Time management—a design-build builder's perspective

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A Design-Build Builder’s Perspective

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Abstract: Time management in design-build construction encompasses efficient project management controls, scheduling and execution of the contract as agreed upon by the parties. Time Management is one of the prime areas of concern to the builder and his team. It plays an important role in shaping the progress of projects and thus is decisive in determining its course. The professionals of the construction industry today are aware of the challenges ahead of them. This article explains the importance of time management in construction.

Key Words: Communication, Internet portals, teamwork, schedule

The builder and his contractual relationships in design-build

To understand the relevance of time management in design-build, we must realize the significance of teamwork involved in the project delivery system. Under the traditional system depicted in Figure 1, the owner had a contractual relationship with the design professional and another contractual relationship with the contractor or builder. One of the drawbacks of this system is the absence of a contractual and binding relationship between the two key parties, the design professional and the builder. The responsibilities of the professionals on certain issues like quality are not clearly defined. In such an environment of uncertainty, it is the owner who eventually ends up paying the price.

Figure 1—The Traditional System of Project Delivery (Design-Bid-Build)

The design-build practice as illustrated in Figure 2, tried eliminating these shortcomings by adopting a system of a single contract between the owner and the professionals of a design-build. The system involves existing design-build companies proposing on a project, and if successful, in most cases signing up for the project for a pre-established contract price otherwise known as “guaranteed maximum price”. As evident from figure 3, more than half of the design-build projects have a builder-led team, where the builder accounts for a major portion of the stakes [2]. On some projects, there are equal stakes partnerships.

Figure 2—Design Build System
or even joint ventures between the builder and the design professional.

We sometimes also come across the designer-led design-build project. Depending on the priorities of the owner, a design-build team is formed and organized to perform the required task. If there is a constructability drive on a certain project, the builder will participate as the lead in the project. If the owner demands a large degree of design input into the project at an initial stage, the builder plays second fiddle to the design professional.

The phrase "time management" is self-explanatory and translates into administration of time. On a design-build project, the builder and his team strive hard at achieving a successful schedule for the project in order to accomplish the tasks at hand to the required level of quality. In design-build, synchronization among all the players in the contract is an essential factor for its success. Scheduling of the jobs and categorizing the various tasks to be accomplished during the course of the project, is an interesting and challenging facet of the project.

The basic concept of time management is effective use of time in realization of the task at hand. Experts believe that the following are a few considerations for efficient time management.

- Prioritizing the tasks at hand in the order of importance and based on the resources available.
- Advance planning and use of the time available in the most efficient way.
- Control distractions and deviations that break the smooth flow of the work according to the schedule.
- Increase the efficiency and reduce the stress on the schedule and the personalities involved in the project.

The builder ideally has to prioritize his tasks based on the resources and manpower on his team. Forethought and advance planning is the key for the successful management of these resources available. The resource and time management can be efficiently managed on a well-programmed construction schedule. The construction schedule is a connectivity chart or diagram indicating the succession of activities on a project starting from the initial mobilization to the final de-mobilization or close out. During the planning stage of a project schedule one important consideration that deserves a lot of attention is the stress and constraints on the schedule and the personalities involved in the process. Understanding the capabilities of the team as a unit helps in projecting targets that could be achieved systematically.

ACTIVITY LOGS

While on a project, the team should maintain activity logs to list down the activities performed by the team at different stages of the design-build project. A careful study of the activity log after the completion of the project would reveal details on how time was spent during the course of the project. The builder might realize that certain portions of work, though simple in nature took up more effort in terms of time as compared to a tougher task, which probably would have been achieved with relative amount of ease. This may be external influences that might affect some activities. The specialties and the competence of the team as a whole may characterize the success of the schedule. The realization of these crucial facts comes from experience on previous projects.

SWOT ANALYSIS

SWOT (strength, weakness, opportunity and threat) analysis of the project is a compulsion at the initial stage of the design-build. It would sometimes be advisable to carry out a SWOT analysis at regular intervals to have better control over the project. However, this is usually done when the preliminary schedule is submitted along with the rest of the proposal while competing for a project. Based on the SWOT analysis and the results obtained, progressive planning needs to be implemented with tasks in mind. The strengths of the design-build team are weighed against the weaknesses to make a bid/no bid decision on the job. The opportunities in the areas where the team can actually improve the chances of securing the project are concentrated on. In doing so, both the external and internal threats, because of the weaknesses of the team, would have to be taken into consideration before preparing a schedule and bidding on a design-build project.
STRATEGIC PLANNING AND COMMUNICATION

Strategic planning of a design-build project aids better control over the project time. There are two types of planning:

1. Project planning (macro level).
2. Personal Planning (micro level).

Construction is a team game where all the entities involved have to contribute to the best of their abilities towards a common motive of success of the project. The project planning begins with defining the innumerable tasks that need to be accomplished over time. There are five main resources that a builder should consider. They are material, manpower, equipment, money, and time. Thoughtful management and planning of these resources is necessary to assure quality control over the project.

Personal planning along with overall project planning with the participation of all the entities involved in the process is an essential factor. The planning at the macro level helps to recognize the potential of the design-build team and also helps organize the various tasks at a micro level. Personal planning has an equally important role to play, since it is the potential of all the personnel on the team, added up, that makes the project.

Communication is another important aspect of a successful project. The efforts in planning cannot be actually appreciated on the project unless there is communication of the strategies. The planning of the project needs to be conveyed to all its lead representatives in order to be implemented on the project. The prime representatives then communicate the applicable information and strategies to the professionals under them. This is where the communication skills of the builder play a crucial role. The meetings and discussion sessions hosted by the builder should have a healthy environment conducive for the exchange of ideas and opinions. These meetings should be conducted regularly to discuss the progress of work. The meetings are an ideal medium of exchange of thoughts and comments on each other’s works in the best interest of the project.

CONSTRUCTION SCHEDULING

Construction scheduling should be of prime concern, since it is one of the most important elements on any construction project. A schedule can actually make or break the project. For the builder it may mean the difference between realizing a profit or losing an extreme amount of money on a project.

The construction scheduling that we know of today, is a development of the network scheduling used in the construction process since the 1950s. With the development of CPM (critical path method) and PERT (program evaluation and review technique) the industry readily accepted these methods of programming a construction project. CPM, probably the popular of the two, finds its application in a wider range of projects than the PERT system. The network schedules transformed out of non-network bar charts and Gantt charts.

Schedule programming is an important aspect of the design-build process. The flowchart in Figure 4 shows the sequence of the events that need to be included in the scheduling program. The initial setting up of activity logs and the determination of the sequence of all the activities in the log comes from prior experience and current information available in the industry on that particular activity. For e.g.: To cover up a particular area with a roof, the design could be modified to have rafters and purlins, and constructed using a labor force. This particular activity might require certain period of time, depending on the availability of material, labor, equipment, and the influence on other activities on the project schedule. The same roof covering could be done using a technology-oriented method of construction, wherein a prefabricated truss system is used to cover the room. The truss could be fabricated in a shop several days ahead of schedule and assembled on site at the time it is to be mounted using a crane. There would be a cost difference between the two ways described. The priorities of the builder are to be set out clearly before he programs the schedule for the project.

Based on these decisions, the durations for each of these activities is determined. A preliminary resource leveling is also done determining the resources required for the various activities. The schedule is then drawn connecting the activities in a sequence of hierarchy. The design and the estimates of the project provide useful inputs in the network programming. The information from the design professional and the estimator is a crucial part at this stage. The builder should ensure proper coordination between the entities and himself in order to formulate a schedule that will be suitable for all the parties and also the project as a whole. Simultaneously calculations of the starting times and the finishing times of the different activities are done to arrive at the projected time of completion.

Once the schedule is completed, a session with the prime entities helps to ensure that the schedule is realistic. The review of the schedule helps eliminate errors or omissions in the schedule. Once a satisfactory schedule is agreed upon it is called the “master schedule” and the project execution sets in motion as per the master schedule. In design-build however, the pre-construction activities like clearing up of the site or trenching might occur concurrently with the network programming. This will be dependent on the resources available to the builder.

The master schedule shall be reviewed and updated throughout the course of the project. Updating a network schedule is an inevitable characteristic of the construction process. Ideally, there cannot be a project without changes in the schedule. It is often seen that the builder’s staff is either pessimistic or optimistic on certain activities while scheduling for a project. The CPM update is a vital part of project control and helps manage the time and keep the cost of construction under control. An update in the schedule might be a result of change in the duration of an activity or a series of activities, or an addition or deletion of an activity. Sometimes, change in the logical sequencing of the activities may be a cause for the rescheduling.

The process of rescheduling should be thoughtfully carried out. It should be done at times when it is the most cost effective. It is a common custom to update schedules during progress payments or at points where major milestones are achieved. The updating or rescheduling of activities should be carried out in the same sequence that was used initially at arriving at the master schedule. The new schedule shall now become the master schedule and work shall be carried out as per the latest updated schedule.
COMPUTER SOFTWARE IN TIME MANAGEMENT

In the late 1980s and the earlier part of the 1990s the computer industry provided computer software solutions for construction management. Pioneers like Primavera and Timberline, besides many others, are dedicated to this cause—creating their versions of software that could help design-build in the organization and planning of a project and facilitate time management.

Expediton, a product of Primavera is a popular management software program used by the industry. The program has a user friendly interface, for setting up projects and creating logs for the different documents. Sure Trak, another product of Primavera is a program used to plot construction schedules. The various activities with their durations and their start and finish dates are input into the program. The program creates a construction schedule.
and also marks out the critical path for the project.

The schedule can then be inserted into Expedition and security passwords allotted to the different professionals on the job. These professionals further have access to edit the documents that are directly authorized to them by the builder who acts as the master administrator of the software program. Since the contact addresses are all input in the program, initially while setting up the project, if any changes are made to any of the documents that have some consequential effect on the project, the program sends electronic mails to all the concerned persons regarding the changes that were made in the document.

The main objective of Expedition is to manage RFIs, transmittals, submittals, change orders, and other logs that are an important feature of the construction process. Design-build requires teamwork between the two professionals namely the designer and the builder. If the firm is an existing design-build company, the policies and procedures of the company determine whether some of these documents are written or not. However, if a team is specially formed for the project, the contract between the parties may compulsorily direct the exchange of all the procedural documents like the submittal, change order, etc., from time to time.

The software maintains a permanent record of all the logs that are transmitted, thus confirming the duties and responsibilities of the different persons on the job as per the contract documents. Organization of all these documents and their timely transmission is monitored by the software and is an effective way to manage the construction time. The builder could go back and refer to these logs at any time and review the decisions made at an earlier stage.

This system though convenient, requires the software to be resident on the computer or the user. It could be also used in offices where there is a LAN (local area network). A LAN is a simple network of computers that are connected in series. The software, if resident on the LAN could be accessed on all the computers on the network. Recent development in technology is providing this service through Internet and thus is becoming more and more popular among management professionals today.

ONLINE PROJECT DEVELOPMENT FACILITATING TIME MANAGEMENT

The concept of the design-build type of project delivery system demands effective management of time and the communication of project data that must be available to all the prime entities at any given point in time. The Internet in the last half-decade offered to the construction industry a perfect network for structuring project management online. The construction industry, though in a very elementary state of transition from its traditional methods of management, is slowly but surely complying with the change.

On current large-scale design-build projects with a large magnitude, it is a widespread verity that the design-build team includes a construction firm and an architectural firm from different geographical regions. In such a case, it is practically impossible for the professionals from the different companies to be located in one particular area at all times while on a project. These Internet services offered by some of the leading portal companies acknowledge the responsibility that rests on the shoulders of these professionals and extend their services to the construction industry.

SOME IMPORTANT FEATURES OF A PORTAL THAT OFFERS CONSTRUCTION MANAGEMENT SERVICES

- A comprehensive project management program with Internet resident software.
- A "web cam" service providing a general supervision of the job site at all times.
- A detailed construction material and product database.
- Industry information, news and updates.

THE FUTURE TRENDS

Autodesk, Timberline, and Web Ex, besides several other renowned companies, are partnering in setting up these portals of construction management. Buzzsaw.com, a service provider was recently named among Computerworld's top 100 emerging companies to watch.
has building experts who are well established in their profession and are reluctant toward the shift to online project management. The online tutorials are helpful in educating these builders and other personnel on the value of the Internet in communication and project management.

The web camera is a recent innovation in the construction industry. The camera is set up at different locations on the job site. The overall supervision of the job site could be done by online supervision of the video that is accessible through the Internet. Views from the different predetermined positions can be acquired and discussed with the in-house team.

This helps the professional with time management in terms of site visits, supervision, and conducting in-house meetings.

Real-time pictures and stills can be obtained from the job site and used in discussions and group meetings and progress meetings conducted online. This promotes regular and quality supervision of the project from different geographic locations. The builder could go back in time and refer to the pictures taken at different times and keep a track on the progressive development of the project. This tool comes in handy when strategic planning and scheduling have to be done, or changes have to be incorporated. Buzzsaw provides "messaging" (a service) to receive all e-mails, faxes, and voice mail at one single point. This solves most of the problems in communications by providing a single point of reception and delivery.

An extensive material and product database provides the user with a wealth of information regarding the latest products in the market. The database is updated regularly, to add on to the already existing references and product specifications. Changes in materials and products at different stages of a project are a feature of the design-build. To confirm to the budget for the project, the builder juggles between various materials and products options that are available to him. The service offered by Buzzsaw, helps the builder in value engineering through the resourceful information available to him.

In design-build, often a team is formed to meet the requirements of an owner. In the initial stages of team formation, different personnel or companies with different specialties merge together on one particular project. The portals offer a database of links to all the leading professionals in the industry. So a builder could easily judge the caliber of the design professional or versus by browsing through their portfolio of works, before forming his team.

The marking of documents online, often referred to, as "redlining" is a feature of all the leading portals. Certain authorized persons can mark on drawings or parts of documents while discussing a certain part of a project. The authorized personnel, while on an online discussion could view the redlined document. The users are assigned different passwords are authorized different extents of access to the different documents. For example the design professional might have access to modify the architectural drawings, but cannot modify the interior finishes. Once he or she makes changes, the changes have to be communicated with all the prime entities, so that the respective professionals can make changes in their documents accordingly. This avoids any confusion or errors or conflicts between different sections, since all changes are made only after mutual consultation with each other. On a large project organizing these frequent meetings may result in wasting time, and so the availability of online services helps synchronize the approach of management.

The development of e-commerce and the tendency of the industry towards online construction management programs is a definite sign of progress. The construction industry is revolutionizing its time management techniques and executing projects using online services offered by various giant portals. Though the questions pertaining to the security and the reliability of these tools are yet to be answered, this is a gradual but sure step towards progress. In the next few years, we are bound to see a shift from the conventional management techniques to online project management.

**ADVANTAGES OF TIME MANAGEMENT**

Time management is a necessity on all design-build projects. The application of these tools helps enhance the quality of the project and hence its performance. The owner always is on the lookout for firms that offer him or her greater service, faster production, effective management of time and resource, and satisfaction. The time management tools and programming assures the owner with a certain amount of quality of the finished products.

We often see on RFP's for design-build projects, an evaluation plan that stresses on quality assurance and quality control (QA/QC) programs on the project. Scheduling is another aspect of the design-build that carries an equal amount of attention. Once on the project, the time management tools clearly define the responsibilities of the personalities involved in the process and introduce them to their goals with regards to the project. It couldn't be emphasized more that excellent project management; planning and communication are the only answers to time management and achievement of the goals according to the schedule.

The cost of time management and planning is overshadowed by the benefits the design-build team derives out of it. The new breed of engineers and construction professionals understand the essence of programming in the construction process and influence their use in the environment they work in. The older and experienced, though reluctant to use the modern techniques provided by the computer and the Internet, are making their best effort to act in accordance with with the changes. The industry is shifting its means and methods of management by relying on the recent technologies and developments.

The effective organization benefits the builder and the design professional, since the project and overhead costs are directly or indirectly controlled. Since both these parties shall have a portion of their profits from the design-build, the techniques are all the more commendable. The owner, in turn benefits out of the project, since the project control and quality issues are thoroughly planned out in the initial stages of the project. This not only gives him the initial confidence in the team, but also assures him a quality product as guaranteed by the design-build and in the allotted time frame.

Design-build projects usually have a guaranteed maximum price (GMP) agreed upon in the contract between the owner and the design-build. Time management helps the design-build in realizing the project at that GMP that is agreed upon by the parties. However, the strategies, as explained earlier have to be updated regularly to record current decisions and the latest developments on both the office and job fronts. Unfortunately techniques alone cannot ensure the success of a design-build.
The execution of the project in coordination with planning is an essential factor in the appreciation of these techniques.

GUIDELINES AND RECOMMENDATIONS

The competence of the professionals is under a test while on a design-build project. These are a few guidelines and recommendation for time management on a design-build project. The checklist below addresses the macro issues on a project. It is understood that micro issues are not to be overlooked while the focus is on the broader issues.

- Prepare activity logs with activities relating to the proposal preparation for a design-build.
- If the design-build team is formed especially for a particular project, analyze the capacities of the team as a whole and the individual entities that make up the team. A SWOT analysis of the team is recommended at this stage.
- Schedule programming is done for major activities as per the flow charts in figures 1, 2, and 3.
- A bid/no bid decision is made by analyzing the teams potential against the opponents potential.
- Communication and discussions within the team members facilitating a healthy environment for exchange of ideas and discussion of strategies.
- Project planning and personal planning are done simultaneously to boost up the potential of the team.
- A projected construction schedule and estimate and all other bidding requirements should be prepared with coordination between all the members on the team at regular intervals. If it is practically impossible for the two entities to be in one geographic location, the power of the Internet could be exploited in having discussions online through the management portals.
- Assuming the team is on the project, prepare a detailed activity log considering all the activities involved on the project. Try handling simultaneous activities taking the potential of the team and the resources available into consideration.
- Develop the project using online portal services that are useful in organizing and communicating of data in a more effective way.
- Organize meetings at regular intervals to monitor progress and also reassign fresh tasks or update old ones for the next phase.
- Use value engineering through the Internet, since a lot of invaluable information on the various products and materials is available on the Internet.
- Webcams and real time discussions can prove very helpful in saving time at each phase of the project.
- Whenever changes are made, intimation is to be given to all the concerned parties on the job site or the office, whose part of work will be affected by the change.
- Update the schedule at regular intervals to ensure proper quality control on the project. Always update a project, with changes if any, at junctions where it is cost effective, or when major milestones are achieved.
- Cost versus time trade off is to be done at all stages to select options based on priority in the best interest of the team and the project.

T he significance of time management is a well-established fact in the industry today. It is opening avenues for the management experts and offering them an opportunity to apply their skills. The proficient use of time assists in addressing the quality assurance and quality control issues and provides the entities of design-build with a better charge of the project at hand. The use of online project management tools is in vogue and gaining popularity among the professionals in the industry. Proficient decisions in crucial situations and organization and communication of the principals in time shall have a profound impact on the management techniques. Management professionals will have a significant role to play in the next couple of decades as long as they promote their principles and the owners witness results through their application.

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