Project Management in the Construction Industry

MASTER OF SCIENCE IN MANAGEMENT
OF PROJECTS AND PROGRAMS

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This paper examines some of the project management challenges that are unique to the construction industry. In addition it revisits those that are likely to appear in any project, but does so from the special perspective of a project manager of a construction project. Throughout this examination, reference is made to specific course offerings in Brandeis University’s Master of Science in Management of Projects and Programs (MSMPP) Program that address those issues and can provide practical assistance in their satisfactory resolution.

ABOUT THE AUTHOR
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Current Construction Industry Trends

Economic Factors

It would be an understatement to say that the construction industry, as a whole, has taken a substantial beating during the current “Great Recession”. However, at least in the U.S., there are indications of a slow but steady growth in new construction starts. Indeed, some types of construction projects – regional infrastructure, government buildings and large-scale residential rehabs or conversions, for example – have not experienced the substantial decline seen in other areas such as housing starts or municipal improvement projects. It’s quite safe to say that construction projects are not about to disappear from the project management horizon, although they will probably be operating on razor-thin margins for the foreseeable future.

Technological Factors

However, there may be a danger of the construction industry not keeping pace with the advances in management efficiencies that have become common-place in the general business environment. The industry, in some ways such an optimistic risk-taker, can be rather conservative in the adoption of new techniques or methods; it has basically been building things the same way for several decades. Indeed, an argument can be made that the last (and best) project management innovation to come out of the industry was its role in the evolution of the Critical Path Method during the 1950s.

Without going into any detail about the often discussed, multiple and various business impacts of the globalization of work, it is clear that the construction industry is not immune to this revolutionary force, and that it will have to change its management philosophy and methodology to accommodate it. One example of relatively new technology that can adapt to and promote the globalization of construction project management is that of Building Information Modeling systems (BIM) that allow architects, managers, owners and engineers all over the world to simultaneously view and change plans/designs in “real time”. This has in turn facilitated the recent emergence of the construction management approach known as the Integrated Project Delivery method (IDP).

Construction project managers must be prepared to utilize these and other worthwhile innovations that enhance project value, while remaining aware of potential constraints or risks posed thereby.
In recognition of the sometimes unique attributes that are specific to the construction industry, the Project Management Institute has (since 2003) published the Construction Extension for the PMBOK Guide®. The purpose of the Extension is to improve project management of construction projects by emphasizing those methods and techniques that are particularly important to this subset of projects.

Section 1.2.4 of the Extension accurately summarizes the challenges peculiar to construction project management: “Buildings may be prototypical but, when constructed on different sites each project presents its own challenges to accurate cost, time projections and control...unique subcontracting arrangements, extensions to schedules and increases in capital costs...Construction projects involve many stakeholders with varying expectations such as public taxpayers, regulatory agencies, governments and environmental or community groups...”

Key Challenges for Project Managers

Construction projects are notorious for being over-budget, late and saddled with scope creep, as well as for poor communication protocols and inadequate controls around scope change management. It is vital that a construction project manager take a proactive approach from the moment of his or her appointment. Project management plans, even for relatively modest construction projects, should exhibit a level of detail greater than might be deemed appropriate for other types (non-construction) of projects of equivalent cost and duration.
Examination of Specific Construction Project Management Issues

The balance of this paper will present a brief overview of selected project management challenges typically arising within construction projects, coupled with reference to those MSMPP course offerings of particular relevance in resolving those challenges.

Problems Posed by “Design-Build” Processes

• The typical “Design-Build” or “Design-Bid-Build” process starts with an architect or general contractor designing a plan, followed by various engineers or sub-contractors producing multiple mechanicals, so that a comprehensive construction plan grows serially or sequentially. This process is a breeding ground for miscommunication and missed communication. In turn, poor communication leads seemingly inevitably to budget and schedule busting scope creep. An alternative and even more destructive outcome may be the creation of scope gap, with fearsome impacts on quality and risk as well as costs and schedule.

• The customary practice of contractor(s) pricing at each phase (Schematic Design Phase, or Design Development Phase, or Construction Documents Development Phase) frequently triggers cost-cutting activities on the part of the owner at each point. Budget and cost controls must be rigorously maintained and baselines monitored. In addition, the project manager must be aware of the possibility of “stealth” scope cuts in this environment and insure that, if any do occur, they are accurately reflected and incorporated into revised schedules, WBS, resource plans, risk management plans and all other appropriate components of the project management plan.

• An extremely common and accepted practice is to begin the Construction Administration Phase with still unresolved issues of scope. The risks inherent in this practice, with potential impacts on project scope, schedule, costs, quality and procurements, should be obvious and require no elaboration.

• The MSMPP courses of particular assistance in dealing with these types of challenges include *Foundations of Project Management, Advanced Scheduling and Control, Risk Management in Projects and Programs*, and *Procurement and Contract Management*. 
Scheduling on Ever-Shifting Grounds

Building and maintaining a construction project schedule is not an exercise for the faint-hearted. It takes place in an environment that can quite literally change in a matter of hours. Close monitoring of schedule progress and a rigorous enforcement of change management controls are both extremely important to maintenance of a viable project schedule. In addition to the typical issues related to resources and budget, a partial list of the constantly shifting constraints that must be juggled in order to maintain a construction project schedule include a host of enterprise environmental factors such as: weather, geography, geology, environmental and other regulatory constraints, and numerous stakeholders representing a wide diversity of interests in the project.

The MSMPP courses of particular assistance in dealing with these types of challenges include *Foundations of Project Management, Advanced Scheduling and Control, Professional Communications*, and *Negotiating and Conflict Resolution*.

Budgets and Management of Costs

Construction project budgets, always subject to cost-cutting initiatives, are being cut to the bone in the current economic climate. What razor-thin margins that do exist require assiduous attention to costs and resource requirements at a fairly granular level of detail. Baselines for cost accrual, cost disbursal and other resource expenditures, in addition to earned value, must be created and careful monitoring of actuals against baselines mandated. Sub-contractor costs are no longer generally accepted as a matter of course. All contractual expenses tend to be subject to enhanced scrutiny, both before as well as during the contract administration process.

The MSMPP courses of particular assistance in dealing with these types of challenges include *Foundations of Project Management, Advanced Scheduling and Control and Procurement and Contract Management*. 
Procurement and Contract Management

When the project manager is working in-house for the owner or developer of the construction project, a formal procurement management plan is a fundamental requirement. The use of standard AIA (American Institute of Architects) forms does not in any way diminish the need for a detailed, accurate and comprehensive contract statement of work. In turn, the statement of work must be closely monitored since it is not, unfortunately, a static document; it is subject to frequently fluctuating enterprise environmental factors, such as resource availability and prices, weather events or even political stability issues. Adequate lead time must be incorporated into the schedule (and zealously defended once there!) for preparation of the RFP and the subsequent bidder evaluation and selection processes.

When the project manager is working for a contractor, the process of responding to the RFP requires at a minimum the development of a schedule, resource and costing analysis, and a preliminary risk identification and management plan, all to be produced within an extremely tight time frame.

In addition, identification of sub-contractors typically occurs at this point and contract negotiations begun. This latter activity may be managed by a contract office, but it must nevertheless be closely followed by the project manager since all terms and conditions will need to be incorporated into the final project management plan.

The MSMPP courses of particular assistance in dealing with these activities include Foundations of Project Management, Risk Management in Projects and Programs, Negotiating and Conflict Resolution, Professional Communications and, of course, Procurement and Contract Management.
Project Team Structure and Management

The task of the project manager in a construction project is usually made more complex by the presence of two factors:

The first factor has become common in many projects and is no longer peculiar to the construction industry, and that is the use of virtual project teams. Construction project teams almost always are composed of a site team component and one or more support team components that may be located anywhere around the globe. The typical constraints and risks attendant to virtual team management are exacerbated by the fact that actual on-site work can occur only within a brief and inflexible window of time each day (e.g., 8am-4pm) due to available daylight, safety concerns, labor rules and/or regulatory constraints. This is in contrast with, for example, software projects in which work can be produced 24/7. The second complicating factor is that of organizational interfaces. These can include both formal and informal reporting relationships, as well as funding-related constraints and dependencies. A formal communication plan is the project manager’s best hope of dealing successfully with the challenges posed by organizational interfaces.

In addition to the foregoing factors, construction team structure typically requires the integration of multiple subject-matter experts and contract workers. This is one of the (many) reasons for the statement made earlier in this paper about the desirability of construction project management plans exhibiting a level of detail greater than might otherwise be deemed appropriate for even relatively modest projects.

The “soft skills” of communication, negotiation and problem-solving are of great importance in construction projects, as is the judicious application of leadership skills in managing a large and generally independent-minded group of consultants and contract workers. The Construction Extension to the PMBOK Guide® states at Section 1.5.5: “In particular, the following interpersonal skills are important for construction projects: Leadership... Communicating... Negotiating... Problem-solving...”

The MSMPP courses of particular assistance in dealing with these challenges include Negotiating and Conflict Resolution, Professional Communications, Organizational Leadership and Decision Making, Foundations of Virtual Team Management across Cultures and Geographies, and Management of Virtual and Global Teams.
Stakeholder Identification and Management

In addition to the typical set of stakeholders that one should expect every project to have, every construction project involves many of the following additional stakeholders:

Multiple regulatory agencies, usually on the local, state or regional and federal level; other project managers produced by the organizational interfaces discussed above; local, national or international citizen interest groups; media; and funding participants, whether private lenders or representatives of public funding sources. Early and comprehensive stakeholder identification and analysis, together with regular monitoring and updating, is necessary in order to deal successfully with all stakeholders and defuse many possible project obstacles. Once again, a formal communication plan is imperative.

The MSMPP courses of particular assistance in dealing with these challenges include Negotiating and Conflict Resolution, Professional Communications, Organizational Leadership and Decision Making, Foundations of Virtual Team Management across Cultures and Geographies, and Risk Management in Projects and Programs.
Management of Risks... and Risks... and Risks

Even if the project manager of a construction project were to look no further than the topics briefly discussed in this paper (a practice that is NOT recommended!), it is clear that quite a lengthy list of risks would be identified. A formal, substantial and detailed risk management plan is a bottom-line requirement. In large construction projects, it will ideally consist of sub-plans tailored to construction phases or processes; for example, engineering or site preparation. The processes of risk identification, analysis and response planning must be undertaken iteratively through project close-out, else the risk management plan may well be obsolete within a week of the project kick-off meeting. Every possible step should be taken to instill within the project team, specifically including the consultants, subject-matter experts and contract workers, the understanding that risk management is everyone’s responsibility throughout the duration of the project.

The MSMPP courses of particular assistance in dealing with these risk-related challenges include Professional Communications, Organizational Leadership and Decision Making, and Risk Management in Projects and Programs.
Master of Science in Management of Projects and Programs

In summary, the MSMPP seeks to advance project and program management professionals in the field by providing a robust curriculum that balances the hard and soft skills essential of project and program managers. The curriculum is aligned but not tied to PMI Standards, allowing the master’s program to retain its applied focus and while recognizing the relevance of the professional standards.

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