A Case Study: Implementing Integrated Project Controls Software

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ABSTRACT: Over the past couple of years, since first releasing a fully integrated project controls software package, the author has discovered, both through his own experiences and through research, that providing a complex software to fulfill project control needs within any organization is not as straightforward as introducing a single function software. In this article, the author shares with you some of the discoveries he has made and how you might plan to avoid these problems when you implement multifunctional software.

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Over the past couple of years, since first releasing a fully integrated project controls software package, I have discovered, both through my own experiences and through research, that providing complex software to fulfill project control needs within any organization is not as straightforward as introducing a single function software. In this article, I will share with you some of the discoveries I have made and how you might plan to avoid these problems when you implement multifunctional software.

The software package to be introduced provides for integrated project controls and carries projects from the initial budget and schedule until final completion. It links engineering, procurement, construction, and accounting. Delivery of this software has led to involvement in the training and support of persons from a wide range of responsibility: project and construction managers, engineers, estimators, planners, cost controllers, procurement professionals, contract personnel, inspectors, expeditors, clerks in material receiving and warehousing, accounting staff, and notably all the secretaries entrusted to critical data input duties.

I have discovered that certain criteria must be present for any company to adopt a new methodology. In particular, for a company to accept and effectively use a complex "multidisciplinary" software, there are key areas where its adoption and use will dramatically impact any company.

The key areas can be divided up as organizations and structures, personnel and environments, and tasks and technologies.

The following are some elements I believe must be incorporated into a successful software delivery package, along with some ideas you can examine to discern the readiness level of your firm for a complex software application, and to learn some ways to facilitate its implementation.

ORGANIZATION AND STRUCTURE

Requires the Need for Change

For the effective introduction of any new efficiency tool, the need to change must be perceived as essential and valuable by the goal-setters within an organization. If the need is not seen as valuable to the future of the organization, then it is inappropriate to introduce the tool. Why? Because the introduction of an integrated project management tool will likely precipitate realignment of an organization from a vertical system to a more horizontal one. This movement toward more horizontal management is viewed as the direction of the future where efficiency depends on bringing the decision making process to the lower echelons of the organization. Thus, an organization must be prepared for the changes that will arrive with the tool.

Frequently, the larger and older an organization is, the more firmly its traditional ways are entrenched, and therefore, the more difficult it is to implement any tool that will cause sweeping changes. Such firms have reliable and sound procedures in place—some even inherited from before the computer age. Most of these methods are based on functional divisions working independently with information being transferred manually on paper or even via electronic downloads. In one large international engineering company, we observed a six-week time lag between the commitment of an item by procurement and the logging of this item into the cost control system. With an integrated system this process would be seamless and immediate.

Full acceptance and integration of new software was best achieved within forward thinking electronically "at ease" younger firms. These companies recognize the need for change, and are not satisfied with spreadsheets and word-processing tools. In other words, they are future-minded and buy-in without having many entrenched methods to confront. To achieve their vision for a competitive edge they seek out data base vehicles for integration and for information retrieval and processing. Some, having fewer than 100 staff, are now managing projects of several hundred million dollars. Projects of this size were previously exclusively reserved for the industry giants.

Requires the Will to Change

Within established organizations, a movement to allow decision making to take place at other than the top level in each department, that is a team approach, and a movement to decision making being in the hands of the actual doers, may create some challenges. In fact, this type of change often seems threatening to many entrenched managers.

In some organizations, another factor interferes with the process of change—the departmental in-house developed soft-

ware. Often, in-house software has been developed at great cost, and it is both familiar and it is working. However, such in-house products may limit the company's need to move forward toward remaining or becoming even more competitive. So in these organizations, it is important to work with key personnel to help them see the bigger picture and to expand their view and to have the will to adopt a new method—one that moves the whole company along the continuum bringing it to a position where it is more competitive, via a system that integrates their work with that of other departments.

Requires Corporate Support

To adopt an enterprise-wide system for project control forces changes within any organization. These changes will include areas outside of the project controls domain. Therefore, the most essential aspect of successfully introducing such a tool is the involvement of senior management from the time the need is identified through all the stages of adoption until the software tool becomes a part of the company's culture. Companies that have this management leadership adopt and integrate the new tool easily. I have noticed that because resistance to change can come at any level within an organization, from individual employees to entire departments, only with the financial support and directive of senior management can any broad change take effect through more than one functional department. In companies where the senior management did not initially actively participate, only partial implementation was achieved early on. These firms realized benefits within the departments that did adopt the system, but did not enjoy the advantages that full and seamless integration provides.

Requires a Corporate Sponsor

I have found that having an influential corporate sponsor can facilitate communication between departments, help resolve trust issues, and ensure that the appropriate resources, such as training budgets, are secured.

Requires a Resource Person

Essential to the implementation stage, and required for continuity and support, is a resource person from within the company. The resource person, preferably an experienced cost engineer, should be knowledgeable about company policies and procedures and should also be given a thorough understanding of the software being introduced. Then, ideally, team members using the software would refer to this person as their first resource should any questions arise. The resource person should coordinate training and communicate needs and other issues to the software developer.

PEOPLE AND ENVIRONMENT

The introduction of cross-functional software directly affects the people and the culture of every organization. By enabling personnel to effectively communicate real time project status, there will be a weaving of departmental project information. Having all the current data available revolutionizes and dramatically enhances communication. And, as I mentioned before, an integrated software product requires that a company evaluate its culture. If it has been a vertical/traditional organization, the introduction may feel threatening to some and may be shunned by others. Efforts to recognize and overcome these resistance areas need to be made early on within the adopting company.

Requires "Buy-in"

The major stumbling block is to have 'buy-in" and the full cooperation of all parties. This is imperative, as each person working with such a system is integral to the end product—a successfully completed project. Their dependence on each other is a change from the vertical and traditional organization where each job was done separately and then the data, as stale as it might have become, would be transferred to another department for further processing. In an integrated system, all data is available to the right personnel as soon as it is entered into the system—in real time.

Educating on how to use the software is not as integral to its successful implementation as is the instilling of confidence in the software within each department and ensuring that each person involved in the use of the software is fully aware that his or her work is integral to the successful outcome of the project. That is, each person needs to identify with his or her value/role in the success of the project and therefore the success of the company. Creating this self-confidence with respect to the software and pride in the results that could be achieved by its use is a far greater challenge than teaching personnel how to use the software!

So that each step of the introduction and full adoption of the software is "visible" to the more traditional organizations, a gradual introduction of the software should be suggested. Its implementation process should begin at the startup of a new project and proceed in a logical fashion through each department as the project unfolds—step by step and department by department.

Requires Time for Training

One must allow enough time to properly train a project team. My experience is that, the time to train already computer literate, knowledgeable, project team members in how to have an introductory level use the software, usually requires four days. A shorter, crash course can be used to prepare experienced project managers who already have effective computer skills. The other personnel who will use (enter data, produce reports, etc.) need to understand the system not simply from a, "what to do when," and "what data to enter where," but also they need an understanding of why the data is integral to the process and to the management of projects. Support personnel need some introduction to project management so they can understand the value of their role in the running of the project. In my own experience, initially I provided a two-day course, but soon discovered that far more support was required from my personnel. And after this short training period, this lack of sufficient introductory training meant a loss of client productivity, as well as slower implementation, and errors that required intervention. I learned from my initial training efforts to make the training period longer, ensuring that the material presented was fully digested.

Requires Basic Computer Skills

Basic to the use of any software these days is a thorough understanding of the

Windows operating system. When the personnel using this software are unfamiliar with the latest developments and Windows based software, they require a much longer learning period and will tend to make far more input errors. From my experience, this is a stumbling block for some of the more established firms, as their more senior personnel probably did not grow up using laptops and surfing the "net!" However, these senior personnel delight in the speed, accuracy, and timeliness of the reports an integrated system places in their hands.

Requires Understanding of Project Management

Part of the training requirements do not relate directly to the use of the software. Rather some parts of the training needs to be designed to help clients understand the interrelated needs of the others concurrently using the software and to ensure that they will all work toward a common goal. Key to a successful implementation is having personnel respect and understand the needs within their organization, those of their own departments and those that fall outside of their narrow specializations. This not only extends the employee value to the firm but makes each person using the program part of the corporate web and helps them understand their value to the project outcome. Frequently, a flow chart map helps the users understand the relationships and responsibilities existing between the players. This understanding reinforces the value of their work and contributes to communication between the various departments.

Requires Project Teams

One of the clues to successful integration of enterprise software is the creation of cross-functional teams. These teams dramatically improve communication and affect the learning absorption rate. Team members have more liberty to expand their horizons and affect the decision making in various departments. And this builds a greater collaborative effect resulting in a dynamic organization with keenly interested, involved employees. In times of employee shortages, as is obvious in many areas of the US at present, keeping employees excited about their work is a major key in keeping them on staff. In fact, keeping them excited and involved rates higher than increased salaries as a factor in employee retention! An integrated project controls system promotes effective team building and may in fact reduce employee turnover because the communication barriers are effectively broken down and opportunities to expand each employee's horizons within an organization increase. The growth of team members from project to project increases their potential and efficiency, resulting in their looking enthusiastically forward to the next team project!

Requires Trust and Cooperation

Within any organization when departments become part of a continuum rather than separate entities, the organization needs to build trust. Once this trust has been established, the collaborative efforts of the personnel increase even further the efficient operation of the firm. This continuum and established trust is easily observable, in firms with more than one year of full implementation of this type of software. Clients report that they are able to easily manage more than twice the number of projects with the same personnel as before introducing a fully integrated project controls software package. And, they are accomplishing this with employees who are enthusiastic about their work, not overworked, but keenly interested because the information flow makes their jobs easier—and the company more profitable! Based on client reports like this, I believe that with careful planning and supportive training, the implementation of an integrated software package not only makes clients more profitable, it makes them more desirable to employees.

TASK AND TECHNOLOGY

Requires a Project Start-up Immediately After Training

Experience shows that the learning retention rate following training is greatly enhanced when a real project is initiated during the introductory training on the use of the software. In my experience, "real life" software training is not sufficient to master the program; the optimal training really happens afterwards on the job. I have even experienced the need to retrain an entire project team because, although they had been trained, they had not started a project during or directly following training. The implementation of an integrated software package into a client's domain should be considered completed only after the first project has progressed through all its stages to final completion.

Requires Training Follow-up and Ongoing Support

Because integrated software has an affect on all levels and through all departments of an organization, it is essential to ensure the ongoing provision of support and follow-up. Software developers have a responsibility to provide their clients with an ongoing means to evaluate their usage of the software and to ensure that the product is being used effectively. The developers should also help their clients identify any problem areas as a part of the early stages of support. This enables the client to experience a growing set of benefits from the software as early as possible. Via follow-up, the developer should ensure the optimal use of the software.

Requires an Allowance for Customization

Although operating within the framework of project controls best practices, each firm still handles tasks differently and has specific needs. An enterprise/integrated system must be versatile and flexible and should be able to be easily customized especially in the area of reporting. Integration should complement and reinforce sound and well-tested practices. In fact, software should grow in features and functionality that reflects input from the clients and partners who use it.

Requires Built-in Security

The maintenance of data integrity and privacy is essential to an integrated software package. The trust required to use such software throughout an organization must ensure that data can only be input and accessed by the authorized person(s). Security is vital and is probably one of the areas that most often has to be demonstrated to reassure potential clients that their data integrity is safe when they use this type of software package. Especially, as

web to usage expands, this area becomes even more critical to clients.

Requires Built in Safeguards

Complex software must have built in safeguards so that no one can bypass procedural steps. No essential steps should be able to be skipped, and warnings should appear whenever any procedure has been missed in the process.

Requires a Web-based Future

With the ever increasing use of the Internet, most likely all project management will be done via this portal so it is essential to ensure that your project management software packages can and will migrate into this environment. It must be assumed that the "connection with the web," from the simplest ideas of interconnecting company offices around the world to having offices function in a paperless manner and using the web for all the details of procurement, data base access, etc., is a definite part of the future. So, when seeking a program for your company, ensure that the developer is headed in this direction. And start considering all the ways you can facilitate the movement of your company into a future filled with change and challenge!

The major benefit of moving into integrated project controls software is the increased efficiency—the time saved, the problems averted, and the profits made. The efficiency comes not only from the use of a lateral decision process that cuts across the traditional vertical organization but also from the elimination of duplication of work effort allowing the right person to act at the right time.

In the implementation of a multifunctional software throughout an organization, not limiting it to specific departments, my experience has been that there are certain hurdles, that once known, can be approached and tackled to ensure that the key ingredients for success are in place.

I believe this can be accomplished by giving consideration to the following items.

- identify the need for change;
- foster the will to change;
- involve corporate support;
- appoint a sponsor;
- establish and appoint the resource person;
- have cost engineers on staff;
- educate for buy-in;
- identify the advantages of the change;
- support the advancement of computer skills at all levels;
- ensure the understanding of the process of project management;
- create project teams;
- build trust and confidence;
- allow time for training;
- start a project immediately after training;
- provide follow-up support;
- allow for customization;
- build security into the software;
- build safeguards into the software; and
- prepare for movement into the web.

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ABOUT THE AUTHOR

***Mike Milinusic, P.Eng.**, is the founder and president of OnTrack Engineering. Mike graduated with a degree in mechanical engineering from I.N.S.A. in Lyons, France. He then completed his MBA at McGill University, Montreal, where his thesis topic was on project controls. A member of AACE International since 1977, Mike's passion has always been project controls. As manager of project controls for two major international EPC companies, Mike has always been pushing the envelope and finding new and better ways to control projects. As founder and co-owner of an EPC company in the early 90s, he further confronted the major areas of inefficiency in project controls including the time wasted in getting information between departments, the lack of accurate information trails, and the duplication of information. In the search to resolve these inefficiencies and assure that project costs and schedules are effectively and most efficiently controlled, a software package evolved. Mike is actively involved in developing other innovative software and continues to provide services to consultants and operating companies. Coming from a highly competitive environment where he was a world-record holder in the 100 meter, Mike has maintained the desire to lead, to be ahead of the pack with his ideas in designing the most effective tools, and keeping in touch with the most advanced methodologies in the industry. He is currently overseeing the release of the web version of OnTrack's core project execution software CostTrack™, and is preparing two other applications for release in the near future. OnTrack Engineering Ltd. is located at 1804 Bay Shore Road SW Calgary, AB T2V 3M1, CANADA, Phone (403) 251-5678, Fax (403) 251-3639. Mike can be reached via his website www.ontrackengineering.com.*◆