William J. Pinkerton

PROJECT MANAGEMENT

ACHIEVING PROJECT BOTTOM-LINE SUCCE$$

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PROJECT MANAGEMENT

FOREWORD

One of the biggest challenges facing today's major industrial corporations is the manner in which capital improvement projects are handled. So much depends on it. Not only are capital improvement projects expensive (some in the hundreds of millions of dollars), but a wrong strategic decision can cost a company its place in the market. The result can be disastrous, to say the least.

In this book, William J. Pinkerton offers a candid look not only at the origins, planning, and execution of these projects but also at the strategic thinking that should be taking place from the outset. I say "should be" because, unfortunately, too often this strategic thinking isn't taking place. In over 35 years of observing and taking part in some of the largest capital improvement projects in the world, I can state unequivocally that this book has hit the nail square on the head; that is, one must think and plan strategically with but one overriding priority in mind—all activities must take direct aim at positive contribution to the corporate bottom line. Nothing else matters!

Now I know that almost every CEO, every general manager, every project manager will say that this is exactly what he or she does. But it isn't true! Many, many projects shouldn't go forward at all. They are products of emotionalism, ego, short-term gain, and illogical or "sideways" thinking that are usually brought about by insufficient front-end planning. Most of these projects will fail; and by *fail* I mean they will either return less than they should to the bottom line or, in the worst cases, seriously damage the corporate entity. Only rarely will a failed project lead a company into total failure; a *series* of these projects can, however, lead to corporate demise over an extended period of time.

One of the points made dramatically in this book is the widespread misunderstanding by many project teams of the term

bottom-line dollar. The million-, multimillion-, and, yes, even *billion*-dollar project cost terms are thrown about so easily by corporate project planners and teams that the impact of the origin of these huge sums of capital becomes obscured. These are not *sales* dollars; these are dollars that collectively make up the "bottom line." These are corporate *profits* that are being spent! It takes a tremendous amount of product sales to produce these dollars. This, then, is the reason that the message put forward by this book is so important.

We are now operating in a global economy and, although most managers have the best interests of the company at heart, many of the decisions we have seen indicate that they are triggered by interests that are in reality short-term solutions, solutions that may not be in the best long-term interests of the corporation, venture, or other entity.

The term *Project Bottom-Line Success!* is not just another empty corporate phrase; it's a philosophy, a philosophy that can help guide our thinking as we consider the impact on the venture of these decisions affecting capital improvement projects.

The decisions that we make may not only affect the project at hand, but the long-term competitiveness of our respective companies. It is after all a *global* economy and the competition is fierce.

Project Bottom-Line Success!, or *PBLS,* is a model for first assessing the need and then making the proper decisions in the execution of a project. It addresses not just the aspects of design, procurement, and construction activities, but, more important, the effect of the project on the corporate bottom line and the long-term strategic interests of the company.

The use of a structured methodology leading to successful project selection, execution, and start-up is absolutely essential because the project costs, although sometimes high, pale in comparison to the operating costs and loss of revenues and profits if the project is a failure, from the standpoint of either selection or execution.

When operating revenues are in the many thousands of dollars per minute, we cannot afford the mistake of either an

unneeded project or a poorly executed one. The costs can be catastrophic not only to the company's bottom line, but also to its position in the marketplace relative to its competitors.

Good project management and start-ups are absolutely paramount to the success of any company. The cost of poorly planned and executed projects often exceeds the cost of the capital investment, effectively forcing the stockholders to pay in many cases double what they should for their investment. This is not only unfair to the stockholders, it could even lead to the demise of the venture. Investors don't back losing propositions for long.

A successful project starts with the germ of an idea. The idea must be good, and it must fit in with corporate strategy. There is no room in the *Project Bottom-Line Success!* methodology for what we might call emotionally driven projects. Emotionally driven projects almost invariably end up with a less-than-desired outcome, and can certainly inflict harm on the corporate bottom line.

For this philosophy to be successful, the client company must also lean on its suppliers and contractors to adopt the same approach. The effort cannot be one sided. *PBLS* language and philosophy should be written into the inquiries and specifications furnished to any prospective bidder or supplier. If a proposed supplier or contractor doesn't wish to comply with this type of approach to project planning and execution, it should be dropped from consideration.

We are asked sometimes, "What is the most important phase of a project?" Although all phases are critically important, we would have to say that, first, defining the need through strategic planning (to avoid the waste of huge sums of bottom-line dollars) and, second, proper and detailed preproject planning are probably the most important. Get these two areas right and the capital improvement project has a much better chance of succeeding.

It is my contention that a project that has suffered through poor execution and start-up will never, ever achieve its fully intended benefits and will therefore return less than it should

to the bottom line of the venture or company. Put several of these together and the corporation itself may be in jeopardy.

There is no, repeat no, guarantee of success for any major project. However, the adoption of this *PBLS* methodology can produce the highest degree of probability of success that I have come across in my 30-odd years of experience with large capital-improvement undertakings.

This is a rapidly changing world. We are in the midst of a changeover from the machine age to the information age. Corporations must change not only the way they have been doing things, but also the way they *think* things. Sometimes the project that is *not* undertaken is the most profitable business decision of the year! The very first *PBLS* "principle," as defined in this book, is profound in its simplicity:

> If project need cannot be justified on the basis of a realistically and sufficiently positive contribution to the venture *bottom line*, legal mandates, or safety considerations, then the project should not go forward.

Strategic planning, as an integral part of the PBLS philosophy, is paramount to success. If the capital improvement project is fatally flawed through a failure on the part of executives to think beyond the next two or three quarters, then no amount of solid project management will help. This is why we say that, in the final analysis, *PBLS* is a top-down philosophy.

This book is excellent reading, *must* reading, for anyone—corporate executive or project manager, engineer or operator, business systems analyst or consultant—who seriously wants to see the capital improvement projects he or she is concerned with take a turn for the better. In fact, it just may be the ticket your company needs to remain in the chase!

G. Brian Jones
General Manager, Systems and Process Control
U.S. Steel Corporation

PREFACE

Down through the pages of history, we read of great projects planned, initiated, and executed by those who have gone before. Some of these projects are only myths filtered through the haze of centuries past, leaving scant, if any, trace; other projects are tangible and lasting, monuments to past people and present sources of inspiration.

We read of the Colossus of Rhodes—what an engineering feat that must have been! We read in the biblical record of the ancient Tower of Babel, reaching to the heavens. But did it really exist? What of the Hanging Gardens of Babylon or of the Library of Alexandria, holding all the knowledge of mankind to that point? Were those projects actually executed? How did they go? Did they achieve the goals that their planners, their engineers, their builders had set for them? The answer is that no one really knows. Although evidence has recently come to light that supports their existence, the facts are still shrouded in the mystery of the ages.

But let's assume that those projects were real and explore that last question for a moment. Should we not say that the answer depends on just what those goals were? If, for example, the ancient client's goal was *to be remembered*, then, to a certain degree, the goal was accomplished. These projects were so magnificent that people have remembered them and those they honored down through the ages.

If, on the other hand, the goal was to build a lasting edifice and we are left with only a myth, the goal may not have been accomplished; the project may have been a needless waste of an ancient people's treasury—an ancient boondoggle.

Ah, but we do, indeed, know of one series of projects that meet both goal criteria!

THE PYRAMIDS

The Pyramids—those ancient wonders whose purpose was not only to proclaim the power and the glory of their builders, but also to provide the future with a lasting memorial to their culture. Although the Pyramids have long been wrapped in mystery and lore, they were actually projects about which we do know something.

We know, for example, the name of the architect/engineer who designed and oversaw the building of the first great pyramid, the "step pyramid" of King Joser. The architect's name, frozen forever in hieroglyphic writings, was Imhotep. Both his name and his accomplishments as an architect and engineer were revered, not only by the Egyptian pharaoh for whom he worked, but also by the ancient Athenians, who knew something of architecture themselves.

We also know a good deal about one of the most interesting of the ancient projects, the Great Pyramid of Khufu. As with most projects, the construction phase of the Khufu Pyramid had problems. For one thing, the wheel had not yet been introduced into Egypt, at least not as a method of conveyance. Therefore, all stones had to be laboriously dragged on skids or on a slick mud surface to their destination. And how did Pharaoh Khufu's engineer raise these heavy stones to their ever-increasing resting height? No, not by antigravity ray machines from alien spacecraft, not by forces known only to the Ancients, but simply by continuing the drag up long and gradual earthen inclines by a more mundane source of power—manpower.

We can only imagine some of the labor force problems: sickness, malcontents, the feeding of thousands. (Although nonpaid conscripts or, in some instances, low-paid soldiers made up the majority of the work force, very few actual slaves were used, contrary to the Hollywood view of this great project.) However, we can imagine that after several years of backbreaking drudgery, the concept of "for king and country" wore very thin, leading to mounting labor problems.

And talk about scope creep! The client (Pharaoh Khufu) changed his mind not just once, but twice during the construction phase, as to just how high in the structure he desired his burial chamber. These changes, coming in the middle of the project, created structural changes that resulted in broadening the monument's base and height. Obviously, much work had to be redone in order to make the required changes. Budget and schedule were severely overrun, as they almost invariably are when the scope of the project is ill-defined from the very beginning.

But much was learned from these early projects. We still recognize the pyramid as a basic shape, a shape of extraordinary strength. These builders had a profound influence on the continuing efforts in architecture, engineering, and, oh yes, project management!

Let's now shift forward a few millennia to a series of projects that not only were awesome in their scope, but also led the way to new project management concepts, precepts, and principles.

THE APOLLO PROGRAM

We had to use both research and some imagination in exploring the great Pyramid projects, but we have no such problem when it comes to Apollo. Never was a project more planned, more documented, or more witnessed than our journeys to the moon and, in contemporary programs, beyond.

This writer was fortunate in that, for 10 years, I took part in those historic projects at the Cape Kennedy Space Center in Florida, from the Gemini launches, through the Apollo moon missions, and on through to the conclusion of the Skylab program.

As we studied case upon case of actual project execution in preparation and development of the seminar and workshop series entitled "Design for Start-up," we saw that the principles and tenets upon which we had built this series were strikingly

similar to the project management methodology that drove the Apollo program almost 30 years before. In Apollo, the buzzwords may have been a little different, but the principles and tenets of teamwork, the preplanning, the clearly defined objectives, and a recognition of the risks involved were obviously the same.

The Apollo program was, indisputably, a gigantic success. It scored success after success in a series of individual steps, or projects, culminating in Apollo 11 and subsequent manned landings and safe returns to earth. America soared with Apollo. If ever there was a doubt that the United States led the world in technological development, it was put to rest on the Mares and the Laurentian Highlands of the Moon.

In retrospect, each of the program's many, many glittering successes was brought about by an almost religious adherence of the entire project team of hundreds, if not thousands, of people to the principles and tenets we shall be considering in this book.

But there were stumbles along the way. Tragic failures. Likewise, in retrospect, with *every failure,* the trail of evidence bright as a Saturn rocket's fiery tail points unerringly to the omission or blatant disregard of these same principles and tenets. Let's look briefly at a few examples.

APOLLO 11

The Apollo 11 mission was a mind-boggling success. The hundreds of thousands of individual parts, pieces, and systems that made up the awesome Saturn V rocket performed flawlessly through the long countdown procedure, the launch, the lunar landing, and the historic "one small step" statement. Then, through lunar lift-off, return, and successful landing it all looked so, well...rehearsed. And rehearsed it was. The launch team, from pad technician to astronaut, had planned, planned, and replanned, had trained, trained, and retrained. In the words of the NASA Launch Director Gene Kranz, "We make our mistakes in training, so as not to make them in the real game."

But a price had been paid to learn these basic principles of project management. A terrible price.

APOLLO 1

On a beautiful day in January 1967, in the early evening hours, a critical dress rehearsal in preparation for the first Apollo flight came to a sudden end in a white-hot glow of oxygen-fed fire at the 220-foot level of pad 34. In a few, brief seconds the program had lost three of its finest astronauts. Virgil "Gus" Grissom, Ed White, and Roger Chaffee were gone.

The investigations continued for months. The program came to an abrupt standstill. The immediate cause of the spark that set off the conflagration was almost impossible to discern, although some said it was a small tool lodged between wiring bundles, indicating a slip in quality procedures. But regardless of the immediate cause, investigators were looking for the root cause. And it was not too hard to find.

Here was a spacecraft, jammed with both flammables and electronic circuits, operating in a *pressurized, pure oxygen atmosphere.* It was a bomb just waiting to go off. These were bright and intelligent design engineers. Why would they design such a craft? *Expediency.* An unrealistic schedule. It's easier and quicker to design a single-gas system using oxygen than to design a two-gas system using oxygen and nitrogen. And America was in a race to the moon! Whatever would get us there quicker than the Russians was pretty much the rule of the day. However, even the Russians knew better than to design a single-gas system; their spacecraft was designed with an N_2O_2 system from the beginning.

Learning this lesson, the lesson of avoiding unrealistic schedules, was costly, both in the tragic loss of a fine crew and in the ensuing delays and extra costs caused by the necessity of spacecraft redesign. Unfortunately, memories are short; it would not be the last time that this and ensuing programs would be plagued by unrealistic schedules and emotional or ego-dominated decisions. The Challenger tragedy is a case in point.

CHALLENGER

The Challenger event appears to have been a tragic case of a project launch decision dominated, at least to some degree, by emotion and peripheral, or outside, pressures. (Be aware that much of what we say here is conjecture based only upon newspaper and television accounts of this event; we were not personally involved.)

It appears, however, that Challenger was launched on a cold (very cold for Florida) morning, in a continuing series of "scientific" missions. Although the mission did, indeed, allow for some scientific experiments, it was apparent to even a casual observer that the real aim was centered in public relations concerns, i.e., to show the world that American space travel was now commonplace enough to send a grade-school teacher into earth orbit.

Apparently, a known potential problem had existed for some time with a large sealing O ring on the booster. According to some, low ambient temperatures at launch time could impede the flow of O-ring material into its seating grooves. It was later reported that at least some engineers from the booster contractor's offices had attempted to warn the launch team to delay until weather conditions improved.

But there were many "important people" on hand to witness this launch, and their presence undoubtedly increased the pressure on the launch team to go with the schedule.

We, most of us, saw the terrible results. The entire crew was lost in the ensuing fiery explosion. There was such excellent coverage by the media, owing to the fact that a beautiful, young school teacher was going into space, that the entire nation witnessed, close up, the Challenger mission's destruction.

We cannot, and will not, say for certain that the decision to launch was based on anything other than good engineering practice. However, we do know that in many similar situations, where emotional issues and egos have either taken control or played a part in the decision-making process, other projects have also suffered catastrophic losses. But perhaps none so poignant and sad as the fate that befell Challenger.

Overall, however, both the Apollo and ensuing programs were tremendously successful, leaving a legacy of technological advancement unmatched in history for such a short period of time. We continue to reap the benefits of these ventures today through our computers, increased knowledge of our own planet, and in new products and methods such as the microchip and miniaturization; the list could go on and on.

But for those of us who strive to execute projects better and better, the knowledge gained is *the project management methodology* that led us to the moon and beyond.

As we delve into the principles, the tenets, the *methodology* of project management, we think you will see their correlation to those great projects of the past. Experience is, after all, the best teacher.

GUARDING THE BOTTOM LINE—THROUGH BETTER PROJECT MANAGEMENT

In this book we will refer repeatedly to the term *Project Bottom-Line Success!*, or *PBLS*. This term simply refers to the structured methodology that we feel is essential to the achievement of a successful outcome in the practice of project management. Why *Bottom-Line*? Because we feel very strongly that the contribution to the venture or corporate bottom line is the most important consideration of project management teams, and that this fact is sometimes lost in the clamor of project execution. (If a project is perfectly executed but adds little or nothing to the bottom line, then why was it done?)

Let us state right here, at the outset, that this book contains no secrets: no new gimmicks or fads, no motivational buzzwords (unless you wish to call our methodology, *Project Bottom-Line Success!*, a buzzword), no bombshells. All we're going to do is lay out basic management techniques and practices that you have probably known all along—just good, commonsense practices. In the press of budget, schedule, or other demands, you may not have always implemented these techniques and practices to the

fullest extent possible. No one *sets out* to execute projects in any other way than in a logically laid out manner, with planning being accomplished in orderly, detailed sequences. However, budget, schedule, boss, and client pressures often result in project team decisions that may appear justifiable at the time, but are disastrous in retrospect.

In the following pages we will attempt to assist you in bringing your current or future capital improvement project to a more successful conclusion, at least perhaps more successfully than you have been able to in the past.

We will do this by introducing you to the principles and tenets upon which almost all successful projects are based. Some of these principles, when stated in their simplest form, are nothing more than an application of common sense. I'm sure you're going to be saying, "But I knew that already" or, "Everybody knows that!" And we will say, "Ah yes—but did you *do* it that way?"

As we make this journey, we will lead you logically, step by step, through the required planning and the options and then will try to help you avoid the pitfalls and potentially disastrous, although common, judgment and decision-making errors you will almost certainly face on any capital project.

Scrupulous implementation of *Project Bottom-Line Success!* principles and techniques will help ensure that project teams make the right decisions at the right times, resulting in more project start-ups that are "nonevents" rather than the madhouse, three-ring circuses that they often become.

As a reinforcement to the *PBLS* philosophy, we will explore numerous case studies of actual projects to see where and why they broke down or, on the other hand, what made them successful. We think you'll agree—it simply takes a commonsense, *Project Bottom-Line Success!* approach to make any project a real winner, a project that contributes substantially, and quickly, to your company's bottom line.

Let us begin.

William J. Pinkerton

ACKNOWLEDGMENTS

Much of the material, most of the case studies, and certainly a good deal of the structure and organization of the project management philosophy set down on the following pages have come from the American steel industry.

Although the roots of the *Project Bottom-Line Success!* (*PBLS*) methodology reach back to the early days of the U.S. manned space program (Mercury, Gemini, Apollo, and Skylab), it was U.S. Steel Engineering that recognized the need for a more structured approach to the management of industrial capital-improvement projects. With foresight and a considerable number of planning sessions a program entitled "Design for Start-up," or DFSU, was initiated.

This precursor to what we now call *Project Bottom-Line Success!* indoctrinated U.S. Steel engineers and project management teams with a more structured approach to the management of projects both large and small. DFSU also imbued most participants in the program with a newly found confidence that facility start-up could, in fact, be accomplished smoothly and without the long, costly delays experienced on some past projects.

The driving force behind the Design for Start-up program was, and remains, Bernard J. Fedak, General Manager, Engineering, at U.S. Steel, and G. Brian Jones, General Manager, Systems and Process Control, U.S. Steel. To these two fine engineers and managers go a world of thanks. The impact of their assistance and support in the development and implementation of the Design for Start-up program at U.S. Steel, and its subsequent influence on both the *Project Bottom-Line Success!* methodology and this book, cannot be overstated.

My thanks and appreciation also go to John L. Davis, Director of Engineering at National Steel Corporation, for his help and encouragement both in the development of the *PBLS* workshop series and in the writing of this book. And