

Construction Management

Practicum

In the early 1970's the construction industry was on the verge of a workforce rollover which would forever change the face of the entire industry. Colleges and Universities could not produce enough architects, engineers, and technical professionals over the next decade to meet the attrition rate of an aging construction industry. Throughout the industry, design firms, contractors, suppliers, equipment dealers and the like were finding that to remain competitive they would need to develop new efficiencies within their individual delivery systems. This not only meant technological growth but also, the development of human resources for a more technically advanced marketplace.

Just as the entry level management labor force dwindled a paradigm shift in the labor force was becoming more evident. Workers who had over the years worked their way up through the rank and file of a construction company where now in their thirties or forties and were filling the roles of their predecessors. With fewer and fewer human resources available to replace the attrition of labor level employees the industry began to hire more Hispanic migrant workers to fill this vital role. The face of the American labor force which drove the construction industry from the years following the Great Depression and into the early 1960's was soon to become the minority.

Construction in the United States, continuing its steady rise, reached a new all-time high with a volume of about \$65 billion, roughly six percent over 1962. This represents 11 percent of the nation's gross national product, a healthy proportion. The increasing demand for skilled management level personnel to lead the ever aging Construction industry was becoming increasingly acute. Colleges and Universities in cooperation with the Construction industry began to answer the call by instituting cooperative programs within existing schools of engineering or architecture. Hence, the birth of Construction Management Technology and its evolution had begun. For the next two generations educators and industry would define who and what the Construction Manager was to become and the role of the Construction Manager in the industry.

As you may surmise funding for the newly instituted schools of Construction Technology came second to the already established college of engineering and science or the college of architecture. So industry provided funding through grant programs, scholarships and internships to supplement the development of the new schools.

***“Managers have their eyes on the bottom line;
leaders have their eyes on the horizon.”***

*Warren Bennis (1925 -)
U.S. educationalist and writer*

As the school of thought around the country began to accept the new academic and graduates made their mark on society, Construction Management began to define itself in the construction industry's political and economic establishment.

Construction Technology from the late 1960's until the late 1970's was substantially found in community colleges or technical schools. Main campus curriculums primarily offered courses complimentary to the parent colleges they were developed under. If under the college of engineering and science, courses of study may relate to estimating, scheduling, materials testing, survey, drafting, internship. While those developed under the college of Architecture may engender curriculums complimentary to the building industry.

A Construction Manager will directly or on behalf of the program Owner employ many types of business professional, Architects, Engineers, Attorneys and General Contractors over the course of project development. The key to a successful project is a clear communication of responsibility with accountability. The Construction Manager for the Owner is the accountability measure for the team of this there is no doubt.

Just as important as relating through experience to the owner, the effective Construction Manager must understand the General Contracting business and the Engineering Consulting profession and each of their unique challenges to achieve productivity and profitability in their environment. To round out the balance the manager should have hands on experience with materials, testing and the most current management

information systems (MIS) tools to help achieve budget, and schedule goals while maintaining effective lines of communication. An effectively led project is one where work assignments are clearly communicated and followed up on, and order is maintained between all team members. Formal education in Construction Management equips the Construction Manager in seven major categories of higher education Finance, Business, Computer Science, Engineering, Science, Architecture, Construction Law and Construction Practicum.

It is important as a professional CM to identify the strengths and weaknesses of people and apply them to those things that they are strongest in. It is incumbent on the Construction Manager to encourage interdisciplinary cooperation within the program team. This is best done through contracting separately the various professional services associated with a program directly with the program Owner. In practice this delineation allows the individual disciplines to focus more efficiently on their activities while design coordination is performed by the design team as usual, the effort is also facilitated by the CM or a third party review team.

During design the CM will integrate a selection of contractors to assist in the pricing of design elements as the design phase progresses thereby insuring the design phase tracks well with the master budget. During this process the contractors have opportunity to become knowledgeable about the design and develop their value engineering ideas for presentation after the project is bid during the VE/interview process.

The CM led delivery method offers the Owner the ability to strategically extract activities during contract negotiations as appropriate to contract and manage directly in order to facilitate project completion. The CM will negotiate and approve all contracts prior to Owner final approval.

After the project is bid, there is a period of time for the contractors to prepare value engineering proposals for presentation to the design team and Owner. The determinate for selection of the successful contractor is based on value, innovation of thought and

chemistry with the other team members. Final approval of the contractor rests with the Owner but is based upon the corporate recommendation of the design team.

During construction phase the CM is the principle hub of the communication protocol to ensure Owner buy-in and timeliness of response to Contractor requests. Although the design team is aware of all relevant contractor communications many are resolved immediately through the CM/Owner and do not require design team input. Daily project documentation (i.e. daily diary, photos, meeting minutes) promote efficiencies for both the Contractor and the design team. A fluid document management system allows real-time access to project activities. With effective communications risk is mitigated and professional liability is greatly reduced over the course of a program.

The top three skills a Professional Construction Manager must possess are;

1. An exceptional ability to create a programmatic framework that promotes success for all team members. (i.e. owner, design, construction)
2. A balance of experience and knowledge to discern the most effective means of execution for all tasks and activities associated with a construction program. (i.e. site selection, cost, time, design, etc.)
3. A unique ability to direct at all levels of a program, human and material resources toward successful program completion.

In comparison the top three skills a Project Manager must possess are;

1. Ability to effectively execute a defined set of construction documents.
2. Ability to manage program controls and direct to site, necessary human and material resources and assets to meet program budget and schedule goals.
3. Effectively interface with project Owner/End User to meet project goals.

Finally the top three skills a Site Superintendent must possess are;

1. Ability to interpret and execute a defined set of construction documents.
2. Direct and coordinate site specific human and material resources to meet project requirements.
3. Effective interpersonal communication and written skills.

Construction Management Delivery Process - Cost Benefit

Although Owners have a number of delivery modalities available to them for consideration. The CM led delivery method is akin to the Architect led traditional delivery method (Design-Bid-Build). The principle difference is that it is led by a professional manager specializing in the art of construction management. Through utilization of the Construction Management delivery method it is not uncommon to achieve cost savings of 7%- 15% of total construction budget. The nominal cost for a Construction Manager ranges between 3%-5%. No other delivery method has proven as Owner-centric or able to provide the depth of design/industry/constructor integration for a successful capital build program outside of the CM led Design-Bid-Build modality. The degreed professional CM is uniquely equipped through industry experience, a lifetime commitment to the construction industry and the requisite balance of formal training and practical application. History has proven, no other professional service provider practicing in their field whether design professional or constructor are equipped through education and experience to execute the Owners program as fully as the Professional Construction Manager.

The construction management delivery method presented in the following paragraphs stems out of the fundamentals of educational requirements for a Construction Manager and their practical experience with design professionals, owners, contractors, auditors, accounting departments, administrative staff, office engineers, architects, schedulers, public and private utility work, state and local government, supply chain service providers, materials engineers, construction law, environmental, etc. The construction

management delivery system requires a balance of interdisciplinary skills that few other professionals will ever know over the course of their professional career.

Many Owners in our industry have been persuaded by professional service providers and possibly some educators and special interest groups away from traditional delivery modalities through promises of cost and time savings. Improved efficiencies and better risk management, fewer change orders and stronger contract language. The same promises are now being made about BIM and its promise of less potential for contractor claims related to design conflicts or coordination issues. If not for technology I wouldn't be nearly as efficient or be able to provide my owners the level of service required for today's complex construction programs.

To further complicate or create specialty environments within the industry from the design side is unnecessary. What BIM promises are far from what it will deliver. Just like LEED when it first gained in popularity, today we are beyond LEED and have determined the cost to value of LEED is unsustainable. Only our Government can afford to use BIM and pursue LEED credits on their projects. They have no problem spending our tax dollars no matter how wasteful it is.

The CM led modality begins with the development of the Owners program requirements (OPR). Due diligence will be given to economic conditions of the market, state and local planning and zoning requirements, environmental concerns, political and legal requirements and assets, available design and contractor base, preliminary budget and schedule development, and funding are considerations during the feasibility stage of program development.

During Design Phase the CM will integrate a selection of GC's interested in bidding the project into the design effort for budgeting and constructability. The bid process includes a VE element which contributes to cost savings for the Owner. Additionally the CM/OR will strategically contract elements of the construction and integration direct with the Owner.

Typical percentage of construction cost savings by phase;

Feasibility Stage; 2%- 100% *(Not for amateurs, the difference between success and failure).*

1. Master Budget – Get buy-in from all team members through design phase, insure budget confidentiality until after bid.
2. Master Schedule – Get buy-in from GC's supporting design effort and design team for design related activities.
3. Site Due Diligence- ALTA, Geology, Logistics, Owner Program Requirements.

Selection of Project Team; 0.5%

1. RFP and project team interviews. Establish team chemistry well during this time, be wary of any Owner preferences and get the respect of anyone the Owner has already retained. Pricing is not the most important aspect of the selection process the Owner should be educated on this. Never compete your professionals and be careful with the low person.

Planning & Zoning; 1%-2%

1. The CM is the maestro through the process the attorney is part of your team and the design team should be used just enough to make your presentation to the board of appeals or board of commissioners reviewing the project as bullet proof as possible. This is a critical phase of project development many neglect to their own detriment. The cost implications if poorly handled can make or break a project through delayed approvals or special requirements, etc..

Design Phase; 3%-5%

1. Integration of Construction Methods and Means into Design Phase through voluntary involvement from local GC's.
2. Develop phased design/construction activities that provide measurable benefit to program cost and schedule.
3. Revise budget numbers for accuracy and get buy-in from Design team. GC only sees what you need them to see for budgeting purposes.
4. Coordinate and facilitate civil site drawings through reviewing authorities, mitigating proffers and special requirements along the way.
5. In practice I've found it far more beneficial to the owner to separately contract design professionals direct with the Owner. But I like to see the Architects proposal with everyone lumped in. Negotiating direct with the MEP/Structural allows them more creative control over their design and benefits the Owner.
6. Be sure to get design phase WBS that meets your schedule format and meets project cash-flow projections.
7. Lump Sum CA from design team members except for Architect who should provide estimated hourly CA. Then use him as an accountability measure as necessary and at your direction.
8. Bid specifications should be free of proprietary building components as possible. Either way the contractors get an opportunity to VE during post bid interviews.
9. Construction Contract should be included in draft form for all bidders to review. (Use a well tested custom document written to protect your Owner, avoid AIA contracting documents)
10. Use custom bid form to insure bid accountability and for ease of preparing bid tabulations.
11. Include alternative pricing when beneficial to Owners project goals or for finish upgrade/downgrades.
12. Incorporate Living Building Concepts where possible to reduce construction cost and energy consumption.
13. Maintain budget and schedule accountability through design phase. Many projects delay unnecessarily due to a poorly managed Design team.

Bid Phase; 2%-3%

1. Facilitate bid RFI's to ensure clarity of owner requirements and plan intent prior to bid.
2. Pre-Bid conference as deemed necessary.
3. Advise all contractors low bid is not a basis for award and that final award will be contingent on VE ideas offered during post bid interview process with A/MEP/Structural/Civil design team approval. The GC's bidding should be advised to keep VE items to themselves until after bidding is complete.
4. Try to keep your GC's who are bidding to eight or less anything beyond this has shown little added benefit.

Contract Negotiations; 1%-2%

1. Never use AIA always opt for your own custom documentation that protects the Owner.
2. Strategically contract separately with specialty subs to avoid general conditions and fee. Especially on IT or AV activities or where it is preferable for warranty and service contract purposes.
3. Always contract direct for QA/QC and site survey (not necessarily through or with your Civil Engineer). Contractor will pay for survey after one stake-out.

Construction Phase; 3%-5%

1. Review and negotiate all Proposed Change Orders.
2. Make timely decisions, giving no opportunity for contractor schedule delays.
3. Take financial credits when trade delays or mistakes create opportunities.
4. Compress activities as is realistic and where possible reducing float to just off critical.
5. Insure master schedule is given full distribution to all subs.
6. Eliminate excuses and provide the contractor (as much as it is up to you) every resource they need to perform optimally.

7. Facilitate payment through the funding source to promote above average payment of contractor pay requisitions.
8. Start punchlist and project closeout activities well in advance of planned occupancy date.

Closeout;

1. Prepare/assemble closeout documentation and route through design team for review.
2. Aggressively pursue release of bonds for bonded activities from state and local jurisdictions.
3. Pursue as necessary alternate post construction financing as appropriate.
4. Confirm with Owner all punchlist items are completed to their satisfaction.
5. Prepare/assemble final pay applications and appropriate lien releases.
6. Prepare final project accounting for owner.
7. Issue final payment to GC and others.

One Year Warranty Walk;

1. Insure contractor warranty items are corrected to the Owners satisfaction.

Of special note in a CM led program is that the OR/CM is the only one at the table who doesn't have a profit motive. The other team members will, (as long as they are performing in the best interest of the owner) benefit from an experienced OR/CM managing the program. For the Architect/MEP/Structural/Civil design team a CM will mitigate risk without adding risk to the Owner through clear communication protocols and concise transfer of information from the Owner. During construction the CM is able to translate more effectively what is happening in field operations to the owner and also back to the field. No other professional discipline is as qualified for this function as the professionals CM.

As the primary contact for all project related concerns the chance for mis-communications is greatly reduced, one voice-one message, unified through full team integration. When we make a decision it is corporate, minimizing opportunity for error.

As a professional Construction Manager serving in an Owners Representative role focus is on added value to the Owner/client. Below are some examples of how a qualified OR/CM benefits the GC.

The OR/CM has the unique ability as an extension of the Owner to press forward decision points and provide answers the team needs to move the project along. It's not uncommon for review or approval of project documents initiated during construction to impede the team's ability to make timely decisions. When Architect or governmental agency reviews impede construction progress, interruptions in work sequence occur increasing the potential for schedule and cost impact.

Benefit to GC: Accelerated response time in reviewing shop drawing submittals, RFI's and PCO's, reduces the likelihood for interruption in project sequence and impact to trade schedule. With an active and knowledgeable OR involved it allows site personnel to more quickly implement needed design/detail information to reduce project flow inefficiencies and potential for rework.

A well defined communication protocol with the OR/CM at the center to insure clarity of purpose and timely response to RFI's is fundamental to a project. The early implementation and effective utilization of a Digital Document Management system to facilitate document process flow in a meaningful and productive way is an effective way to secure and provide redundancy for project documentation.

Benefit to GC: Provides specifically defined and enforceable communications protocol to ensure effective information flow at all levels of the project team structure. Effective communication eliminates unnecessary correspondence improving efficiencies at all levels. The professional OR/CM insures effective management of Owner/Team relationships smoothing the decision points through the project.

Effective management of the Owner and owner's resources by the OR/CM for overall project execution is a vital but often poorly executed aspect of the OR/CM role. Effectively managed the Owner relationship allows the OR/CM to functionally manage the project/program with as needed support from the Owner and far reaching authority. The OR/CM should have the overall management responsibility of the project to limit any delay attributable to the Owner and limit potential for assumed risk by inadvertent actions of the Owner.

Benefit to GC: One point of contact, one point of accountability. Other team members report direct to OR/CM minimizing any potential for conflict within the project sub-groups.

All cost information is compiled and reviewed for accuracy by the OR/CM and processed for payment on a monthly basis to improve billing efficiencies and budget reporting. OR/CM is responsible to certify and process all payment applications to insure accurate and timely payment through bank or Owner AP. All GC initiated PCO's are facilitated through the approval process by the OR/CM to insure promptness.

Benefit to GC: Reduced processing time for contractor initiated changes; changes are often approved same day by Owner/CM. This improved cash flow, provides opportunity for schedule compression and provides opportunity for improved profitability.

Examples of how a qualified OR/CM benefits the Design Team.

1. The OR/CM effectively coordinates Owner requirements with the project Architect saving the Architect time while insulating them from unnecessary meetings or communications ensuring effective use of time.
2. Most technical design specific questions are answered directly or are facilitated by the CM on behalf of the Owner. This allows the Architect to focus their efforts on project design and team coordination without delay or distraction.

3. The OR/CM works to provide the design team timely response to questions and facilitates the design review process reducing review comment turnaround time from the Owner and other reviewing agencies.
4. Insures timely review of invoices and payment processing.
5. Reviews all Proposed Changes reducing design team involvement as much when appropriate.
6. Certifies contractor pay applications for payment reducing Architect responsibility and time involvement.
7. Limits direct access from field operations to design team as is practical.
8. Protects the design team from adversarial conditions associated with construction phase.
9. Emphasis is given to Construction Administration services as an hourly service for risk mitigation.

The successful execution of any program is achieved by creating an environment that first benefits the program Owner and secondly provides the necessary resources for success of the entire project team in their business objectives. In this way the project outcome will be positive for all involved.

Sincerely,

Construction Management Professionals, LLC.



Joe D. Skeith - Construction Manager