

CM-at-Risk Contract Delivery: *everything you ever want to know about construction contracts!*

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In the early days of Melhorn Construction, most projects required that Melhorn perform both design and construction functions. The separation between pre-construction and construction was simply marked by the groundbreaking at the site; the period up to groundbreaking was the pre-construction period and the rest was the construction period. The team that developed the design also supervised and built the project, providing continuity through both phases of the work. This offered some tremendous advantages in terms of understanding and implementation of the design intent, but also had some drawbacks.

Current day structures, mechanical/electrical systems and regulations have become much more complex than they were in the first half of the 1900's. This has led to (necessitated) a high degree of specialization in both the design and the construction fields. In some of the simple structures that Melhorn built in the early 1900's we had a single designer who provided civil, structural, architectural, electrical and mechanical design and who also provided direct supervision of the work at the site. Individual field employees usually performed work that covered multiple trades. Most modern commercial structures are a collaborative effort involving the participation of at least 5 distinct design disciplines, a general contractor, 30 or more construction trades subcontractors, numerous material and equipment vendors, inspectors, consultants and various public agencies.

So how does this change the way we build: *The Possibilities and the Challenges*

A. The Possibilities

We are now able to build structures that would have been impossible previously and which have the capacity to create superior living and working environments. The cumulative knowledge, experience and talent of the teams that design and build these structures are unprecedented. This provides a foundation for continuing innovations and improvements in the process of design and construction of structures as well as in their functionality and aesthetics.

B. The Challenges

The individual specialists that are required for these team efforts may be working on their piece of the project at different locations and/or times. They may not have a detailed understanding of the work of the other members of the team. Without a well organized system for coordination of the efforts of this diverse group there is a likelihood that the design intent will not be effectively communicated to all members of the team. This can result in duplication of efforts, unintended negative impacts of one team member's work on the work of another team member, unnecessary conflict within the team, and ultimately, unanticipated costs, delays in completion, or reduced functionality of the finished product. In order to avoid these negative consequences it is best to begin the process with a plan that will promote good team communication, clearly establish who will be responsible for managing the process and make provisions for continuity of the process through all phases of the project.

Design-Bid –Build

Design-bid-build is a phrase used to designate a project delivery method that distinctly separates the pre-construction phases and teams from the construction phase and team. Typically the design team produces a complete set of construction documents based on criteria provided by the owner. These documents are then given to several general contractors who in turn solicit competitive bids from subcontractors, compile the anticipated costs, add the GC's fee and then bid against the other GCs for the project. Generally, the project is awarded to the lowest "qualified" bidder who then manages the construction. The designer(s) may or may not have continuing involvement in the construction depending on the terms of their agreement with the owner. Many in the industry consider this method to be the standard, however, historically it seems to be a relatively recently adopted approach that parallels the adoption of public contract law requiring the hiring of the "lowest qualified bidder" for work funded by taxpayer dollars. Many public agencies have been searching for alternative contract delivery approaches in order to deal with some of the problems that are inherent in design-bid-build.

So, what are the problems with design-bid-build?

Lowest bid is not always lowest cost. It is not practical to create a set of construction documents that completely addresses every possible question concerning how the structure is to be built. Efforts to provide greater detail in order to address this problem increase the likelihood of contradictory information in the documents and increases design and coordination costs. The competitive bid process encourages contractors to bid low and make up the reduced fee in change orders. The ultimate cost of the project probably has more to do with the intent of the parties to the contract than with the "low bid".

Gentlemen raise your gloves and come out fighting. The low bid process and distinct separation of design vs. construction teams sets up an adversarial relationship from the beginning. It is likely that the Owner, the designer(s) and the contractor all have different objectives. This is not a win-win game, it is win-lose. That is not to say that these obstacles can't be overcome if the right combination of companies and individuals is in the mix, but why start out with a handicap?

The design phase vs. build phase barrier is a semi-permeable membrane. Not all of the information generated on the design side or the barrier makes it through to the construction side and vice versa. The limitations of the bidding and the construction document process make this impossible. The intent of the parties to the contract can make this situation better or worse.

What do you mean, this project is going to cost 20% more than my budget ?!!*#
Well,what if we delete the roof? Architects do their best to stay within Owner's budgets, but they are not builders and it is pretty hard to stay in touch with real construction costs without being in the market on a day-to-day basis. 30 days prior to the scheduled start of construction is no time to start a value engineering process. When value engineering starts that late in the process the costs of resulting project delays and confusion usually eat up the VE savings that are realized. Design-Bid-Build generally precludes contractor cost and VE feedback until it is too late for it to be useful.

OK, so the only drill rig that can be used for this type of foundation system is going to be tied up in Bahrain for the next 6 months,..... can't we start from the top and work down? It can be useful to have constructability feedback from the GC during design. Design-bid-build doesn't allow for this or requires the hiring of a consultant who may have a different idea about how to build than the contractor who is hired to do the work.

So..... let me see if I understand this.....it's going to take 3 months to build the foundation and then we are all going to the Bahamas for 4 months while we wait for the structural steel? For some projects a "fast-track" process is required; certain portions of the work may need to be contracted before complete construction documents are ready in order to meet occupancy dates. Design-bid-build does not work well for this type of process.

"We provided the super-duper, water saving, auto-flushing, self-cleaning toilet, just like the specs said, but the waste riser diagram didn't show us hooking it up, that's gonna to be extra." In the competitive bid process, subcontractors may be hesitant to "connect the dots" and include items that they know are needed for a functional system because they are worried they will lose the bid to another sub that did not include that cost. GCs can fill a lot of those gaps by "scoping" the work for the subs, but if they do that in a design-bid build scenario they put themselves at a competitive disadvantage with other GCs who do not "scope" the subcontractors' work.

If Not Design-Bid-Build, Then What?

Here we will briefly discuss several other contract delivery methods before getting into "CM-at Risk"

Cost-Plus. Under this method the owner simply pays the direct cost of the work plus an agreed fee. Virtually all of the risk is taken by the owner and cost may be uncertain until the project is finished. It may be appropriate under circumstances where the scope of work is evolving or uncertain and/or where there is a strong basis of trust and fairness between the owner and contractor. This method can be combined well with pre-construction services. In most cases this is not considered suitable for public works contracts.

Negotiated-Lump Sum. This method involves direct negotiation between Owner and Contractor in order to arrive at an agreed contract value. Once that price is agreed on the contractor is "at-risk" and must complete the project in exchange for the agreed compensation regardless of the actual cost unless the owner makes changes or there are "unknown conditions" beyond the control of the contractor. This method is frequently used when the Owner has an existing relationship with the contractor or has a particular reason to use one contractor. There is a sharing of risk under this method. In most cases this is not considered suitable for public works contracts.

Negotiated-Guaranteed Maximum Price. This is very similar to the previous method except that the agreed price is a maximum and any cost savings go back to the owner or may be split at an agreed ratio between owner and contractor. If the cost exceeds the GMP amount then the contractor is "at-risk" for the overage. This type of contract frequently has a "Builder's Contingency" allowance to cover certain types of cost overruns.

Multiple-Prime with Construction Manager. Under this method the Owner hires a Construction Manager on a fee basis. The Construction Manager solicits bids from specialty contractors and manages the process. The Owner then contracts directly with the specialty contractors and the Construction Manager coordinates the work of the “multiple prime” contractors and handles contract administration. The Construction Manager typically has little or no risk in this process and as such the Owner assumes more risk than in most other types of contract methods. The CM usually is a part of the pre-construction team and this can help to address some of the problems inherent in the design-bid-build format. This type of contract is generally considered suitable for public works projects and is used fairly frequently as an alternative to design-bid-build on those projects, particularly on schools.

So, How Does “CM-at-Risk” Work?

With the CM (Construction Manager)-at-Risk contract delivery method the contractor or construction manager is chosen prior to start of design or during the early stages of design. The terms of engagement can be negotiated, or competitively bid at this point. If competitively bid, the bids are evaluated based criteria established by the Owner which commonly include a) proposed fee for pre-construction services b) proposed general conditions costs c) proposed fee for construction. The Owner usually has the option at the end of the pre-construction phase to enter into a contract for construction or to terminate the agreement. During the pre-construction phase the contractor normally provides services which may include progressive cost estimates, constructability and value engineering review, participation in design team meetings, input on selection of building systems, project and design schedule development, assistance with early procurement, site evaluation, etc. Just prior to completion of construction documents the contractor prepares bid instructions for subcontractors, which may include detailed scopes of work. When construction documents are ready the subcontract work is competitively bid. After receipt of bids the contractor analyzes the bids and reviews them with the owner. Upon agreement and selection of subcontractors the direct costs are compiled, added together with the previously determined general conditions costs and the fee applied to arrive at a final contract value. There may be a builder’s contingency to cover certain types of unanticipated costs. Once this contract value is arrived upon contractor or construction manager becomes at-risk and is expected to complete the work for the contract price regardless of actual cost unless the owner makes changes or unknown conditions are encountered which are beyond the control of the contractor. This contract method is considered acceptable for use with public works projects and is under trial by many public agencies that are frustrated with the shortfalls of the more common design-bid-build method.

So, How Does CM-at-Risk offer Improvements over Design-Bid-Build

Let’s look at the problem areas previously discussed for Design-Bid-Build:

Lowest bid is not always lowest cost. Getting the contractor involved in the pre-construction process helps to make sure that the contractor has a full understanding of the intent of the designer(s). The contractor can also write

detailed scopes for the sub trades to eliminate gaps in coverage at bid time and reduce the incidence of changes orders

Gentlemen raise your gloves and come out fighting. The team environment created in a collaborative pre-construction process as well as the establishment of well understood common goals for the project team gets the project off on the right footing. This occasionally requires some re-education of team members who may be accustomed to the adversarial roles which are common in design-bid-build but most participants quickly recognize that overall project success is more easily achieved when everyone on the team is successful.

The design phase vs. build phase barrier is a semi-permeable membrane. Under Design-Bid-Build there is a discrete hand-off of written information from the design team to the construction team and the construction contract is based on these written construction documents. Under the CM-at-Risk method there is also continuity of project personnel that are present through both the design and construction phases providing a more complete information basis than can possibly be contained in written documents. The scoping the subcontract trades is also typically incorporated into the general contract documents providing more thorough documentation of design intent and filling gaps in the plans and specifications.

What do you mean, this project is going to cost 20% more than my budget ?!*# Well.....what if we delete the roof? Budgeting is normally a continuous process with CM-at-Risk, starting with a conceptual budget with progressive estimates as the drawings are developed. This cost feedback loop allows the Owner and designers to adjust design to meet budget or budget to meet project needs during the design process rather than waiting until bid time when it is usually impractical or expensive to implement significant changes.

OK, so the only drill rig that can be used for this type of foundation system is going to be tied up in Bahrain for the next 6 months,..... can't we start from the top and work down? An integral part of CM-at-Risk should be constructability review. The question "How are we going to build what we designed?" needs to be asked during the design process. The contractor who is going to build the project is the one best suited to tackle this question, however, the contractor may benefit from ideas the designers have about how to build it. This exchange of ideas can work in CM-at-Risk in the pre-construction phase, but in Design-Bid-Build this falls into the realm of "means and methods". After bid time, "means and methods" discussions can be treacherous for Owners and Architects because change orders usually follow those discussions.

So..... let me see if I understand this.....it's going to take 3 months to build the foundation and then we are all going to the Bahamas for 4 months while we wait for the structural steel? CM-at-Risk easily accommodates a progressive contract which can allow for a "fast-track" process. For example, trades like structural steel that may have long lead times for shop drawings, material ordering and fabrication can be contracted prior to completion of the full construction documents, avoiding delays after start of construction.

"We provided the super-duper, water saving, auto-flushing, self-cleaning toilet, just like the specs said, but the waste riser diagram didn't

show us hooking it up, that's gonna to be extra." Architects usually insert language into the plans and specs conferring responsibility to the contractor and subs for providing complete systems and items that are "reasonably inferred" from the contract documents. This can be difficult to enforce without the support of the general contractor. Under the CM-at-Risk method the general contractor should assume some of the responsibility for eliminating these gaps by thorough review of the documents during the design process and by scoping the sub trades.

So, what is the best contract delivery method?

There probably isn't a single answer to this question that fits all situations. The participants in the project should review the circumstances of the project and their individual interests to select a method that is acceptable to all of the parties and is likely to produce the most successful result.

The CM-at-Risk method of contract delivery, offers some distinct advantages compared to other methods in terms of positioning the project for success. It sets the stage for a free exchange of ideas and information between all of the participants in the project and removes some of the common barriers between design and construction. CM-at-Risk provides a good balance of consideration of the interests of the owner, the designers and the contractors. At the beginning of this discussion it was mentioned (with some sense of nostalgia) that in Melhorn's early days there was high level of integrity in translating the design intent into the finished product and that this was a result of continuity of the team through both the design and the construction phases. The complexity of current buildings has made it impractical to house the design and construction teams within the same organization. CM-at-Risk provides a potential vehicle to put the continuity back into the process.

Good contract methods and documents don't guarantee good projects.

The most important ingredient of a well executed project is competent team members with a good understanding of and a commitment to achieving the goals of the project. The first step in a successful project is selecting the right team. The method of contract delivery is simply a tool that can make the job of that team easier or harder.