to be sprayed all over the operating floor as well as torrents of water to infiltrate their high voltage electrical room. Without any company knowledge the PM authorized the engineering group to design a proper piping system from the pumps to the quench headers.

Warnings Were Not Heeded

The project continued on for the next several months, and except for some late deliveries by one of the other major suppliers, went through a certification and startup phase without a great degree of difficulty. Acme also completed delivery of the preparation equipment, and that section of the new facility began operation as scheduled. However, Acme's failings began almost in the first minute of their operations, some of the unexpected but most of them predictable. In the meantime, the balance of the project had been completed successfully and within budget and, following some change order approvals and other necessary paper work, Sammy's role as Project Manager was concluded. Although he moved on to other activities, Sammy was continually contacted by the company's Operations and Engineering departments to help them resolve some of the ongoing problems with Acme.

During the first few years of operation, Acme presumably did its best to satisfy the many plant requests for improvement to its system. Gradually, the spirit of cooperation gave way to animosity and the blame game. Providing the many system adjustments and tweaks proved to be very costly to Acme; on the other hand, the company never realized the potential value that a well-designed system could provide. The company continued to be plagued by low quality products that did not meet market specifications.

No Winners

Finally, after five years of heated verbal and written exchanges involving numerous trials and negotiations with Acme, the company filed a long-anticipated lawsuit against Acme, contending that Acme had cost them several million dollars in lost revenues. Although litigation resolved some of the dispute, neither party was particularly pleased with the ultimate judgment, and once again the biggest winners were the trial lawyers. However, Acme was not required to pay for any damages that had occurred as the result of the company's inability to satisfy customer requirements. In addition, the legal team that was hired by the company charged a substantial fee to prosecute the case for the company. Furthermore, the company still has an inefficient and costly system, due in large part to the fact that they were unwilling to work closely with the supplier. An obvious situation that should have never gone to court ended up being a lose-lose situation for both parties.

Summary: The one person, Stuart, who was in the best position to resolve the situation, had developed the attitude that the supplier should sink or swim on its own merits. Conversely, the supplier Acme refused to accept any external support, and may have been reluctant to accept any internal assistance as well. A number of mistakes were made, including the supplier being awarded a contract based on promises rather than on previous results, and the company being unwilling to offer any concrete solutions to the supplier's systems which were knowingly lacking.

Whether you are a salaried or contract employee, your position as Project Manager demands that you be dedicated to the best interests of the company that is paying you, no matter whether you are dealing with engineering firms, suppliers, contractors, or other company employees.

As a PM you are obligated to offer your candid opinion on critical matters, and to have both the knowledge and courage of your convictions. Should your employer choose to not heed your advice or recommendations, you still are expected to move forward with the project in the best professional manner possible. You will have demonstrated your sincerity by showing your concern; maybe the project won't turn out the way you would have hoped, but you at least maintained a positive outlook.

Large and Multi-National Companies

There was an experience by a young Project Manager who was relatively new on the job. Danny had been a supervisor at one of the company's plants and, when the plant was cutting back in production, was asked to transfer into the company's central engineering department. Within a few months of Danny's transfer, his leadership qualities and his abilities to motivate personnel were recognized by his superiors, and he was rather quickly asked to manage four smaller projects. One of the projects was ongoing and had an initial budget of \$4.0 million, but was on trend toward a 50% overrun. Interestingly enough, the original PM whose duties on this project Danny had assumed, had been promoted out of the project management group and into another engineering sector. Another project that had been assigned to Danny had just been approved by the company's board of directors for \$8.0 million and was scheduled to begin immediately. However, the company had made the decision to delay the second project pending the financial results of the first project when it was further along and executive management could determine its cost impact on the company as a whole.

Always Plan

During this delay, which turned out to be about six months, Danny provided a somewhat unorthodox approach to project management. He analyzed both projects and then proceeded to manage them as one project, even though they were at two different plants which were 2,000 miles apart. He requested an Advance Authorization of \$1.2 million for the second project, which was within company guidelines, in order to proceed with the necessary engineering to provide for long delivery equipment items and construction drawings and specifications. He also had a \$400,000 contingency allotted to the first project (also within company guidelines as a Change in Authorization), thus bringing the budget of the first project up to \$4.4 million. Danny then, with the second project underway, proceeded to analyze the

cost structure of the first project in order to bring its costs more in line with the original budget without sacrificing quality or any other production values.

He started by eliminating a new office complex and slightly expanding an existing office that was only being partially utilized. He followed the same practices with an existing maintenance shop and utility building, thus reducing projected costs by several hundred thousand dollars. He had his engineering group rearrange and simplify the conveying system, which eliminated several hundred feet of conveying equipment at a cost of more than \$1,000 per foot. While these activities had been developing, Danny had been in conflict with some members of plant management regarding the actual construction of the facility. The plant had awarded a "standing order" to a favored local contractor that had been given an open order for most of the construction in the plant, including this new project. Danny convinced Executive Management and most members of plant management that all capital projects must be competitively bid, and that the favored local contractor was welcome to submit a bid, along with the bids of at least two other local contractors. The resulting competitive bids produced prices that were nearly one-half of what the favored local contractor had estimated. The project met its startup date and, after all the agonizing about it breaking the budget, the final cost was slightly less than \$4.0 million.

Approval of 2nd Project

Meanwhile, the second project was progressing quite nicely – long lead equipment items were either on site or were close to being delivered, and construction specifications had been written, revised, and rewritten. In addition, all construction drawings had been checked at least twice and were ready to be issued. When Danny received notification to proceed with the second project, he and his project team were quickly able to secure construction contracts and begin the actual field work. The construction companies that were awarded the contracts on site already had available to them the necessary facility equipment available, thus avoiding any costly construction delays that had plagued previous projects of this type. The construction drawings had been issued in a timely manner, allowing the various contractors to order their necessary construction materials and have them also available for their crews. The original schedule had set aside 120 days from start to finish of the project; the actual time for the project was 88 days. Owing to the availability of the equipment and materials as well as to the accuracy of the drawings, there were no registered delays, nor were there any Extra Work Orders written for the first time ever on a project of this type. Primarily as the result of these savings in construction costs due to the diligence of Danny and his project team as well as the overall planning, the total cost of the project was slightly less than \$6.0 million, for a net savings to the company of more than \$2.0 million.

For weeks afterward, Executive Management would send other PM's and engineers to Danny's office to hear his "words of wisdom" on how to bring their projects under budget and within schedule. As Executive Management continued to assign him to larger and larger projects, Danny never tired of repeating his philosophy: provide the engineering as early as possible and have the equipment on site before the construction begins. This simple philosophy meant that the Project Manager had to plan and prepare the work for which the PM was responsible, but also to understand the needs and requirements of others engaged in the project so that a successful conclusion could be achieved.

Summary: A quality Project Manager has a long list of objectives when starting or assuming a project. Regardless of experience or longevity as a PM, that individual must plan; that includes the budget,

schedule, work force, plant or office management and personnel, and the scope as presented. If a PM fails to take the necessary time to review and plan a project, failure does unfortunately become an option. On the other hand, many projects have become successful when a Project Manager comes to understand the nature of the project, listens to the wisdom of those who are involved, and moves forward in a positive, direct but not contentious manner. As you may have noted from previous case studies, other factors such as leadership and decision making are usually very important, but none more so than planning.

Defining Decision Making

Joe was a small-town boy from a community about 30 miles south of Pittsburgh along the Monongahela River. At the time when Joe was growing and developing into an athlete of some renown, Donora's only claim to fame was Stan Musial, the great baseball player for the St. Louis Cardinals. Most of Joe's family either worked or planned to work in the old Donora Wire Works when the time came. Joe and his friends probably spent a lot of their time playing the major sports of football, basketball and baseball, enjoying activities along the wide river – especially in the summertime – and proclaiming that the future held something better for them than the Wire Works. However, that was one decision that was taken out of the hands of Joe and his friends – the plant shut down permanently in June of 1962 at just about the time that Joe and his buddies were entering peewee league football. Although Joe did not have the greatest arm strength, the years of experience with his dad had taught him so much about the game of football that he naturally became a quarterback when he enrolled at Ringgold High School, a joint school district that was formed between Monongahela City and Donora when the plants shut down and the population declined.

Major Decision

Joe was no slouch as an athlete, even though he came from a smaller school. He was a Parade All-American in football in spite of his smaller stature and seeming lack of arm strength and was also an All-State basketball player. Joe was recruited by several Division One schools, but his first choice of where to accept a scholarship was at North Carolina State, since they had agreed that Joe would be able to play both football and basketball. However, his boyhood idol was Terry Hanratty from nearby Butler, PA, who had led Notre Dame to a national championship in 1966, and was then playing for the Pittsburgh Steelers.

Joe chose the romantic over the pragmatic, making a decision to accept a scholarship to Notre Dame, where he had been recruited by Ara Parseghian. Joe was ineligible to play as a freshman, but when Parseghian resigned at the end of the season, Joe had the option of transferring to another school. Joe again made a major decision, preferring to stay at Notre Dame, even with a new coach and several big-name recruits ahead of him at the quarterback position. Joe languished on the bench as an unknown entity for much of his sophomore season. Finally, the new coach Dan Devine called on Joe on two occasions when both games were seemingly lost and Notre Dame was several touchdowns behind in the fourth quarter. All Joe did was to complete touchdown passes, four in one game and three in another, each resulting in a near miraculous victory for the Fighting Irish. Coach Devine ultimately recognized Joe's capabilities, but Joe remained as the third team quarterback at the end of the season.

Career Changing Decision

Preparing the next spring to battle for the starting position, Joe suffered a serious shoulder injury and had to sit out his entire third season. Joe still had two seasons of eligibility, but knew that he would be far down Coach Devine's depth chart and might not ever have an opportunity that he had dreamed about as a young boy. Nevertheless, he decided to rehabilitate his separated shoulder, and worked hard to get back into playing shape. In his junior year he was still listed as the third string quarterback and Notre Dame struggled to a 1-1 record. In the third game of the year, the team fell behind by three touchdowns. With Notre Dame losing its first and second team quarterbacks due to injuries, Coach Devine in desperation inserted Joe into the game in a nothing-to-lose role. Instead of being resigned to lose, Joe threw four touchdown passes in the fourth quarter and Notre Dame won the game. Afterward Coach Devine somewhat reluctantly named Joe as his first team quarterback, and Joe led Notre Dame to a near perfect 1977 season, winning their last nine games. When Notre Dame defeated Texas in the Cotton Bowl, they were crowned the national champions, thus fulfilling one of Joe's childhood goals.

Fulfillment

In spite of Joe's many successes on the football field, he was not highly regarded by the professionals, was rated as low as the sixth best collegiate quarterback when he graduated from Notre Dame, and was finally selected in the third round by the San Francisco 49ers. As a professional quarterback Joe had to make numerous decisions on virtually every play. Obviously, Joe made many decisions, some bad but mostly good enough to win four Super Bowls, be the Most Valuable Player in three of them, and be elected to the Pro Football Hall of Fame. Joe is only one of two quarterbacks who have ever led their teams to both an NCAA championship as well as a Super Bowl victory. Interestingly, the only other quarterback to have done that grew up in the community of Beaver Falls, 30 miles north of Pittsburgh and is also named Joe.

Summary: Decision making is also a way of life for a Project Manager, just as it was with Joe. Although a small percentage of PM's come by these attributes naturally, the great majority of PM's and other managers develop the necessary skills for true decision making through personal experiences and instinct. Others may acquire it later in life through diligence and effort, including study and training. Irrespective of how you have managed to position yourself as a leader, know that leadership is one of the two or three greatest qualities of a Project Manager. As you go through this course in Advanced Project Management, you will note a few other important qualities for a PM, although none is more important to the success of your project than strong leadership

Dealing with a Project Team

Matrix Organization

Jennifer was the only daughter in a Midwest family that included three brothers, two older and one just a year younger. Her brothers played many different sports and, not surprisingly, Jennifer became an outstanding athlete, usually being the first one chosen in a family pickup game of football or basketball.

She excelled on her high school basketball team and was granted a full scholarship to a southern university with strong academic credentials. Jennifer followed in the footsteps of an older brother and graduated with a degree in mechanical engineering, was easily accepted into graduate school, and received her master's degree in business technology one year later.

Jennifer received more than a few employment offers after getting her second degree, and opted for a large manufacturing company that had a strong reputation for growth and for promoting its management from within. Jennifer spent the first few years in the company's training program at their largest facility, followed by nearly three years as a Process and Project Engineer. Finally, Jennifer was assigned to one of the company's medium-sized expansion projects as the lead Project Manager, and was to be given guidance by a Senior Project Manager on an as-needed basis.

First Significant Assignment

Jennifer had a pretty good idea who she wanted, or didn't want, on her project team right from the start. She was fortunate to have a Construction Manager with previous experience and a solid reputation assigned to the project by the vice president of engineering. In addition, the lead civil engineer and primary mechanical engineer that she had selected were both available and anxious to do all that they could to assist Jennifer in making her project successful. However, she was stymied when she requested the personnel from the Electrical and Process Control departments that had been suggested to her by her senior advisor. Both departments were in demand throughout the company, and most of the lead engineers in these departments were involved in ongoing and long-term commitments.

Needless to say, these were two very critical areas of the project, and the overall success of the project would depend in large part to the qualifications and quality of the personnel chosen as the leaders in these two positions. As a new PM, Jennifer chose her dealings with the managers of those departments cautiously but with determination. Being a team player was ingrained in her DNA and personality, so that she understood that she could not dictate company policy. She was expected to work within the established parameters of the engineering department, so she addressed each of the two department heads individually. In the case of the electrical department head, she was offered a younger, less experienced engineer; however, the department head promised to monitor his progress and performance, and to even replace him if the PM was not satisfied with his progress. When the meeting with the head of the process control occurred, Jennifer quickly realized that she was not going to be so cooperative. Her initial response to Jennifer was that all of her people were extremely busy, and that no one would be available to assist on Jennifer's project for at least 2 ½ to 3 months.

Maintaining a Positive Outlook

Jennifer began her project as she had seen her mentor and other project managers do; she scheduled a scope of work and planning meeting for the following Monday. The meeting lasted no more than one hour, and was attended by the individuals who had been assigned to her team as well as by two of the department heads with whom she had previous discussions. The electrical department head offered his apologies for not attending the meeting due to a prior commitment, but assured Jennifer that he would make himself available in the future. Conspicuous by her absence was the process control department

head, who did not respond to the meeting invitation. However, an executive from upper management was in attendance, and seemed quite pleased with the progress of the project meeting.

As Jennifer had learned from her experiences in the project group, a Project Manager's primary responsibility is to define the initial project scope, budget and schedule for her project team. After some brief introductions and her opening comments, Jennifer spent the last forty minutes of the meeting asking and answering any questions. As the PM she made a point of assuring them that they should notify her in the event that they encountered any problems, and that the schedule for issuing deliverables was very important. She was asked about the fact that there was no process control representative at the meeting, and she advised the team that this matter was being addressed by her. In the meantime she requested that each discipline stay within the guidelines of the original scope of work, and that they design the facility within those parameters. The member of the mechanical group then asked if there could be any flexibility in the final design. Jennifer displayed her confidence in the project team by stating that the initial scope of the expansion could have some flexibility in overall size and design, and that she would support their ideas and efforts.

Jennifer continued to move the project forward, holding informative meetings each Monday morning and issuing weekly progress reports to each team member, each department head, and to some selected members of executive management. At no time did she offer any criticism of anyone's individual performance, choosing to resolve any problems openly, but to recommend any changes or modifications on a personal basis behind closed doors. The project team and the department heads recognized her competence as a Project Manager, and worked hard to help make their project a success. Her mentor gradually let loose of any reins that he might have held over her originally and very quickly recognized that Jennifer had the maturity of a much more experienced Project Manager. Nevertheless, she usually accompanied the weekly progress report to the process control department head with a short note highlighting some assumptions that she and the project team had made, always indicating that she would be willing to make modifications if necessary.

Enthusiasm is Infectious

One Monday morning as Jennifer was beginning to start her second month on the project, into the conference room walked the process control department head. She had with her a 3-ring binder filled with Jennifer's meeting minutes as well as several pages of personal notes that she had been making regarding the project. About one-third of the way through the meeting Jennifer asked her to comment on the progress of the project and to offer any suggestions or recommendations. She was quite complimentary of the project team's efforts thus far, and then gave the team some precise information that she had apparently been developing, quite possibly since the first week of the project, but was only able to finalize the data over the weekend. She handed out specification sheets for the Data Center, which included numbers of work stations, servers and sizes, and the specification for the Clean Room. She also answered questions from the team's electrical engineer regarding recommendations for standby power and fire protection. Furthermore, she offered some suggestions regarding cyber security, an area that neither Jennifer or any of her other team members had considered.

Jennifer soon realized that the department head had been following the project almost since day one and had actually functioned as a part of her project team in absentia. The department head closed out

her participation in the meeting by stating that Joe, one of her highly regarded engineers, would be available to work full time on Jennifer's project beginning the following week. Meanwhile, she would try to make herself accessible for any important issues that may arise.

Joe was in attendance at the next project meeting, had been almost completely versed on the status of the project by his department head as well as a review of the PM's weekly meeting minutes, and immediately proved his value to the project team's efforts. Jennifer was now feeling that the project team was settled, and great progress was made over the next four weeks. Final design parameters had been established, and bid packages were being sent out almost on a daily basis to building and equipment suppliers.

Consistency Does Not Require Status Quo

However, the mechanical engineer that had been assigned to the project was suddenly assigned to an emergency project in another location, again leaving a void that threatened the project's continuity. Once again Jennifer was faced with a mid-project dilemma, which she handled with maturity and competency. She requested a replacement for the engineer that had been reassigned and was offered a younger engineer that had only been with the company for less than one year. By this time Jennifer realized that the project team would often go through changes in manpower due to reassignments and various other reasons associated with a matrix organization, and would constantly be in a state of flux.

As the project passed through the purchasing phase and began its construction phase, Jennifer was appreciative of the fact that the Construction Manager was a consistent and steadying force for the project team and the project. He was an experienced hand who had been involved with several company projects, large and small, over the past twenty years. While he was respectful of Jennifer's directives, he did not hesitate to recommend a contrary viewpoint on an issue, which Jennifer truly appreciated. One of the many considerations that Jennifer, or any Project Manager, learns during the course of a project is the importance of a quality Construction Manager.

Summary: Jennifer had been with the company for over five years, had carried out her assignments effectively, and felt prepared to manage her first project. However, when you are dealing with a matrix organization that is involved in numerous projects all over the country, selecting a project team can be difficult. To her credit Jennifer maintained a positive attitude, working well with the team members who were assigned to her project. She was very fortunate to have a strong Construction Manager assigned to her project team, a valuable member of any Project manager's team. Her patience and attitude afforded her the opportunity to receive a firm commitment as well as a comprehensive package of information from an unexpected source, the department head of process control. The company management always believed that Jennifer had the qualifications to become a strong leader and manager; now she had proved that she also had the necessary character.

Direct Supervision Team

Andy was in a unique position, whether or not he recognized the situation. He had just been named as the Senior Project Manager for one of the corporation's largest-ever industrial projects in the South. He was currently deeply involved with another somewhat smaller, but similar, project in the Midwest. The

new project had just been approved by the company's Board of Directors, had a strict financial limit, and was expected to be on line and running at close to full operation within two years. In fact, the project had assumed such importance that Andy had been authorized to forego past practices of management jurisdiction and to report directly to the Senior Vice President - Operations of the entire corporation. While Andy was not too comfortable with this unusual arrangement, he did manage to maintain a relationship with his normal tier of management personnel, notwithstanding the fact that his new project was well into the ten-figure range.

Choosing Your Replacement

One of the first items on the new Project Manager's agenda was whom should be chosen to replace him as the PM on his current project. There was some question regarding who should fill that position. The project that Andy was leading was, after all, the second largest capital project in the corporation. Andy, with the assistance of the VP, considered several names, including some in the central project management group, before deciding on Rob, a plant engineer with a strong operating and technical background. Although this was somewhat of an unconventional choice, Rob had made some valuable contributions to the project earlier. Rob also had a reputation for his willingness to go into the plant and assist operations and maintenance to solve problems. Rob proved to be an excellent choice as a replacement for Andy.

Choosing Your Project Team

Once that decision was made, Andy's next order of business was to select an associate who had similar values as Andy, had a strong work ethic, and could fill in as a moderator and communicator when the Project Manager was occupied with numerous tasks. The job would involve working with and motivating in-house engineers and designers as well as outside engineering firms. In addition, much travel would be involved to many different parts of the globe, and several people throughout the corporation were given consideration for this position. Andy and his boss were in complete agreement that Rick was the right person for this position. Rick, a Senior Project Engineer in the engineering department, was extremely well educated, was still relatively young despite having extensive international travel experience, and had no particular family obligations. Andy and Rick worked very well together over the next two years, and Rick's performance earned him a considerable promotion following completion of the project.

As the PM Andy had the obligation to select a Construction Manager, and this critical position proved to be one of the easiest to fill. Jack was already on site at the plant where the new facility would be built. Although he had never managed construction on a project of this magnitude, he had been at the plant for nearly twelve years. Jack had been involved with numerous smaller maintenance and construction projects, knew the capabilities of the local workforces, and had been involved with many of the regional and national construction contractors. He and Andy and the other project team members worked closely together to assure that the project would be completed in two years.

Once the key pieces of the project team were put together, Andy and his two associates moved quickly to bring other quality personnel on board. They brought in young and vibrant engineers such as Gary, Ralph and Ned to fill the roles of Lead Project Engineers. They solicited Sue and Nelson from the

corporate Purchasing Department to function as the project purchasing agents for the project team in order to circumvent any red tape that is sometimes prevalent in a large corporation. In this regard Andy realized that there would be some instances when he and his project team would have to work with preferred and sole-source suppliers. In those situations, the Project Manager and his team would not have the time for the corporation's customary three-bidder process. Nor had the corporate purchasing department been willing to accept a higher bidder's proposal without a formal, written evaluation by the Project Manager and his project team. Because of the size and scope of the project, the project team had to justify the use of several particular suppliers which could supply products with a value that would meet the overall criteria of the project.

To further support the team's fast track philosophy, Bill and his assistant were placed on the project team to analyze the cost effectiveness of each major equipment item and to provide daily financial guidance and updates. Needless to say, many of these assignments created controversy with department heads and other corporate managers. However, the Senior VP was firmly behind Andy's decisions, and constantly reminded the initiators of any complaints that there was nothing more important than this project. Gradually the complaining died down, and then stopped altogether.

Solutions and Communications

Andy truly believed that the project team had been chosen well and had great strength in all areas. He was constantly reminded by a friend of his, who was director of personnel for the corporation, that 10% of the people did 90% of the work. As the Project Manager he expected 90% of the project team to do 90% of the work, figuring that he could manage the other 10%.

One of the team's early obstacles was with the State Environmental Agency (SEA), which restricted their relocation of a nearby creek, demanded numerous data on air and water quality control, and even limited the amount of noise that could be made. Andy was really fortunate to have included on the project team a civil engineer who was versed in the rules and regulations of the EPA. She was able to prepare the necessary documents, have them signed by the proper corporate executives, and to satisfy each of the restrictions. All of these demands and limits were made in spite of the fact that the plant was on an industrial site and the nearest house was more than three miles away. Andy and his project team complied with every request by the SEA, responding clearly and quickly, thanks to her qualifications.

Andy held weekly meetings with his entire staff every Monday morning (when he was out of town Rick or one of the other Senior Project Leaders chaired the meeting). These meetings lasted no more than one hour, with the first half hour dedicated to status reports. The second half hour was used to air complaints or gripes among the team members. Common among the complaints as the project "came out of the ground" was that engineering was late with drawings, or that purchasing should be expediting critical equipment. Just as common was that construction was taking shortcuts with their installation practices. Andy tolerated a moderately adversarial relationship among the project team members, but usually arbitrated any contentious issues and resolved those issues or else had the conflicted parties schedule their own meeting to achieve a resolution. Andy or Rick usually closed those weekly meetings by reminding the Project Team members of their mission and objectives.

As the Project Manager Andy was more than willing to accept new ideas from such a highly qualified group that he was managing. He encouraged each of them to be flexible and to use originality, particularly if that meant saving time and or costs. For instance, Andy attended a critical process control meeting hosted by his Process Control Team Leader. Also in attendance were two of the corporation's process control engineers as well as the manager of an outside process control company and two of his staff. Andy suggested that this group could develop a unique design for the facility which would allow the raw product to become a finished product and shipped out the door without one button being pushed. In order to do that, the product would have to travel over one mile, or about 5,500 feet, under a roof structure that encompassed more than 22 acres. The group's first reaction was that it was impossible, but as they discussed the possibilities, their next reaction was that this was indeed a challenge. The group's decision when the meeting ended was that this was certainly something that they could do. In retrospect the final facility allowed the product to travel almost 4,000 feet before a button had to be pushed, but Andy had given that part of the project team a challenge that resulted in the corporation saving millions of dollars.

Delegating Authority with Responsibility

As the project gained in momentum, the Senior Vice President requested that Andy and his team prepare for a monthly status meeting that would be held on the first Monday of each month. Numerous corporate executives were invited to this meeting to learn about the progress of the project, and were also invited to tour the facility as it was being constructed. In addition to the corporate president, who attended several of the meetings, the executive list included the vice president of engineering, the vice president of commercial, and Mr. Lowell, who was the vice president of finance. While most of the executives were content to listen and learn about the status of the project, Mr. Lowell always reminded everyone in the meeting, especially Andy and his team, that millions of dollars in federal and state tax credits were dependent on achieving a successful project by a specific date. Andy usually chaired these meetings, but he often had one of his Senior Project Leaders make significant presentations as well as answer any direct questions. During the latter stages of the project, Andy was able to ascertain that his Construction Manager as well as Bill, his financial services leader, seemed to have an air of credibility that put the executives at ease.

Eventually Andy moved his staff of project engineers into different areas of the facility to support his staff of construction engineers, using both groups to certify equipment installation and operation, and to provide more firepower for the startup and fine tuning of the equipment that was valued at hundreds of millions of dollars. This portion of the project was done in phases, and was accompanied by significant and intensive training sessions with operations and maintenance personnel. Nearly all of these sessions were directed by Andy and his Project Team Leaders, with the ultimate result that the project was completed one month ahead of schedule and nearly ten percent under budget. Incidentally, the corporation apparently received all of the tax credits to which it was entitled.

Summary: Very few Project Managers will ever be involved in a project of the size that Andy was fortunate to manage, or to even have the direct support of the Executive Vice President of the corporation. Nevertheless, there are several lessons that a PM can learn, regardless of the size of your project, when you are managing your own project team.

Andy kept his meetings short but consistent; he encouraged his project team to think "outside the box", but he always reminded them of their purpose and ultimate mission. While he advocated a somewhat adversarial relationship among his team members, he never allowed any animosity to occur, being quick to arbitrate any serious disagreements. And he encouraged each of his project team to be their own person, to offer solutions that would make a positive impact on the project, and to express themselves in front of corporate management.

Defining a Project Team

The six o'clock news had just come on the three major television networks, and people all over the U.S. who were fortunate enough to have television sets were straining their eyes at the black and white pictures which were being broadcast on the round screens. The early fall of 1957 had brought a surprise revelation from the other side of the world. The Russians (at that time they were known as the U.S.S.R.) had earlier launched a rocket into the earth's atmosphere, and it was carrying a Russian satellite known at that time with the name "Sputnik". Sputnik was orbiting the earth at speeds of nearly 18,000 MPH.

America was shocked into action, and that was the beginning of a "space race" between the Americans and the Russians that has essentially gone on to this day. NASA (National Aeronautical & Space Administration) was created and began a series of programs that were initially meant to catch up to the Russians. After a concerted effort by many engineers and scientists, the U.S. was able to put astronaut Alan Shepherd into space in the summer of 1961, and then to have John Glenn, also an astronaut and later a Senator from Ohio, orbit around the earth three times in 1963, in preparation for lunar flights and landings. During the activities of this initial space program, which was named Mercury, President John F. Kennedy made a speech to Congress in May, 1961. In that speech he called for America to put a man on the moon and have him return safely by the end of the decade, and NASA was off and running.

How to Get There

There was a great deal of uncertainty regarding methods for putting a man on the moon let alone being able to have him return safely to earth. The second phase of the space program was entitled Gemini. Its purpose was to place astronauts into an orbit around the earth in a command module which they would then launch toward the moon. Once close enough to the moon they would then send a lunar landing module down to the moon's surface, where the astronauts would plant a flag, retrieve moon rocks and other souvenirs, and then return and dock with the command module as it circumnavigated the moon. This now may seem like a simple solution to a hugely difficult problem, but there were several ideas proposed over the next twelve months before the decision was made on how best to land a man on the moon, over many objections from within the Kennedy administration as well as from the NASA administration. One of those alternatives included the construction of a spaceship, vis-a-vis Star Trek.

Apollo was the third and final phase of the moon landing project, and it culminated when the Americans put the first man on the moon in July, 1969. That was an achievement of gigantic proportions, and

involved many engineers, scientists, contractors and project leaders, and was the epitome of successful project management. The Apollo project lasted for about 11 years and was occasionally fraught with tragedy. A fire on board Apollo 1 during a training exercise took the lives of three astronauts.

Nine missions were planned to land men on the moon. Six were successful (11 and 12, 14 through 17), while the final two missions were cancelled due to budget constraints. The one unsuccessful mission involved Apollo 13 and the actions of an impromptu project team in 1970, which saved three lives and may have been one of the most remarkable accomplishments of the Apollo program.

Launch

Apollo 13 was scheduled to be the third lunar landing in the Apollo program, and was launched from Cape Canaveral on April 11, 1970. On board were James Lovell, the commander, Jack Swigart, the Command Module Pilot, and Fred Haise, the Lunar Module Pilot. The two main Saturn V rockets did not perform perfectly, but with some slight maneuvering they lifted Apollo 13 into orbit 100 miles above and around the earth. Apollo 13 made 2 complete earth orbits, then fired its third Saturn V booster rocket and headed for the moon. In the 56th hour of the flight when Apollo 13 was approximately 205,000 miles beyond the earth's surface, and the crew had just had a live TV broadcast from the spacecraft, a chilling message went over the airwaves.

"Houston, We Had a Problem"

Haise was in the process of powering down the Lunar Module, and flight control in Houston requested that Swigart turn on the hydrogen and oxygen tank stirring fans in the Service Module. About two minutes later the crew heard a loud bang, followed almost immediately by variations in the electrical power and the firing of the attitude control thrusters. The crew's first inclination was that a meteoroid had struck somewhere on the Lunar Module. However, within a few minutes they quickly realized that an explosion had taken place in the Service Module, a large separately docked module that provided power, oxygen, and water to the command module, and was also responsible for removing carbon dioxide and other human waste.

Investigation later revealed that one of the two oxygen tanks had exploded because of an electrical fire that had occurred due to a breakdown in the thermal insulation, and all the oxygen for the fuel cells was depleted in about two hours. The crew did not panic, and immediately shut down the emergency battery backup power system in the Command Module in order to preserve it for reentry back to earth. This meant that the crew would have to move into the Lunar Landing module for the nearly three-day return flight back to earth, a premise that had been discussed several years earlier, but had been discarded as being impractical. The Lunar Module was designed to carry two men and support them for 1 1/2 days. It was now being asked to carry three men and to sustain them for three days.

Project Teams Swing into Action

Ground Control in Houston, Texas immediately recognized that a safe return from a lunar landing would be impossible under the circumstances, so Flight Director Gene Kranz gave the order to abort the mission, and thus began a series of events that saved the three astronauts' lives. The quickest abort plan

was to use a direct trajectory by implementing the Service Module propulsion system, and its operation was now questionable. In addition, this plan required the jettison of the Lunar Module, which was out of the question since the crew's survival depended on their using the Lunar Module. Another option was to burn the Service Module propulsion to depletion, then to jettison the Service Module. However, the Service Module provided thermal protection to the Command Module's heat shield and needed to stay docked to the Command Module as long as possible.

By this time Apollo 13 was less than one hour from the moon's gravitational field, and there was also concern regarding the structural integrity of the Service Module. For these reasons Director Kranz and his project team chose a circumlunar abort plan, which used the moon's gravity to in a sense boomerang the spaceship and return the spaceship toward earth with a catapult effect. A series of short propulsion system burns placed the spacecraft on an expedient trajectory that would have it land in the Pacific Ocean, approximately ten hours sooner than if its landing were to occur in the Indian Ocean.

Next Project Team Decision

The Lunar Module was powered by silver-zinc batteries and, although it carried enough oxygen to support the three-man crew, other consumables such as electrical power and water were at a premium. Considerable planning and experience were required by the crew, the flight controllers, and all ground support personnel to assure the crew's safe return. In order to maintain communications with ground personnel, the Lunar Module was powered down to the lowest level possible, and an abort guidance system was used instead of the primary guidance system in order to conserve even more power.

Life-Threatening Decision

Another problem involved the use of lithium hydroxide canisters for the removal of carbon dioxide from the Lunar Module. The Command Module had an adequate supply of canisters, but they were not compatible with those in the Lunar Module. Another project team improvised a way to join the Command Module canisters, which were cone-shaped, with those in the Lunar Module that had a cone shape, by drawing air through a tightly fitted return hose.

Project Team Help from an Astronaut

Still another problem that had to be solved to ensure a safe return was providing a complete power-up of the Command Module, which had been completely shut down. Although this had never been done in-flight, Flight Controller John Aaron and his project team, which included grounded astronaut Ken Mattingly and several engineers and designers, devised a new way to do this with the spaceship's limited power supply and the time factor.

Final Critical Project Team Solution

Finally, the last problem to be solved was figuring out how to separate the Lunar Module a safe distance from the Command Module just prior to reentry into the earth's atmosphere. The normal procedure was to use the Service Module's reaction control system to pull the Command Module away from the Lunar Module, but the reaction control system was completely useless due to the power failure in the

Service Module; furthermore, the inoperative Service Module would have to be released before the Lunar Module was undocked. To solve this problem Grumman Aerospace Corporation called on a project team of engineers and scientists from the University of Toronto.

Led by senior scientist Bernard Etkin, the six engineers on the UT team were asked to solve the problem in twenty-four hours. Using their slide rules (this was pre-computer), the team concluded that pressurizing the tunnel that connected the Lunar Module with the Command Module just prior to re-entry would provide the crew with enough force to push the Lunar Module a safe distance away from the Command Module. The pressure calculation was critical because too low of a pressure would fail to provide sufficient separation, whereas too high pressure would cause damage to the hatch and jeopardize the lives of the astronauts.

Re-entry, Splashdown, and Rescue

As Apollo 13 neared the earth's atmosphere, the crew first jettisoned the Service Module, using the Lunar Module's reaction control system to pull themselves safely away from it. In doing so, they took several photographs of the Service Module, which allowed for assessment of the damages and future improvements of the fleet's other Service Modules. Then the crew jettisoned the Lunar Module, using the procedure developed by the project team from the University of Toronto. There was heightened tension by ground support personnel, as the usual blackout period upon entering the earth's atmosphere of four minutes without communications extended to almost six minutes.

However, the re-entry went smoothly and the Command Module splashed down in the South Pacific Ocean, less than four miles from the recovery ship Iwo Jima. The total flight time was almost exactly 6 days. The crew was safely on board the ship about 45 minutes later and in good condition, thanks to their training and expertise, and thanks to the ingenuity and capabilities of the many project leaders and project team members that were involved.

Summary: Arguably placing a man on the moon was the greatest achievement ever of mankind. The United States of America, less than 200 years old, had accomplished what most people felt was unachievable if not impossible. The effort, which had taken place over a twelve-year period, was the result of the concerted efforts of politicians, project leaders, engineers, suppliers, and contractors.

The main difference between this gigantic achievement and the safe return of a crippled Apollo 13 spaceship was time. The many valuable members of the diverse group that made up the Apollo 13 recovery team had less than three days to bring a non-functioning spacecraft safely back to earth from the moon's gravitational field. The success of this accomplishment, particularly since this took place in the days before computers were so well established, was truly marvelous. The end result was, undoubtedly, one of the greatest project team efforts of all time.

Negotiating with Insurance Companies

Sales orders were coming in at an almost frenetic pace, and the plant had increased its capacity by nearly 35% in the past four months. The plant was operating around the clock and seven days a week, with only an eight or ten hour shift each Sunday for maintenance and to give some of the equipment and operators a short rest. The furniture business was prospering nationally as well as globally, and Smith & Jones, one of the largest furniture manufacturers in the world, was taking full advantage of the situation. In addition to their core products, S&J had recently developed a bedding product that had received much international recognition and could become one of their biggest sellers. This southern facility, although one of the oldest plants in the company, was being hailed for its productivity and was being heavily considered for the company's next large expansion project.

Call to Action

Then tragedy struck, and it struck very quickly. No one was sure how, but a cleaning tank filled with a solvent solution exploded and went up in flames late one night. The flames shot up high enough to ignite the roof structure, and before the local volunteer fire department could arrive and eventually put out the fire, considerable damage had been done to a significant portion of the building and most of the manufacturing equipment in that area.

Henry's bedside phone rang at 2:30 a.m., and on the other end of the line was the president of U.S. operations for Smith & Jones. Henry immediately sat up in bed, prepared for the worst. As Chief Engineer for S&J, he had attended many meetings with the president, and had had numerous conversations regarding the company's expansion program. However, he had never been called by the president in the middle of the night. The president quickly allayed Henry's concerns, assuring him that although a major fire had done significant damage to their southern plant, there were no casualties nor was anyone injured. Notwithstanding these assurances, the president strongly suggested that Henry visit the plant as soon as possible, make a determination as to the damage assessment, and bring the plant back into operation as quickly as possible.

That morning Henry was getting ready and, as he packed a small bag, called his office assistant to make an airline reservation with an open-ended return flight. As he sat in the Atlanta airport waiting for his connecting flight (seems as though you have to go through Atlanta to get to any city in the South), he formulated general plans for moving as quickly as possible. Arriving at the plant later that morning, Henry assessed the situation and then held a detailed meeting with the Plant Manager and key operating and maintenance personnel.

After determining with the plant personnel what the scope of work entailed and visualizing the fastest means to accomplish a restart, his first phone call was to Don. Don was a Project Manager from a large multi-national engineering firm that had just completed an expansion project at a similar plant in the mid-south. Henry's second call was to his casualty insurance agent at Fairhope Mutual (not their real name). The agent at FM assured Henry that he would have an FM representative at the plant site very quickly.

Assistance from a Mini-Project Team

Don was on a plane that afternoon and met with Henry that evening. Henry expressed the company's need to bring the facility back into operation quickly, minimizing activities and eliminating any time delays or time constraints. After Henry and Don visited the plant the next morning and the smoke had literally cleared, they formulated a plan that they hoped would have the plant reconstructed and operating in less than six weeks. The plan included the utilization of used or borrowed or rehabilitated (where practical and probable) equipment. The fire had destroyed three bays, so each bay of the building would be rebuilt and the equipment repaired or replaced while the floor-based equipment in the other two bays was being replaced. Each of the other two bays of the building would be rebuilt in the same manner. Meanwhile the FM appraiser did not reach the plant site until four days after their phone call from Henry.

Much of the destruction from the fire was electrical, so Don had two electrical engineers and an electrical draftsman brought to the plant site to review existing electrical drawings, and to modify any drawings which did not reflect the "as built" conditions before the fire. In addition, they were prepared to advise the electrical contractor immediately as well as to prepare sketches and to assist the contractor as needed. There was no bidding – all contracts were let on a time and material basis, and each contractor had performed a service in the plant within the past two years.

Steel beams were brought in from as far away as Houston and Chicago, using "exclusive use of truck" techniques to expedite deliveries. Two local steel fabricators were contracted to manufacture replacements for the building columns and truss work that had been destroyed in the fire. A building contractor from Birmingham was given the task of first removing the burned-out roofing and sheeting, then removing or repairing the damaged columns, and replacing them as needed. Once the new or repaired columns were in place and the trusses had been installed, the roofing went on first, followed by sheeting half way down the building sides to minimize any interference from rain or wind.

Two mechanical contractors, working alongside plant maintenance personnel, were given the assignment of replacing damaged spindles, roll housings and rolls, and conveyor assemblies. Parts that could be repaired were reused, while spare parts were trucked in from at least five other plants. Most of the AC motors and some of the DC motors were replaced, but four or five of the DC motors had to be shipped to a repair shop in Atlanta to be rebuilt.

Damage Assessment

The Fairhope Mutual appraiser arrived late on the third night after the fire, and spent the entire morning assessing the damage that remained, reviewing the existing conditions as well as the numerous color photographs which Don had insisted that Henry and the Plant Manager take. That afternoon the appraiser met with Henry and the Plant Manager and listed the things that FM would not cover in their program. For instance, their policy did not have coverage for loss of revenue; this had been a foregone conclusion by S&J's legal group.

However, the appraiser then itemized a long list of other exceptions in the casualty policy that S&J never expected. Included in this list were such items as: all contracts had to have at least two bids and

selection would be at FM's discretion; any work performed by plant forces would not be covered; and, finally, that no work could begin until FM had put together an estimate of total costs for repairs, which they would have in three or four days. Needless to say, Henry and the Plant Manager were very unhappy with FM's position, relayed the results of the meeting to executive management, and were told to continue with the repairs of the plant as had been planned.

Don had prepared a schedule that was monitored and followed very closely, and kept a meticulous account of all outside contractors. Henry and the Plant Manager kept an accounting of the plant labor force, and recorded each piece of equipment that could either be salvaged, or repaired and reinstalled, or replaced with new or used equipment. Sections of the fire-ravaged plant began to operate within four weeks, and the entire plant was back into full operation within another week.

Meanwhile, the FM representative had come back to the company about one week after the fire, had prepared another list of exceptions to their casualty coverage, and had offered to reimburse S&J in an amount that was approximately half of the amount that Henry and the Plant Manager had prepared. As the Project Manager, Don had also prepared a project cost, which did not include actual costs for plant labor, but did summarize all building and equipment repairs as well as his and the team's engineering costs, including travel and living expenses. None of these items were listed in the insurance company's proposed settlement, nor were they defined in the insurance fire and casualty policy.

Unsatisfactory Offer by FM

Executive management at S&J was extremely upset by the insurance company's low offer for a settlement figure and threatened to sue FM. The insurance company, confident in their interpretation of S&J's casualty policy, requested that each company select an outside representative to meet and try to resolve any dispute prior to S&J filing a lawsuit. Henry made Don aware of this situation and asked if Don, as the PM, could intervene on behalf of S&J as a representative in a preliminary arbitration-type hearing. He assured Don that regardless of the findings by the two representatives, their conclusions would be taken very seriously but would be non-binding. Don had experience negotiating with insurance companies, and had also seen occasions when issues could not be settled, lawsuits had been filed, and law firms were the eventual winners. Don agreed to represent S&J, but asked that the meeting be delayed for two weeks in order to give him time to review all repair bills and also the terms of the insurance policy coverage.

Don and his project team, with some aid from his office accountant, spent the next several days documenting and assembling all costs associated with the repairs of the fire-damaged facility. He also reviewed the insurance policy that the furniture company had with FM. Don was surprised when he noted that the annual premium was so low, until he read what was excluded from the coverage. As he had been told previously, there was no indemnification for loss of revenue.

Furthermore, there was no stipulation that management salaries and labor wages were to be paid during the period while the plant was idle. This would be, in Don's opinion, one of the major sticking points of the negotiations with the insurance company. Although S&J was not claiming any management salaries in their insurance settlement, there were several hundred hours of labor wages in their claim.

This portion of the claim also included a substantial amount for overtime pay as well as for the cost of materials and either in-house or rental equipment.

In addition, the policy clearly defined that the insurance company would have authority to approve all outside contractors, with the simple stipulation that the company could recommend any contractors that had performed similar work at any of the company's plants in the past ten years. Don did not believe that this would be an item of particular contention, since the plant had a reputation for using the same contractors year after year, nearly all of whom were usually the low bidders.

Negotiations Begin

During the two weeks while Don was gathering all of the cost factors associated with the fire damage repairs and evaluating the insurance policy, there was a great deal of rhetoric by both parties. Lawsuits were being threatened and counter-suits were being considered. Even though the plant had had a very successful restart and was back to where it was before the fire, the air was very heavy, and neither side was talking to anybody but their lawyers.

Don stepped into this acrimonious environment on the appointed day, determined to do his best for the furniture company, but unwilling to compromise his ethics or values. As he sat there in the plant conference room that morning, surrounded by financial documents and makeshift photo albums, he still had a feeling of apprehension. Don was pleased to see only one person appear at the meeting from the insurance company, and was even more pleased when he discovered that the insurance company had sent a former construction superintendent with many years of construction experience. However, Don soon realized that this individual had been employed by FM as an expert witness on numerous occasions, was completely versed in the rules and regulations of the insurance company, and that he would certainly be no pushover.

FM Considerations Did Not Seem Practical

The first item that they discussed was the repair and replacement of the buildings. FM had gotten bids from two fabricators for the building steel which were actually higher than the prices that had been submitted by the furniture company. While the insurance company numbers did include replacement columns and trusses, it did not include the many thousands of pounds of purlins and girts and other support material. In addition, FM was proposing lighter gage material for the roofing and siding, and Don pointed out that this was not replacement in kind as was stipulated in the policy documents. After about two hours of back and forth deliberations, the insurance representative and Don agreed to add slightly over \$2 million to the present insurance company offer.

The next major item for discussion involved the repair and replacement of the operating equipment that had been either damaged or totally destroyed in the fire. The insurance company numbers were surprisingly close to the figures that Don and Henry had developed, although for completely different reasons. FM was offering to replace all damaged equipment with new, off-the-shelf equipment, whereas C&J had repaired much of the damaged equipment and was asking for only about 2/3 of what was being offered.

However, the insurance company had prepared their estimate using a low bid outside contractor instead of plant labor forces, which was about 2/3 of the value that he and Henry had placed on that portion of the work. Lunch was brought into the conference room, and during their lunch hour the two parties agreed that this issue would be a net zero compromise.

The last major hurdle, which was the damage to the electrical systems, proved to be the most difficult issue to resolve. FM had not really prepared and estimate for the electrical system repairs, but rather had simply put a price tag of about ten percent on their overall settlement offer. However, Don and his electrical team had prepared a very detailed estimate, which included new control panels, motor starters, limit switches, solenoid operators, and the like. This number alone for electrical equipment and setup was more than FM was offering in their settlement figures.

Furthermore, Don had actual numbers from the electrical contractors (two were utilized in order to expedite the work). Not counting an assist by the plant labor force to set the electrical equipment and make the final adjustments, the actual cost that Don and his team presented to the insurance company was nearly \$2 million more than what the insurance company had proposed. When the insurance company representative was presented with this number for the electrical work that had been detailed by the electrical project team, he asked to be excused from the meeting for a few minutes and headed for the nearest quiet place to make a phone call.

Decision Time

The insurance company representative was gone for several minutes, finally returning to the meeting with Don after about one hour. In his hand he held a piece of paper with several numbers on it, which appeared to Don to be as the result of his phone conversation with someone of importance at the insurance company. The numbers represented an offer by FM for a settlement that was nearly 85% higher than their original proposal. While Don felt that the offer was very fair, he realized that it was still more than \$1 million below the request by C&J and would require final approval by their executive management in order to make it a binding agreement.

Don excused himself from the meeting and went to find Henry and the plant manager. He presented the insurance company offer of settlement to them, reminding them that the plant had been able to get back to full operation probably a month and a half sooner than could have been expected if they had followed insurance company regulations and protocol. As the result of expediting the reconstruction by that amount of time and being able to get back into full production so quickly, they had likely been able to generate more than \$2 million in revenue.

The two C&J personnel asked Don several questions related to the all-day meeting that he had been in, finally asking him whether or not he thought that the settlement offer by FM was fair. When Don stated that he thought it was very fair, the plant manager gave his approval to the reworked settlement offer. He had apparently been authorized by the furniture company to make the final decision on the insurance company offer, since they were dealing with his plant.

Don went back into the conference room, notified the insurance company representative that the plant had accepted FM's offer, and reviewed with him the terms of payment. Two weeks later the furniture

company received a lump sum certified check from the insurance company for the agreed settlement amount at their home office. Don was praised by the furniture company for his professional efforts, the firm continued to receive additional contracts from C&J, and Don was promoted to Division Manager at his engineering firm a short time later.

Summary: The furniture company was fortunate to be able to recover from such a near-devastating situation that occurred. Henry, the company's Chief Engineer, was obviously a 'take charge' person, but neither he nor anyone else in the company was apparently aware of the limitations of their insurance policy.

While no one person or company can predict a fire to the extent that C&J experienced, the company could have changed their policy coverage once they realized the importance of their continuous operation. Calling on Don and his team was seemingly their best course of action (after the fact) in lieu of filing a lengthy and costly lawsuit.

As the Project Manager Don utilized all the skills of a quality PM to assist in getting the plant back into operation. Furthermore, he demonstrated his initiative and flexibility by going beyond his personal responsibilities. By getting involved in other aspects of reconstructing the fire-damaged areas, he thus made himself an invaluable asset to the furniture company. Don's first-hand knowledge of the repair work involved as well as his understanding of the limitations of the C&J insurance policy allowed Don to have favor with the furniture company. Furthermore, his prior experience in dealing with casualty insurance companies prepared him for the task and obviously saved the furniture company several million dollars.

Course Summary

As you may have discovered by navigating this course, having personal discipline and learning to delegate authority are very important characteristics of a Project Manager. The primary goal of this course in project management is to provide existing project managers and would-be project managers with the necessary tools to manage a successful project. In almost all projects the Project Manager and project team members will develop and utilize some core principles. One of those core principles is that the burden of assuring the finite factors of cost and schedule in addition to the end result is primarily the responsibility of the PM. Also, the Project Manager is given guidelines and examples of what to do when a difficult situation presents itself. Invariably, the solution is not begun until the PM and/or the project team members recognize that a problem exists. It can then be resolved with training and experience, each of which is an equally valuable commodity.

Related Links

None.

Once you have completed your study of the above course content, you need to take a quiz in order to obtain the PDH credits.

Project Management Techniques II

Quiz Problems

PDHNow Project Management Techniques - II

1. Which of the following items is least important when evaluating a proposal for engineering services?
 - a) Total hours estimated to complete the project successfully.
 - b) List of prior experiences for each project team member.
 - c) Hourly rate charged by the engineering firm for a mechanical or electrical draftsman.
 - d) Previous similar projects performed by the engineering firm for that company.

2. Which characteristic is not conducive to a successful project?
 - a) Being flexible.
 - b) Having a teachable spirit.
 - c) Taking the initiative.
 - d) Being argumentative and contentious.

3. When Project Managers feel that they are being second-guessed by the management of the engineering firm for whom they work, they should:
 - a) request a meeting with that firm's management to resolve any issues and to gain their trust.
 - b) air their grievances to a client representative.
 - c) tell the project team members that their employer is being unreasonable.
 - d) be argumentative and stir up controversy.

4. Some common business mistakes that a Project Manager may be exposed to when working with a young and ambitious engineering firm.
 - a) Employees that may lack certain ethical standards.
 - b) Firm that tries to grow too rapidly and takes on greater financial burdens.
 - c) Firm that doesn't properly and meticulously evaluate its bids and proposals.
 - d) All the above.

5. One of the most important items to consider when a Project Manager assumes an ongoing project is:
 - a) Where did the former Project Manager go?
 - b) What was the former Project Manager lacking and how could the project be improved and better managed?
 - c) How much was the former Project Manager being paid?
 - d) Which of the project team members did not particularly like the former Project Manager?

6. When Bruce met with the executive management of the industrial company in an attempt to salvage an already damaged project, what qualities did he not exhibit?

- a) He was honest and sincere.
 - b) He was open to lines of communication.
 - c) He was objectionable and haughty.
 - d) He offered no excuses for past performance by the firm.
7. One of the biggest complaints which the client had about the former Project Manager was that he:
- a) did not get along well with his project team.
 - b) was uninformed about their industry and the client's objectives.
 - c) never visited the jobsite.
 - d) always took Friday afternoons off.
8. Which of these statements is false concerning a quality Project Manager?
- a) A quality Project Manager should never accept an assignment unless the take home pay is very high.
 - b) A quality Project Manager should always remain alert to new and greater opportunities.
 - c) A quality Project Manager should be able to properly manage nearly any type of project.
 - d) A quality Project Manager should always remain loyal to both the client and the engineering firm.
9. Strong leadership in a Project Manager is considered:
- a) a way of life.
 - b) a state of mind.
 - c) important to a successful project.
 - d) All the above.
10. As soon as Sammy realized that the process and ideas expressed by the management team were different from his experiences, he should have:
- a) Injected his own ideas and preferences in the meeting.
 - b) Expressed to the management team that he was confused.
 - c) Remained silent and listened closely to their explanation.
 - d) Turned in his notice and looked for another project.
11. Whenever the Project Manager is confronted with a situation whereby no single supplier can furnish all of the equipment listed in the specification, the PM should:
- a) Take the vendor's word that it can meet the specification.

- b) Change the specification so that the vendor can be compliant.
- c) Segregate the specification into more than one specification so that vendors can be compliant and experienced with the item(s) they are bidding.
- d) Cancel the project.

12. What recourse does a Project Manager have when there is disagreement with a company representative regarding expectations from a supplier?

- a) Remind the supplier that it faces a potential lawsuit if it fails to meet the specification.
- b) Express your concerns to the company representative and validate your reasons, then continue on with the project.
- c) Try to find someone in the company above the company representative who may be more sympathetic to your concerns.
- d) Point out in your weekly status report that you disagree with the company representative on this issue.

13. Irrespective of whether your ideas and philosophies are always accepted by the company which a Project Manager represents, you are expected to:

- a) adopt the company ideas without any questions.
- b) show little or no interest when critical suppliers produce certified drawings.
- c) continue to be dedicated to the best interests of the company that is paying you.
- d) notify your project team members not to be concerned regarding the certified drawings that they are receiving from the suppliers.

14. Although the company representative did not want the Project Manager to make any corrections to Acme's design, Sammy did invoke a common-sense initiative by:

- a) changing the sizes of the pumps that were specified.
- b) modifying the certified drawings that Acme had issued.
- c) increasing the sizes of the cooling towers that were specified.
- d) limiting the amount of damage that an open water system could cause.

15. One of the most important things that Danny accomplished while bringing the first project within budget was to:

- a) manifest significant changes in procedures over the objections of some of the plant personnel.
- b) follow the same practices as the previous Project Manager.
- c) accept the idea that the project was over budget and that nothing could be done about it.
- d) be sensitive to any criticism if his unorthodox ideas did not work.

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16. As the Project Manager, Danny received many accolades for bringing the second project significantly under budget and well ahead of schedule. What secrets did he share with other PM's regarding his success?

- a) He planned the two projects as though they were one and had no fear of failure.
- b) He established a plan to bring both projects within budget and was not intimidated by circumventing past practices or plant personnel.
- c) He wisely utilized the company procedure for advanced authorizations to order long lead items and to have certified construction drawings prepared.
- d) All the above.

17. Joe faced many decisions during his Hall of Fame career, beginning when he was a teenager and extending through his college and pro football careers. What one thing would you think most propelled Joe to the successes that he had?

- a) He felt limited because he grew up in a small mill town.
- b) He was satisfied to be on scholarship at a major university, even though he was a third string quarterback.
- c) Joe felt lucky to be drafted in pro football because of his weak arm strength, and never expected to be more than a backup quarterback in the pros.
- d) He never wavered in his desire to be the best that he could be and always had a positive attitude

18. When dealing with a matrix engineering organization, the Project Manager should:

- a) be able to dictate who will be on the project team.
- b) expect the most qualified engineers and designers to be on the project team.
- c) keep the department heads as well as the project team members apprised of the progress of the project.
- d) be resentful and discouraged when requested personnel are assigned to other projects.

19. Jennifer proved that she was qualified to be a Project Manager because:

- a) she went to college on a basketball scholarship.
- b) she maintained a positive attitude in the face of adversity and developed a strong line of communication with all who were involved in the project.
- c) she established a sense of self-pity when things did not go her way.
- d) she determined that PM's could not cope with the problems created by having a project team that was constantly fluctuating.

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20. Jennifer displayed her confidence in the project team by:
- allowing them the flexibility to determine the overall size and design.
 - not showing concern for the missing process control engineer.
 - holding up the project whenever she did not have a complete project team.
 - all of the above.
21. One of the most important variables that helps to make a project successful is to:
- be on good terms with the head of the purchasing department.
 - follow the guidelines and desires of the senior members of the project team.
 - have an experienced Construction Manager as a member of the project team.
 - be unwilling to accept inexperienced engineers on the project team.
22. Some of the principles that a Project Manager should follow when selecting his project team members include:
- picking your closest friends, because you can rely on them.
 - choose those personnel who have performed well for the Project Manager in the past.
 - interviewing those personnel in the corporate database that want to work on the new project and make the most promises.
 - check with each department head to determine who has the lowest salaries.
23. A very important step that Andy took to accelerate the project was to:
- hold weekly status meetings with his project team and monthly meetings with executive management.
 - include experienced purchasing and environmental personnel on his project team.
 - encourage contractors to begin construction without certified drawings and to take short cuts.
 - work a standard 8-hour day and a 5-day week.
24. While Andy as the Project Manager bore the primary burden for the success of the project,
- he delegated much responsibility as well as authority to his Project Team Leaders.
 - he relied heavily on the Executive Vice President whenever a crisis occurred.
 - he was quick to blame the project team members when things went wrong.
 - he often criticized the construction contractors when schedules weren't met.
25. Because Andy felt confident that he had selected a highly qualified project team, he was willing to:
- allow them to alter the mission from time to time.
 - accept new ideas from them.
 - take short cuts if they could save the project money.
 - moved some of them into the field in order to watch over the others.

26. Not many projects that we encounter or in which we have involvement are life-threatening, but one characteristic that enabled Gene Kranz, the Flight Director, to bring Apollo 13 to a safe return was that:

- a) he knew exactly what to do and made all the decisions.
- b) he followed all the written guidelines for what to do when a Service Module fails.
- c) he called on the expertise of many project team members before making any critical decision.
- d) he was anxious to determine what had caused the explosion on the Service Module.

27. What made the safe return of Apollo 13 such a remarkable achievement was that:

- a) there were plans in place in the eventuality that there would be an explosion on the Service Module.
- b) there was a limited amount of time in which the project team could react before the power was completely drained.
- c) they failed in their primary mission to land another man on the moon.
- d) the Apollo 13 program was in trouble and probably would have been scrapped.

28. Although Henry, the Chief Engineer for the company, acted expediently and with resolve, he and several of the company's management were derelict for:

- a) not knowing that a fire would result in extensive damage to the plant facility.
- b) not having their own fire department readily available should such an event occur.
- c) not having an understanding of the limitations of the fire and casualty insurance policy.
- d) not sending a company representative to Fairhope Mutual to review the policy with them.

29. Don, a Project Manager, was not expected to know about the list of exceptions contained in the insurance policy. However,

- a) his experience in dealing with accidents that caused considerable damage prepared him for the task that he was asked to perform.
- b) his detailed record of the actual work performed allowed him to offer an accurate account of the activities necessary for the company to recover from the fire.
- c) Don's use of a mini-project team of electrical engineers, and their production of drawings as well as their record keeping of damaged electrical gear, proved to be a valuable asset during the final negotiations with the insurance company representative.
- d) all of the above are true.

30. Don's primary objective as a Project Manager was to:

- a) negotiate a fair settlement for the company he represented with the insurance company.
- b) keep a meticulous record of all the material and equipment that was damaged in the fire.
- c) get the facility back into operation as soon as possible.
- d) show the company how important his engineering firm was to them.