

White Paper on Design and Construction Process in the Future

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The construction industry revolves primarily around information management and timely communications. My experience is primarily associated with executing engineering, business development and project controls functions on both small and large design and construction projects for a large construction industry player. The primary thrust of this paper will discuss these two areas within my background's context.

Information Management = "Right-sizing" the Project

We are still trapped in the world of compartmentalization and fragmentation at all levels on the executing project organization. Currently, most major project functional organizations all have their own information management systems. The following list of functional departments and job descriptions serves as an illustrative example.

- Project Engineering (subsystems for calculations, drawings, analytical models, work packages for bidding)
- Project Procurement (subsystems for commitment and small business usage tracking)
- Project Construction Management (subsystems for direct hire and subcontractor management and constructibility planning)
- Project Administration (subsystems for correspondence tracking and supplier document tracking)
- Project Controls (subsystems for estimating, scheduling, cost/trending)
- Contract Administration (subsystems for prime and subcontract administration)
- Project Accounting (subsystems for payables, receivables, expenses processing and billings)
- Project Management Information (integrates parts of project controls, accounting and prime contract administration systems)
- Business Development (prospects tracking subsystems for work on existing projects and potential new projects)

The future will involve less reliance on specific individual responsibility for updating each system. With the trend toward smaller projects, fewer individuals will be handling all of these roles. The industry just cannot afford to have all these necessary functions being managed by singly specially trained individuals. The managerial and technical data entry control will be across project functions. Assignments will be made on the basis of existing skillsets and/or relationship to primary responsibility. Overlapping and cross-functional responsibility will become the norm. Individuals are trained in the process of working the business systems that enable a successful project and become more appropriately titled as general design-construction project personnel rather than the specialist role that their job title might indicate.

The barriers to the implementation of this reality could be the content of an entire study itself. Now, how do you do you implement this reality without completely stressing each and every project team member? Where are the rules of thumb for staffing a project to handle all these areas? Educational, training, supervisory and ethical issues all enter into the equation of whether or not the project team is “right-sized” for the project. In my view, the academic and industrial research for the future should focus some significant resources in this area. Some specific examples for consideration that have already worked (some better than others) are indicated below.

Construction Management takes over all the subsystems subcontract administration, supplier document tracking and scheduling

Project Controls takes all the subsystems prime contract administration, management information, billing oversight and on-project business prospects tracking

Engineering takes over the subsystems for estimating, scheduling and constructibility planning for translating their 3-D model into a 4-D project cost/schedule tool.

Timely Communications => Combating the Information Overload

The other challenge facing the design and construction industry includes the effective transmittal of information embedded in all the above mentioned subsystems that are worked by project team members. In recent times, the Internet facilitates the transfer of information across wide distances and allowed the establishment of “virtual” projects with team members leveraging their skills on a project. A great many startup companies are now pushing the use of their Project Internet Sites, where data is transmitted and actual chat-session now facilitate, on a cost-effective basis, close communications and coordination. I believe communications capabilities such as these, including teleconferencing, is going to be the way of design and construction communications in the future.

However, a challenge still faces us. What structure do you apply to effectively transmit and store the information in organized bins or folders? How do you communicate updates to the project team and get them inclined to look at the report data, not just once, but everytime an update is published? With smaller projects becoming the norm, a manager’s time is stretched pretty thin. The old days of hard copy reports placed on a manager’s chair were pretty effective in getting the manager’s attention, but this method of communication is becoming less possible. Project teams are now located across great distances with certain key functions being performed at other project location. Mailing information is often very slow and courier services are very expensive. Ideas such red flag emails, project wide bulletins on the Internet site logon are terrific ideas to counter this information overload problem and focus attention on what information is current. I do believe that design and construction industry research should focus some resources in this area also, and give attention to developing the tools that can condense the results of many functional subsystem reports. Tools that can pull information such as engineering, scheduling, project control, contract administrative functional subsystems data into formats that enable rapid digestion and suggest corrective actions is a worthy research area.

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Professional Data

- Business Manager at Bechtel National, Inc
- 10 years experience in business management, project controls, engineering and business development
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Personal Data

Married, two children, currently working in Huntsville, Alabama

As a business manager on smaller Bechtel projects, I personally experience all the issues associated with integrating design and construction tasks into a successful business venture. My motivations lie in the fact that I desire more knowledge in the stated areas of figuring out how to right-sizing a project team and finding new and better ways of effectively communicating to project team members located in distant project locations.