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PRACTITIONER CASE (PEER-REVIEWED)

The First World Trade Center Project: A Historical Tribute to a Great Mega Project

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SYNOPSIS

The tragic collapse of the World Trade Center on September 11, 2001 could not erase the memory of one of the most successful projects in history. The project set standards of excellence in project management for years to come. Using a retrospective look at the construction management of the WTC during the 1960s and 1970s, we show how the vision of great leadership and a determined organization transformed the economy of one of the most important cities in the world.

TARGET READERS

By presenting a retrospective analysis of one of the biggest construction projects in the world at that time, we offer a study that is still relevant to experienced project managers and leaders of mega projects in all industries, as well as to researchers who are interested in strategic project management approaches.

BUSINESS NEEDS

- Revitalizing lower Manhattan
- Promoting world trade

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PROJECT GOALS

- A complex business and commercial campus, consisting of 7 high-rise buildings
- Central hub of transportation to trains and subways in NYC.

GEOGRAPHIC

New York City, USA

ORGANIZATION NAME

Port Authority of New York and New Jersey

INDUSTRY

Construction

YEARS OF CASE

1960s - 1973

PROJECT TEAM

The project team included the World Trade Department Director, Guy Tozzoli. Major additional stakeholders involved in the project operation include a principal architectural firm - Masaru Yamasaki, the prime contractor - Port Authority, a company responsible for integration - Tishman Construction Company, and 266 sub-contractors.

CORE COMPETENCES

A great vision, combined with strong leadership, are the core competencies of this project.

RELATED THEORY

The case is analyzed based on the contingency theory in project management, a multidimensional success dimensions' framework, and the critical success factors approach. We examined the project's leadership using a strategic project management perspective.

SUCCESS CRITERIA

Project Efficiency. The project was completed on time, though overbudget.

Customer Expectations. The World Trade Center transformed lower Manhattan to the financial capital of the world and provided instant recognition and credibility for the many businesses occupying its offices.

Business Success. The World Trade Center became economically self-sustained; in 2001 the complex was leased for 99 additional years.

Preparing for the Future. Although the project was completed on time, the cost escalation somewhat damaged the PA's reputation, and it avoided other grand construction projects that had been anticipated as a reward for success with the World Trade Center. However, from an economical long term perspective the project produced financial income for decades.

LESSONS LEARNED

Successful mega project requires a clear strategy and a visionary leadership that create a strong spirit among team members. Effective communication must be applied in order to gain synergetic teamwork and to meet all stakeholders' expectations. In addition, organization and processes should be aligned with the project uncertainty, complexity, and pace.

Project managers must identify the project's specific attributes and select the right management style; and then be ready to invest in building the right strategy, the right spirit, the right organization, the right processes, and the right tools.

KEYWORDS

Project Management, Mega Project, Construction Management, New York City, World Trade Center

Abstract

September 11, 2001 would never kill the spirit of the world's builders and entrepreneurs. The vision, determination, and leadership of those who built and managed the World Trade Center in New York live on. This paper takes a retrospective look at the project management of the World Trade Center in New York City during the 1960s and 1970s. It collects the experience and the lessons learned by those who had the vision the leadership, and the organizational skills to initiate and execute what was one of the biggest construction projects in the world at that time. While many of today's project management concepts did not exist at that time, a retrospective analysis suggests that the WTC builders had implicitly the right understanding of those ideas. This paper is presented as a tribute to great project management and an inspiration to future builders.

Tribute

"We are about to embark on the largest construction project since the pyramids."

Guy Tozzoli, World Trade Department Director -Port Authority and Project Manager of World Trade Center Project

Mankind has displayed throughout history a capacity to push the boundaries of achievement. Eiffel built his magnificent tower, and Roebling the Brooklyn Bridge. And yet it is not the structure that matters most, but what men and women find within themselves during the process of creating. The World Trade Center was one such structure. Born from the vision of revitalizing lower Manhattan and promoting world trade, World Trade Department Director Guy Tozzoli viewed the World Trade Center as the first of many trade centers that would dot the globe. Today, more than forty years after the completion of New York's Center, there are hundreds around the world that comprise the World Trade Centers Organization. On the morning of September 11, Guy Tozzoli watched standing alongside his car in New Jersey at the entrance to the Holland Tunnel as the Towers burned and fell, as he told us in an interview, he cried. He later reflected "Our beautiful buildings fell victim to the insanity of international terrorism that day, but they will always be a part of us—builders all." This article is dedicated to the victims and heroes of the 9/11 attacks, the people who worked on the construction project itself, and to the Port Authority of New York and New Jersey who demonstrated the best in project management.

Introduction

This paper examines the project management and leadership during the conceptualization, design and construction phases of the World Trade Center during the 1960s and early 1970s. The primary purpose for building the World Trade Center (WTC) was to revitalize lower Manhattan. It was one of the first visible signs that the economy of New York City was transforming from manufacturing to service. The Port Authority of New York and New Jersey (PA) was the only organization that had both the political autonomy and financial resources to undertake such a massive project.

This project demonstrated the importance of a great vision combined with strong leadership provided by Port Authority Executive Director Austin Tobin and World Trade Department Director Guy Tozzoli. They believed in the Towers' mission and shared this conviction throughout the project team and all those associated with the building of the Trade Center.

The project was completed on time, but with a final budget that greatly exceeded the initial estimate of $350M. The total cost of construction was $1.5 Billion due to many additions and changes in scope. In retrospect, these changes made the World Trade Center and the surrounding area the successful complex that it became (Holzmann and Shenhar, in press).

Rather than analyzing the project as a typical case study, where you give the story and the lessons learned, we chose to analyze the project by using a few of the recent concepts and theories in project management. Retrospectively, we have applied to the World Trade Center Project the concepts of contingency in project management; a multidimensional success dimensions framework, and the critical success factors approach. We have also examined the project's leadership using a strategic project management perspective. Although when the World Trade Center was built, most of these concepts did not exist, we found that its managers and builders were profoundly aware of the risk and complexity of this endeavor, and have implicitly applied many of the ideas, which are emerging today as explicit guidelines to modern project managers.

Project History, Scope Change, and Characteristics

Guy Tozzoli was a young Navy veteran who specialized in radar engineering. He had previous experience in smaller port projects in New Jersey and New York. Tozzoli had no experience in construction, and was an unlikely candidate to run the WTC project. But to his credit, Austin Tobin, the Executive Director of the Port Authority saw qualities in Guy Tozzoli that led him to the decision to put Tozzoli in charge in spite of the odds (Darton, 1999).

Three original architects had worked on the project for two years and had extremely varying ideas for the Trade Center. Guy Tozzoli replaced them with a single principal architectural firm to promote project unity, which he believed was crucial to project success. To find the best architectural firm, he assembled evaluation teams, which involved experts in electrical, mechanical, architectural and structural disciplines. One of the selection criteria was that the architect had to be young enough to complete a twenty-five-year project.

The project scope changed in a striking way when the Port Authority announced that it would create the tallest building in the world. Early in 1964, Guy Tozzoli ordered the chosen architect Yamasaki to aim higher than the Empire State Building. The strategic significance of this decision was that the additional twenty stories would favorably tip the economics of this real estate venture. However, an equally important aspect was focusing the project around a single, most powerful idea (Gillespie, 1999).

During the design phase, other major property owners in New York started a public campaign to reduce the height of the towers so they would not eclipse the Empire State Building. This campaign was focused on the risk that the WTC Towers would block television signals. Instead of initiating a responsive campaign to dispute these concerns, Tozzoli made plans to spend an additional $60M to put the City's TV antennas on top of Tower #1. In retrospect, later fees for locating communications antennas and cell phone transmitters resulted in substantial revenues to the Port Authority, which repaid the investment many times over.

Six weeks into construction, a strike threatened to halt progress. A tugboat strike interrupted the seven-ton steel panel deliveries from crossing the river from New Jersey to New York. After a failed attempt to fly steel across the river using a sky crane helicopter, a trucking company was hired to deliver ten panels per night into the city using routes through most of the boroughs of New York City. This maintained the construction schedule until the tugboat strike was settled by the city.

As the towers were being constructed, Tozzoli noticed that the view was restricted through the 18-inch-wide windows. He realized that it would be a huge mistake to put such windows at the restaurant on the top floor of the building. In spite of the Yamasaki's resistance, Tozzoli ordered the architect to redesign the top two floors and make the windows fifty percent wider than planned.

A Modern Approach to Project Analysis

For the analysis of this immense project, we turned to some recent concepts and ideas that emerge today in project management. We have looked at the project through the lenses of four concepts: The contingency theory of adapting the right style to the right project, the concept of project success as a multidimensional concept, the critical success factors theory, and the Strategic Project Leadership® framework, which focuses projects on business results. Here is a brief description of each of these concepts:

The adaptive approach suggests that "one size does not fit all projects" and that project management style, organization, processes, and tools must be adapted to the specific project type. Before taking on a project, management must classify the project type and select the right approach to the right project. A universal framework for project classification is the Diamond model, which distinguishes among projects based on their levels of Novelty, Technology, Complexity, and Pace (Shenhar, 2001; Shenhar and Dvir, 2007; Orhof et al., 2013).

The first dimension, novelty, refers to the market innovation and uncertainty – "how new is the product to the market, users and customers. Novelty level impacts market-related activities and the time and effort needed to define and freeze requirements" (Shenhar and Dvir, 2007). It includes four levels: derivative - improvements in an existing product; platform - a new generation on an existing product line; new-to-the-market - adapting a product from one market to another; and new-to-the-world - a product that no one has ever seen before.

The second dimension, technology, deals with the technological uncertainty – the extent of new technology used. This dimension is measuring the content of new technology used by the project during execution or development. It includes four types: "low-tech projects - no new technology is used; medium-tech - some new technology is used; high-tech - all or mostly new, but existing, technologies; and super high-tech - critical technologies do not exist" (Shenhar and Dvir, 2007)

The third dimension for project distinction is project complexity. This dimension is "represented by the complexity of the product or the organization. Complexity impacts the

degree of formality and coordination needed to effectively manage the project. It is based on four levels: component - the product is a discrete component within a larger product, or a material; assembly - subsystem performing a single function; system - collection of subsystems, multiple functions; and array - widely dispersed collection of systems with a common mission" (Shenhar and Dvir, 2007).

The fourth dimension, pace, is based on assessing the available timeframe for the project and the urgency of its completion. This dimension includes four levels: "regular - delays are not critical; fast-competitive - time to market is important for the business; time-critical - completion time is crucial for success by exploiting a window of opportunity; and blitz - crisis project that calls for immediate solution" (Shenhar and Dvir, 2007).

The following Chart presents the Diamond Model.

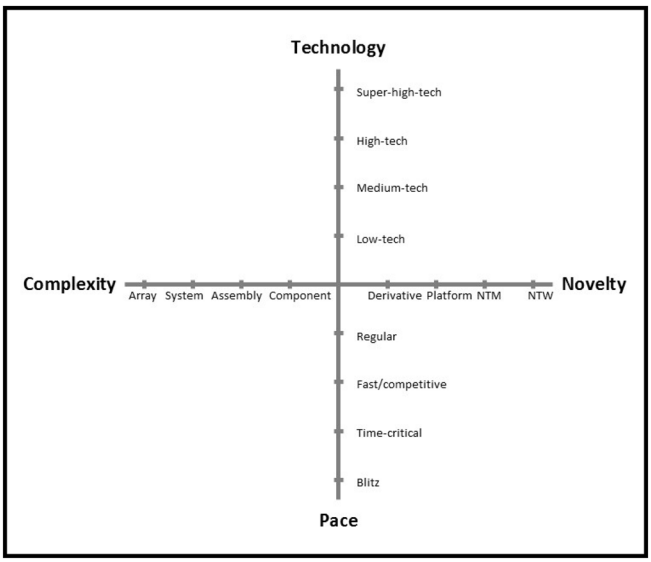

Figure 1 The Diamond Model

The Multidimensional Project Success Framework suggests that meeting time and budget goals is not enough. Even meeting specifications and requirements will not qualify a project as successful. Project success should be judged through multiple dimensions, of which time and budget are only part. Previous research has suggested the following four dimensions: project efficiency, impact on the customer, business and direct success, and preparing for the future. Each dimension will appear dissimilar for different project types and different stakeholders (Shenhar, et. al., 2001).

The Critical Success Factors Theory suggests that projects succeed or fail because of similar reasons. To succeed, management must pay attention to these factors and continuously review how it takes care of them. Pinto and Slevin (1987) identified ten common factors for project success: "project mission, top management support, project planning, client consultation, personnel management, technical tasks, client acceptance, monitoring, communication, and trouble shooting."

Finally, the Strategic Project Leadership® framework suggests that projects are initiated for business results and should be managed as strategic, not operational activities. Project managers are not just managers, but also leaders, who must take-on total responsibility for project results, deal with the strategic and business aspects of their projects, and provide

vision and inspiration to project teams. When planning a project, project leaders must build a hierarchy of five elements in the project plan: strategy, spirit, organization, processes, and tools. The lower elements represent the traditional paradigm that is well discussed in the literature of project management; while the higher levels represent the new strategic approach, which, as claimed, is perhaps the next step in the development of project management as a discipline (Shenhar, 2004).

Contingency Theory – Novelty, Technology, Complexity, and Pace

NOVELTY

On the novelty dimension, from the customers' perspective, the World Trade Center is classified as platform. However, for the subcontractors (who may be seen as "users"), the first of a kind building constituted an unknown experience. That would place the novelty at the *New-To-The-Market* level, which suggests that the new building would require adjustments in the process of work and new integration methods. With regard to business and economic, the World Trade Center uncertainty was of major concern. International trade was only 3.8% of the economy, and the question of whether there is a need for such a project frequently arose. In addition, the project also involved many political and logistical issues with which to contend. The selection of the site and its implications for displacing existing businesses and residents involved a great deal of political maneuvering and court proceedings.

TECHNOLOGY

The World Trade Center can be classified as a *Medium-Tech* project. While standard construction projects are typically considered low-tech (where no new technology is used), this project involved, indeed, some new technologies. In contrast, high-tech project, such as a new aircraft, would involve many new technologies.

The first major advance in technology was the reverse Bathtub system. While existing technology developed by the Impresa Costruzioni Opere Specializzate of Milan Italy was identified as the solution, it was never before tried on such a large scale. Second, the elevator system where both doors opened to allow for passengers first in to be first out had been done before with small elevators holding only twelve people. In order to transport the 50,000 tenants working in the towers, more than 100 high-speed, high capacity elevators of this type were needed. Third, the exterior structural column design was revolutionary; taking advantage of newly developed high strength steel. The towers would be rigid "hollow tubes" of closely spaced steel columns with floor trusses extending across to a central core. One benefit of this design was to maximize rentable floor space. An additional concern was the ten to fifteen foot sway the tall towers would experience and to what degree the occupants would tolerate this.

COMPLEXITY

The project scope involved a complex of seven buildings on 16 acres of prime land totaling more than 12 million square feet of high quality office space. The construction project took eight years to complete at a cost of $1.5B. More than 10,000 workers were involved in various stages of the project, with an average of 4000 on a daily basis and more than 700 contractors.

To assess the complexity of the project, the WTC has been called "a vertical city" with its total population being more than many U.S. cities. Lower Manhattan's largest shopping mall was located in its basement, along with a seven-level parking garage. While typical building construction projects would be classified as systems, the WTC's interface with public transportation systems and other facilities in the neighborhood would place this project at the top of the complexity classification into the *Array* category.

PACE

The pace dimension relates to the time given to completion of a project in relation to its complexity. In this case the timetables of the WTC project had to be satisfied daily to avoid the potential $1 million per day cost associated with a total work stoppage. Once construction started, progress remained on pace with only a few small glitches. In retrospect, the project can be characterized as *Fast-Competitive*.

The Diamond structure of the World Trade Center project is presented below.

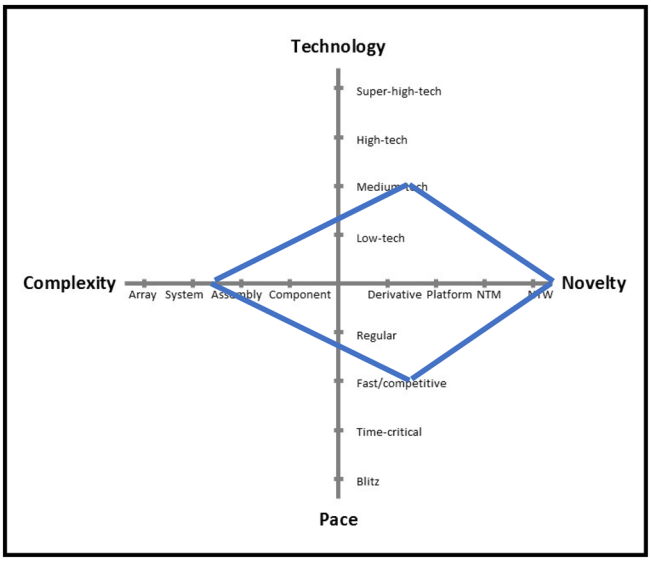

Figure 2 The Diamond of the World Trade Center

Was the Project Management Style Right for this Type of Project?

In retrospect, one may ask, did the project managers use the right approach for this project? While no theoretical classification existed at the time, we classified the project, retrospectively, as New-To-The-Market, Medium-tech, Array, and Fast-competitive. Our assessment is that the management style used in this project was appropriate for this type of project.

As common in most construction projects, management froze the design prior to the start of construction. However, management was ready to support changes perceived as critical to the WTC's long-term success. That was the case when modifying the windows design for the Windows on the World restaurant, the addition of the TV antenna, or the addition of a $1 million transformer room under the future location of Building 7. Later on, the leasing transformer room paid the Port Authority $12 Million per year.

To cope with uncertainty of new untested systems, Tozzoli instituted numerous tests and quality controls to make sure the new technologies are consistent with the building's mission and safety requirements. Specific focus was given to the Reverse Bathtub systems, the new elevator design, and the "hollow tubes" of the steel columns.

Regarding system scope, the WTC project management style was well adapted. The WTC was a large array that needed central coordination for success. This was provided by the Port Authority, which acted as the prime contractor. Work was divided amongst the 266 sub-contractors, by the office of engineering/architecture administered by project deputy for Design and Construction, Malcolm Levy. They were responsible for coordination, control, decision-making and information gathering. The group of 20 engineers and architects had clear and direct channels of communication with each other, enabling the complex integration of all sub-units. Meetings with the Board of Commissioners of the PA (Port Authority) were conduced monthly, while lower level review meetings had occurred weekly and even daily.

In addition, the PA had to deal with system integration problems. This was done by hiring the Tishman Construction Company, together with an advisory board of architects and real estate personnel. The combination of an integration company and an advisory board provided the PA with advanced notice of what to expect when integrating numerous subsystems and what needed to be done in advance to avoid problems.

Finally, to deal with the project's fast-competitive pace, the project schedule was considered critical. Any delay was encountered with excessive effort to not lose even a day as was the drastic action taken during the tugboat strike.

Assessing Project Success as a Multidimensional Concept

Project Efficiency. The project was completed on time; however, the budget had grown from the original estimate of $350M to $1.5B. This was due to many scope changes and unforeseen costs such as NY regional strikes.

Customer Expectations. The World Trade Center was a remarkable success. It transformed lower Manhattan from a collection of small TV repair shops to the financial capital of the world and provided instant recognition and credibility for the many businesses occupying its offices. Trade Center was also successful in stimulating world commerce. It did so by becoming a home for many international financial institutions, insurance companies and small businesses that became the lifeblood of lower Manhattan.

Business Success. The World Trade Center did become economically self-sustained. After paying bondholders for 20-year period, the PA was netting $133M annually. The Trade Center became so economically attractive that in 2001 the complex was leased for 99 additional years.

Preparing for the Future. Although the project was completed on time, the cost escalation somewhat damaged the PA's reputation, and it avoided other grand construction projects that had been anticipated as a reward for success with the World Trade Center.

Critical Success Factors

Clear and Early Project Definition: The WTC project was well defined clearly from the start. There were few deviations from these plans, and they were characterized as project extensions rather than design changes. Project extensions did not change the major scope or affected the project timeline, and were driven by business decisions, not design limitations, or ad hoc requests.

Top Management Support: Management was clearly committed to this enormous effort and provided the best resources and political will to see this project through.

Adequate Resources and Integrative Planning: The biggest threats to the WTC construction were delays. Delivery was a critical part of the supply chain. As previously described, Tozzoli and his team managed to keep the flow of materials amidst worker strikes and numerous vendor pressures.

Voice of the Customer: The PA carefully paid attention to the voice of the customer, specifically the governors of New York and New Jersey and incorporated a flexible project scope to satisfy the requirements of the critical stakeholders.

Communication and Feedback: Tozzoli used daily, weekly and monthly meetings to keep all parties informed. With his continuous presence on the site and by insisting that major problems come to his attention within four hours, he made sure nothing was neglected.

Trouble Shooting: Having a professional review committee was the main project trouble shooting mechanism. Problems were exposed early and expert opinion was used to correct them in real time.

Strategic Project Leadership® (SPL)

The Strategic Project Leadership® framework is built on a hierarchy of five components – "*strategy, spirit, organization, processes, and tools*. Project strategy is the link between the business strategy and the traditional project plan. Project spirit translates project strategy into an inspiring vision, and an environment of passion and commitment that characterizes great projects. Only after selecting the right strategy and creating the right spirit, can project leaders plan and build the more traditional components of organization, processes, and tools" (Shenhar, 2004).

It is surprising to see how, in retrospect, the WTC project management approach fits well into the strategic framework. The following discussion describes the different components of SPL and how each contributed to success.

PROJECT STRATEGY AND COMPETITIVE ADVANTAGE:

The unique selling point of the WTC was to create a complex of buildings that would encourage a synergistic effect for promoting world trade and to become a first rate office building with all the conveniences of a city. An additional factor was the prestige of having your address in the world's tallest building. Finally, the WTC had to offer lower rental rates than those of mid-town.

Tozzoli was a visionary leader who concentrated on strategic goals to ensure that the project would be successful in terms of engineering as well as commercial measures. In retrospect, all the expected advantages were clearly achieved, proving that the strategic foresight that proved effective and profitable for many years to come.

PROJECT SPIRIT, VISION AND LEADERSHIP:

Tozzoli had formulated two visions to his team and to the thousands of contractor workers. The first was that the WTC would be "the greatest construction project in the world". The second was that "Trade Centers help not only to facilitate international trade and build economic well-being, but they foster a higher level of harmony and peace among the nations of the World." To instill this vision, Tozzoli got the best people and he worked hard to create a

strong spirit among team members. Team members were extremely proud work on the project; had high morale, and felt they were part of a unique group.

The vision was clearly characterized by the leadership style. Tozzoli defined clear rules, which provided clear project definition and focus on the strategic goals. He employed a "walk around and talk" management style. This helped him stay informed beyond the formal updates he received from his deputies. His daily visits to the war room, his deputies, the rental manager and the financial group kept him constantly up to date on progress.

Tozzoli hired Malcolm Levy as his deputy of design and construction for his eye for detail and the ability to pull a diverse construction project together. He also made him in charge of future operations. So that any attempt of savings during construction, would be assessed in its future perspective. To complement Levy's hard nose style, Tozzoli hired Ray Monti, to be the Construction Manager, reporting to Levy. He had a management style that built camaraderie and a sense of belonging at the job site. This brought the myriad contractors and sub-contractors together to work effectively as a team. The result was a well-rounded management team, where each member compensated for the weaknesses of the others.

ORGANIZATION:

The World Trade Center project utilized a structure that was pure project management with slight matrix ties to the Port Authority functional departments. Port Authority employees were classified as either line or staff personnel. Line personnel were assigned to specific projects while staff personnel were assigned to supporting departments such as finance, personnel, law and public relations.

The PA Board of Commissioners was divided into two important committees: the Construction Committee and the Operations Committee. The Construction Committee concentrated on issues of creating the WTC while the Operations Committee focused on filling the Trade Center with tenants and the future operation of the complex.

Tobin realized that the WTD had no experience in building skyscrapers and decided to create a professional advisory committee to escort the project. The committee consisted of seven real estate and banking members from New York and Chicago. They met monthly to review the project's status. Tozzoli described the advisory committee as very helpful in evaluating critical decisions throughout the project.

PROCESSES:

The major phases of the project can be divided into pre and post-groundbreaking. Prior to groundbreaking most of the tasks were either political or organizational. For example, during this phase an implementation plan was forwarded to the states of New York and New Jersey prior to entering into negotiations with those states. After ground breaking, the existing buildings on the site were cleared and the bathtub foundation was built while maintaining PATH service. During and after construction of the WTC complex, tenants were signed while the Trade Center's operations were established.

Tozzoli utilized three sources for top down project estimating. He used an external professional estimating group, Tishman Construction Company consultants, and an internal estimating department. The three estimates were compared prior to contract negotiation to create the right price and delivery for components and services.

During the first six months of the project, architect Masaru Yamasaki created over fifty designs for the site. Tozzoli flew monthly to Detroit to review the designs during that period and later expanded the reviews to include Levy and his staff on a weekly basis.

Three primary areas were continuously reviewed: construction progress, financials, and tower occupancy. Daily construction progress was reviewed each morning by the construction team, with four line supervisors communicating the specific activities to the construction teams of both towers. A higher-level review was conducted during weekly meetings with Yamasaki to discuss progress and minor design changes.

In addition, the project's finance department calculated financial status monthly. Financials had to adhere closely to the spending plan and budget and the reports were included in the meeting minutes forwarded to the Governors of New York and New Jersey for monthly sign off.

Finally, daily meetings were conducted each morning in the War Room. These meetings included Levy, Monti, four line supervisors, construction consultant Tishman and construction representatives. The project had also formal weekly meetings to communicate with the construction, finance and renting departments. In addition, monthly verbal communication occurred at the Board of Commissioners meetings through Austin Tobin. And if anything major occurred, Tozzoli insisted that he be notified within four hours.

TOOLS:

The World Trade Department was one of the first users of the Critical Path Method on a large scale. The wall charts were frequently updated to reduce the risk of delay. The formal management office was called the "War Room". It held the computer that organized the CPM (Critical Path Method) printouts that were regularly updated and posted on the walls of the room.

In addition to the monthly report created by the World Trade Department for the Board of Commissioners and project meeting minutes, there were dozens of regularly issued internal documents. The paper trail ensured all departments knew what the others were doing. The level of paperwork was immense, but well organized.

A Retrospective Evaluation of the WTC Project

In retrospect, throughout the entire project, management demonstrated the right approach. It demonstrated that project leadership is the key. Project leaders managed the project with a strategic, long-term perspective in mind. They did not just focus on finishing the project on time and budget, but were constantly concerned with the economic, environmental, social, and political success of the WTC. The strategy was clear and the projected competitive advantage was articulated and stressed to all parties.

Management also had the right vision. Being described as the biggest construction project in the world and articulating the WTC as a symbol of world trade and peace, created high energy and motivated the team.

The project was well organized for its level of complexity and stakeholder involvement. The different departments, contractors, boards, consultants, and committees, all played critical roles in communicating and creating commitment to this enormous effort. In addition, a significant amount of formal procedures and communication reports kept all contributors coordinated throughout. Project leadership identified, anticipated and managed the project interface with the outer world in order to satisfy many influential stakeholders, including the City of New

York, the Governors of New York and New Jersey, and bondholders. Before the project began, it was managed as a well-run political campaign. Afterwards, it resembled a well-coordinated military operation.

Modern projects of today have a lot to learn from the World Trade Center experience. If you have the right leadership and the right team with the right management support, you have the basis for success. You must then identify your project's specific attributes and select the right management style; and then be ready to invest in building the right strategy, the right spirit, the right organization, the right processes, and the right tools.

The WTC project managers did not have all of the modern frameworks at hand, but using common sense led them to the right approach. May the WTC project inspire future generations of project managers and serve as a tribute to one of the best project management teams of all times. And may the tragic collapse of the Towers on September 11, 2001 and the subsequent rebuilding effort symbolize that great project management will keep on living.

In Closing - Tozzoli's Rules of Leadership

During the interview with Guy Tozzoli, he outlined six rules that were central to his management style. These rules focus on visionary leadership, proper management style, teamwork, and respect. We close with these rules in Tozzoli's words. They can serve as a guide for the new generation of project managers:

Rule 1: "If you've been doing something the same ways for two years, then you're doing it wrong. There has to be a better way."
Rule 2: "Don't be afraid to act if you know you are right."
Rule 3: "Everything is the management of money."
Rule 4: "You must absolutely, absolutely be somebody that they can trust; they being the tough guys on the other side that you have to deal with in any kind of a deal. They have to be able to trust the leader. Integrity is the most important thing."
Rule 5: "Most great ideas are very simple. Except they look ahead."
Rule 6: "Everybody has two arms, legs and a head. Try to be as truthful as you can be with people."

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