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Sarbanes-Oxley Act, Making the Case for Effective Project Management!

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As we move into an open global market economy, project management has emerged as the definitive standard for planning and executing projects anywhere, and at any time. The rapid rise of the project management field is exhibited by the tremendous growth of the Project Management Institute (PMI)®, whose goal is the advancement of project management. PMI's Certified Project Management Professional (PMP)® certification has been voted as one of the hottest global certification to have. PMI's "Guide to the Project Management Body of Knowledge" (PMBOK Guide)® is a widely recognized standard across many industries and has been accredited by International Standards Organization (ISO) and American National Standards Institute (ANSI). Project Management which was once perceived as tool used by elite large businesses and Information Technology (IT) corporations is gaining a wider acceptance in the small to medium size Architectural/Engineering community (A/E), and in the construction industry.

This is not say that A/E firms were not using project management in their business practices. However, the use of project management as an effective tool was limited. Many people in the A/E community perceive an effective project management system to be simply an excellent accounting system, or a software package, that would track project costs, utilization rates, overheads, and overall financial performances. Reports produced by these packages are static and do not reflect the long term performance of a project, and may not provide accurate forecasts for costs at completion. In summary, project management was, and still is, synonymous with accounting.

Effective project management systems are much more comprehensive endeavors that examine the entire project lifecycle from cradle to grave. They are dynamic, and if applied properly, would improve the profitability of an organization. Are current reporting and management procedures used by the A/E community adequate to ensure accountability and profitability in a highly competitive marketplace dominated by outsourcing and low cost? Hardly! The A/E community must abandon century-old, single-facet, management procedures in favor of a new integrated, approach for executing projects. The new approach would use proven, universal, project management methods that encompasses all phases of the project including, project initiation, project planning, project execution, project monitoring and control, project close-out and lessons learned. This quiet revolution will create a new paradigm where project management is the new frontier in engineering. The following are ten pillars of effective project management using the human body as an analogy.

PROJECT MANAGEMENT PHILOSOPHY

An effective project management philosophy must be based on the understanding that managing successful projects or programs ultimately encompasses managing the interaction of project management processes, resources, risks and constraints.

Since projects are dynamic endeavors, project management must also be a dynamic, integrated process propelled by continuous cycles of plan-do-check-act (PDCA) actions as described in Armand Feigenbaum's "Total Quality Management (TQM)," Joseph Juran's "Trilogy," W. Edwards Deming's "14 points," and Philip Crosby's "Zero Defects." This cyclical process was proven successful in TQM circles, and it ensures that project requirements are met, within the constraints and resources allocated, with emphasis on quality. Project management is thus seen as an application of the universally successful PDCA cycle, figure 1.

PROJECT CHARTER AND SCOPE (THE BRAIN)

An essential element of project management methodology is the preparation of key project documents such as clearly defined scope statement and project charter. The project charter authorizes the project and allocates resources to it, and names the project manager. It answers at high level important questions such as why, who and what. The scope statement defines the work to be performed and associated deliverables that can be tracked from a quality, costs, and schedule perspective. Understanding project scope is critical to ensuring success or failure of a project. Many projects fail due to scope creep and gold-plating. Scope creep is defined on PMBKOK as "adding features and functionality without addressing their effect on time, costs, or resources, or without customer approval" [4]. Gold-plating is giving the client more than what is required. Scope creep and gold-plating are rampant in the competitive A/E community where owners are asking for added features which were not included in the original scope of

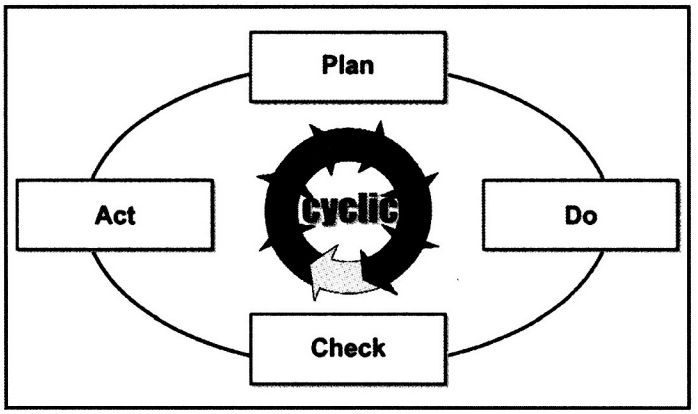

Figure 1—Project Management Philosophy

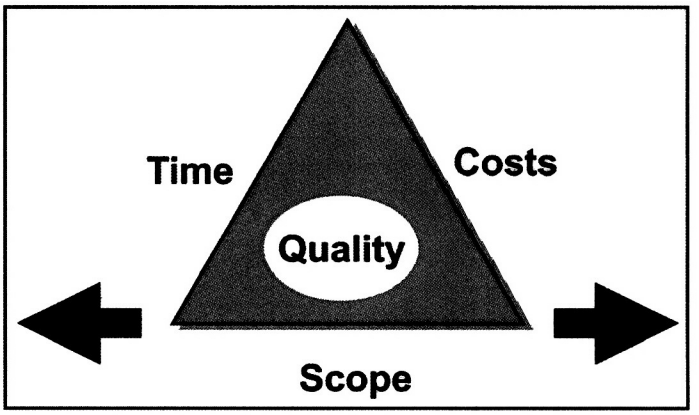

Figure 2—The Triple Constraints

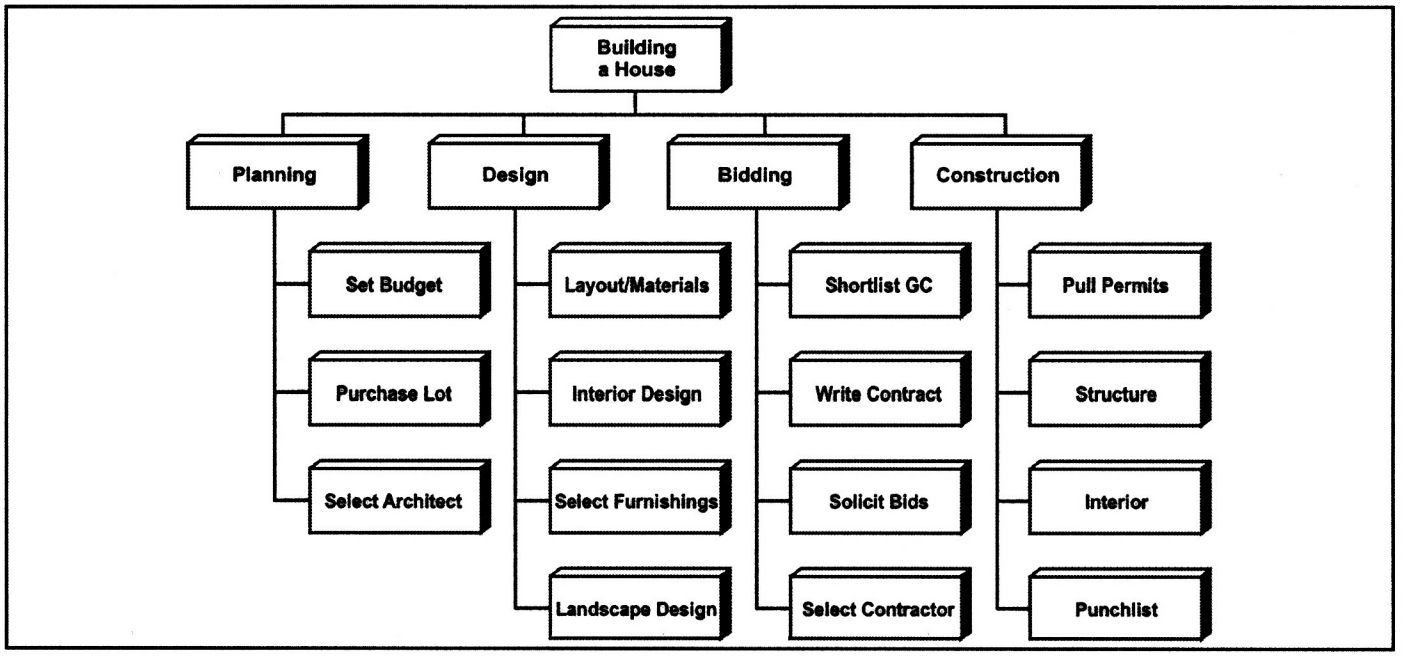

Figure 3—The Work Breakdown Structure

work. The generally accepted rules in project management circles are avoid scope creep at all costs, and do all the gold-plating upfront, but once you set the requirements, do not deviate from those requirements. For example, you can wine and dine your clients all you want, but when the project starts and the scope is defined, you must adhere to that scope.

THE TRIPLE CONSTRAINTS (HANDS AND LEGS)

Managing a successful project hinges on effectively managing resources, risks and scope within a quality level set by stakeholders, i.e. triple constraints. These three constraints co-exist in a state of equilibrium shown in the equilateral triangle, figure 2.

When the project is under pressure, equilibrium is lost and one or more sides of the triangle collapses. Typically, when a project goes awry, quality is the first to go, bad construction workmanship, lower quality material, money is next to go,behind budget, change orders, etc., and finally, time is the last to go, delays, claims. The project manager's primary role is to maintain this delicate balance and trade-off between all of these constraints. This may not be easy task, since project managers do not control the resources assigned to them such as budget and man-power. However, they control the disbursement of these resources, when, and how. Therefore, time is the most important commodity that a project manager posses. Time cannot be recovered, once time is gone, the project is in trouble. The emphasis on time is exhibited by the large increase in the use of scheduling software such as Primavera®, SureTrack®, MS Project®, and many forensic schedule analysis techniques linking time to delays, time impact analysis, window analysis, etc.

PROJECT MANAGEMENT PLAN (THE HEART)

Perhaps the project management plan (PMP) is the most important document in the management of projects. It is the heart of every project. The PMP is a road map that describes how

the project will be planned, controlled and executed. The PMP includes, in an executive summary fashion:

- Budget for the project,
- Work breakdown structure (WBS),
- Cost breakdown structure (CBW),
- Risk management plan (RMP), and
- Plan for project monitoring/controlling during the execution phase and lesson learned phase.

More importantly, this document represents an internal contract between the project manager and his/her team and the project sponsor. The project sponsor provides a signed project charter that authorizes the project along with financing, the project team in return, provides a plan (PMP) outlining how they will execute and monitor the project. The plan, thus, becomes an important communication tool that provides essential information to all stakeholders, and translates commitments to the project of many departments and stakeholders across the organization.

THE WORK BREAKDOWN STRUCTURE (THE SPINE)

The work breakdown structure (WBS) is a uniform, consistent and logical methodology for di-viding the project into small manageable components for the purpose of planning, estimating control, and management. These manageable units are called work packages. PMBOK defines the WBS is a "deliverable-oriented, hierarchical decomposition of the total project work." Graphically, figure 3 depicts a sample work breakdown structure [1].

As a planning tool, the WBS represents the scope of the project. Everything included in the WBS is part of the scope. Anything that is not shown clearly in the WBS is out of project scope. Many project managers have come to grief for omitting the WBS, and for not preparing a detailed comprehensive enough WBS. In fact, The WBS is deemed so essential in project management so that many scheduling software including the new Primavera 5.0 would not allow the user to compile a schedule unless he/she develop a WBS. This reinforces the old saying: plan first, then schedule, and save yourself the grief later. It is projected that the WBS will be dominant in any project management platform and software. The WBS forms the basis for all planning and scheduling and will improve the accuracy of the cost, duration and resource estimates. WBS also defines a baseline for performance measurement and control. The WBS is an integral document in the project management plan, that it why it is the spine of very project.

EARNED VALUE ANALYSIS (EYE, EARS, NOSE)

Earned value analysis (EVA) is a cost control technique that brings together planning and cost management. EVA started in the 1960's as the Federal government mandated its use on defense projects. Although, EVA is gaining wider acceptance in the construction industry, its use by in A/E community is non-existent. EVA is like looking at a RUBIC cube, where we are constantly examining all sides and colors, and shifting blocks to accomplish the end results. There-fore, EVA is sometimes referred to as the three-dimensional tool. It compares the amount of work planned with the amount achieved, and compare this with the cost of what is achieved. Performances are assed mathematically and expressed in key indicators. EVA computes projects indices and variances such as costs variances (CV), schedule variances (SV), cost performances index (CPI), schedule performance index (SPI), as well as, estimates to complete (ETC), and estimates at completions (EAC). All of these indicators represent vital signs of the health of your project at any time, and by continuously plotting and reviewing indices and trends, we can identify problem earlier. EVA is not a magic tool that will solve all your problems. It is rather a tool that will flag and tell you where the problems are, quantifying them, and suggesting corrective actions.

RISKS, CONTINGENCIES, MANAGEMENT RESERVES, AND ALLOWANCES (THE KIDNEY)

Risks are prevalent in the planning and execution of all projects. The increase in the sizes and complexities of projects, combined with stricter regulations, longer permitting periods, and the use of alternative project delivery methods, have all drastically increased risks and exposures in the planning and execution of projects. The A/E community is trying to mitigate risks by using

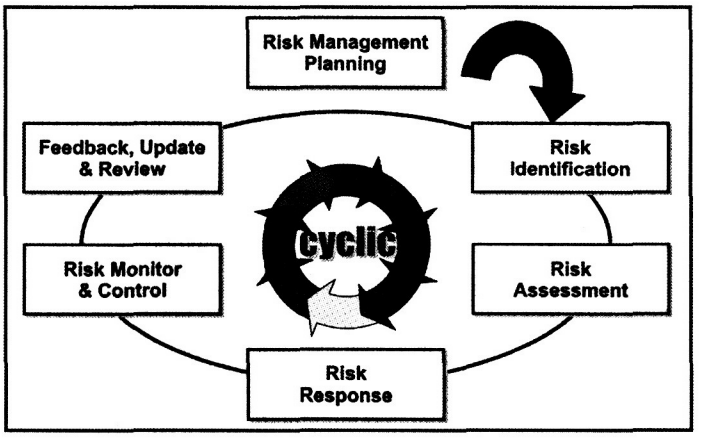

Figure 4—Risk Management Cycle

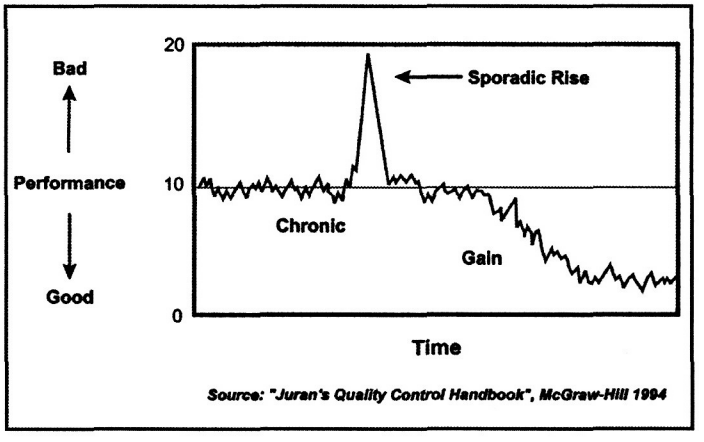

Figure 4—Quality Improvement Theory

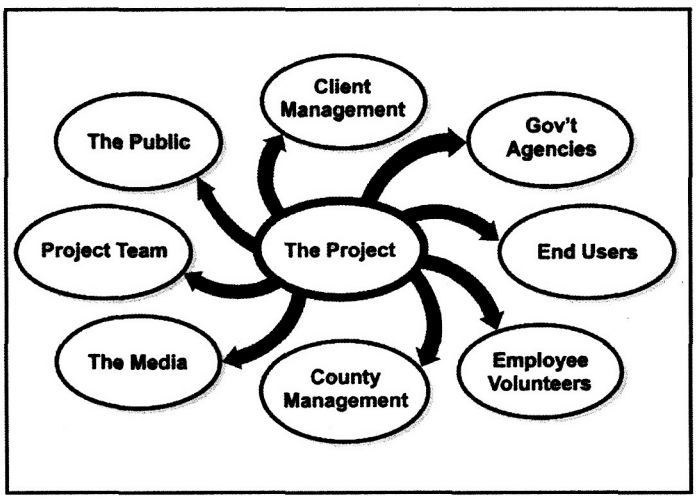

Figure 6—Project Environment and Stakeholders

remedies such as contingencies, allowances, and insurances. While these remedies may be effective in addressing specific and immediate risks, they do not constitute an effective risk management strategy. The major fault with this method is that the approach to risk is a reactive rather that a proactive one.

Risk Management must be a deliberate, systematic process aimed at identifying project risks and developing strategies to either reduce them or take steps to avoid them altogether [3]. It is modeled after the plan-do-check-act cycle established in TQM and encompasses six elements: risk planning, risk identification, risk assessment, risk response, and risk monitor and control, and feedback update and review. See figure 4. An effective risk strategy must be based on continuous assessment and correction cycles to address risk through project cycles from initiation through planning and closeout. Such strategy must include developing risk breakdown structure (RBS), creating risk registers and performing statistical analyses to quantify risk, its expected monetary value (EMV), and its effect on the project at any time.

Contingencies, management reserves and allowances are commonly used when discussing risks. Moreover, they are used interchangeably, incorrectly, and most often the assigned amount is arbitrary. For example, a 20 percent contingency is arbitrarily added to an estimate or a budget. Why 20 percent and not 17 percent? How is this number compiled? This reinforces the misunderstanding of risk.

1. Contingencies are amount added to an estimate to account for the known-unknown, i.e. the event is known, but we don't know if it will happen. Examples include multiple hurricanes during 2004 and 2005 in Florida and the Gulf Coast.
2. Management reserves accounts for the unknown-unknown, i.e. we don't even know the event(s) that could occur. For example, the Federal Emergency Management Agency (FEMA)'s budget is a form of management reserve.
3. Allowances are expandable amounts of money for foreseeable/identifiable items for which the scope may not have been fully determined. For example, allowance for an air conditioning system for a facility.

The basic distinction is that contingency is controlled by the project manager, management reserves are not project specific, and are controlled by senior management and the client(s), and allowances are specific to a project.

QUALITY (THE NERVES)

In the A/E business, quality has become an important factor. Surveys done in the late 1990's by Fails Management Institute (FMI) indicate that owners are looking for quality and value in the goods and services they acquire. How is quality ensured in the product and services that you provide? Many quality theories by Deming, Juran and Crosby suggest that quality should be built-in, not inspected-in. To accomplish that, A/E firms must have an effective quality assurance (Q/A) program that defines the organization's overall quality objectives. This quality assurance program should be augmented by a quality control (QC) program to ensure that objectives are met. Simply stated, performing a review of the 30, 60, 90 and 100 percent competed drawing and specification is not sufficient to ensure highest quality product.

Perhaps the most reliable theory in quality assurance in the A/E community is Juran's theory on quality improvement and the relationship between chronic and sporadic problems. See figure 5.

Due to high work loads, many A/E firms spend too much time and resources attacking the sporadic rise in non-performance, inefficiency, bad quality, instead of eliminating the chronic problems. This action is called firefighting, troubleshooting, and/or put the flame out [5]. Instead, firms should concentrate their efforts and resources on eliminating chronic problems altogether rather than restoring the status quo. Juran stated, "Most often chronic problems are ignored, and become the norm. They become acceptable to live with, and organizations account for this fact by adding waste to their projects across the organization." Often, the cost of waste is passed on to clients in higher service fees. This approach to quality improvement does not create value internally, within the organization, or externally for its clients.

PROJECT ENVIRONMENT AND STAKEHOLDERS (THE SKIN)

Stakeholders are entities that can affect your project negatively or positively. Examples of influential stakeholders include, permitting agencies, adjacent homeowners associations, the public, users, and the media. Some stakeholders may have their own agenda and expectations of the project. Others, like permitting agencies are trying to implement the law and regulation. Therefore, it is paramount that the project manager clearly identifies these stakeholders early, and effectively manages their expectations. Media could also have a tremendous effect on a project that is why media inquiries should b handled by the right person in the organization. See figure 6. Recently, local and state permitting agencies in Florida such as, Department of Environmental Protection (DEP), the South Florida Water Management (SFWMD), and local building departments have become important stakeholders in any project. The permitting process, and the

time for obtaining permits and certificates of occupancy (CO) can be laborious. Another important aspect of the project environment is the organization's culture and how it perceives project management. Using an automotive analogy, one might ask:

- Is project management seen as the fifth cylinder in a four-cylinder car engine?
- Is project management seen as the lubricant that makes the engine run more efficiently?
- Is project management just a pretty color logo on the windshield?

An organization's answer to the above questions, would reveal its approach and attitude to project management, and would largely determine the success and/or failure of any project management endeavors.

PROJECT CLOSURE AND LESSONS LEARNED (THE BACK)

Project closure is a strategic part of the project delivery process and could determine the success of the project and meeting stakeholder expectations. As a result, project closure should be an ongoing process that must be planned for and monitored throughout the project life cycle. Proper project closure will benefit the client, the organization, and the project team. For the client, proper closure creates value by ensuring a thorough project records and easy to retrieve information. Closure will benefit the organization by allowing the compilation and recording of lessons learned, and crucial financial records. Benefits for the project team include creating a sense of accomplishing for delivering a successful project. No project is complete unless it has satisfied the three requirements:

- Performing administrative closure,
- Compiling lessons learned, and
- Ensuring that the project meets the client requirements, and it is fit for use.

Many managers in the A/E community believe that by performing administrative closure, processing last progress payment, punch lists, and correspondences, makes the project complete and little or no attention is paid to the last two items. In fact, compiling and documentlessons learned, and ensuring owner stratification are far more important especially in an era when owners are looking for more value in the goods and services they acquire [7]. Value creation thus becomes paramount if the A/E organization is seeking repeat business with the client.

Lessons learned are also critical to the A/E organization longevity because it is a documented process that records what has gone wrong and what has worked on a project. Project closure provides a unique opportunity to capture, compile, and distribute the experience, skills, and knowledge that have been developed in the project. This intellectual capital, i.e. lessons learned, become an important asset that must be leveraged for business development, and an essential part of the organization's technical and managerial knowledge base for future use.

Many project managers are reluctant to document mistakes because they perceive that would adversely affect their performance evaluations, financial incentives, and job security. Many managers in public works organizations are even warier about documenting anything, let alone mistakes, because public agencies are transparent and information is routinely made public under state statutes, for example, Florida Sunshine Law. So there is a tendency not to have lessons learned on public works projects. How then would an organization learn from its mistakes on past projects? How is knowledge, what has worked what did not work, transferred from the project manager to superiors and new hires? Some in the A/E community believe that information can be compiled and disseminated the old fashion way via a "tribal wisdom" system. This process suggests that directors and seniors managers in the organization know and remember what has worked in the past, and they would avoid the same mistakes in the future, i.e. that is the way we have always done it. Obviously tribal wisdom has its limitations and does not replace lessons learned for the following reasons:

- It is an undocumented process whereby information lies in the memories of tribal members.
- Human memory fails with age.
- There is no mechanism for transferring this information to young managers.

Tribal chiefs, directors, CEO, CFO, and tribal council members, or senior managers, often move on to new jobs. Consequently, they will take with them all the wisdom that they have accumulated.

PROJECT MANAGEMENT TRAINING (THE WAY YOU LOOK—POSTURE)

To train or not to train? That is the question facing many A/E firms. There are many theories and positions regarding this issue. Opponents believe that training is costly and does not improve the bottom line of their firms. This philosophy is shared among many small to medium size A/E firms who believe that because of their size and fierce competition, they will never be able to have a decent return on the investment (ROI). Proponents believe that the training would improve performance and would lead an organization to profitability.

As in many training, sometimes immediate tangible results are not realized, and that often leads decision-makers to abandon the training. This is the wrong approach. Instituting a new project management system, and embarking on a training program, represents a major shift in the organization. It is a drastic approach in rooting out chronic problems, by adopting the surgical approach rather than the band-aid solution. The short term ROI may not measurable. However, research has shown positive return of the investment over the long term [2]. The early years can be considered as laying down the foundation and nourishing a project management culture. This culture provides uniformity in the planning and execution of projects. As a result, uniformity in itself introduces major savings since we don't have to reinvent the wheel every time a project is executed. It also contributes to the prof-

itability of a firm by incorporating lessons learned and avoiding costly mistakes.

The hardest decision regarding training probably lies in the municipal and public works sectors. Utilities directors are under constant pressure to cut costs, and reduce operational expenses. Most importantly, they are trusted with public funds, and as a result, they must seek the best value for the public monies. Embarking on any training is risky since the returns on the investment are not immediate, and long term value may not be apparent. This is exacerbated by constant turnovers of utility directors, commissioners and board members within public entities. All of the above barriers should not prevent public entities from adopting project management systems and training in the public interest. Locally, the Florida Department of Transportation (FDOT) and the South Florida Water Management District (SFWMD) has successfully instituted effective project management systems along with training programs.

Instituting a new project management program would not be easy nor cheap. The A/E community must reexamine its project management procedures and embark on a transformation that would institute uniform, globally accepted project management systems that examine the entire project life cycles. This would ensure profitability in a global economy. It would also ensure the compilation, retention, and dissemination of lessons learned in the organization and its knowledge base. In searching for an effective project management system, A/E must seek systems, software, and methodologies that meet the highest standards in a global marketplace. The selected systems should provide a level of integration with ongoing functions and accounting systems. Most importantly, they should augment prevailing tribal wisdom and should fit within the organization's culture, mission, and vision.

The Sarbanes-Oxley Act represents the perfect platform to launch a project management endeavor because legal requirements of the act would improve profitability, and it makes financial sense. CEO's and CFO's of engineering and construction firms must embrace the Sarbanes-Oxley Act and must address a host of business issues that affect financial performances of their firms. These includes: the rapid rise in insurance costs, high cost of professional liability insurances (PLI) premiums, litigation cost, mergers and acquisitions, outsourcing and competing in a global marketplace. All the above reinforce the business case for establishing effective project management tools and techniques that would help with compliance with the act, as well as, increased profitability.

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