Managing Design Professional Consultants: Methods, Challenges, and Potential Liabilities

By Barry J. Miller, Jonathon Korinko, and Robynne Thaxton

Barry J. Miller

Jonathon Korinko

Robynne Thaxton

I. "Lean Construction": An Increasingly Utilized Approach to Unifying Design and Construction Management

It is impossible to discuss the management of design professionals without recognizing the professional status of architects and engineers. The practice of architecture and engineering is regulated by each state and is limited to those individuals who possess the requisite education, experience, and certification. This professional status makes the independent management of design professionals somewhat difficult and problematic. It is expected that the design professional will perform his or her professional services in accordance with the exercise of their professional judgment and, at a minimum, to a professional standard—that exercised by similarly situated design professionals. These professional services can be generally described as the development of the design for physical improvements, the preparation of the documents that describe this design that will then be used by those charged with the responsibility to construct the physical improvement, interpreting and explaining those documents when required, and evaluating the conformance of the completed physical improvement to the documents that describe the design.

Traditionally, the design professional has been "managed" by their client through contractual provisions that delineate the specific services and expectations associated with those services related to achieving the client's overall cost, time, and quality goals. Increasingly, however, the construction industry is recognizing that the separation of design activities from construction activities injects unacceptable levels of inefficiencies into the overall design and building process. To combine the benefits of both design professional and constructor expertise at the early stages of project development, alternative forms of project delivery have emerged. These alternate project delivery methodologies, like Construction Management at-Risk and Design-Build, attempt to provide construction expertise during the design processes and eliminate potential excessive initial cost and inefficiencies associated with incomplete or confusing design documents. Nonetheless, there are still inefficiencies that create unnecessary economic waste in the overall design and building process.

The use of Construction Management at-Risk still retains elements of design and construction separation. The process of design followed by evaluation of design and pricing of design (whether at the end of each design stage or the completion of the entire design process) is inefficient. As a result, major consumers of the construction industry are mandating the use of lean construction techniques to reduce overall cost and time and to improve the quality and the ultimate value of the completed physical improvement. Increasingly, the construction industry has embraced these lean construction techniques to capture the potential benefits they promise. Lean construction techniques challenge conventional project delivery approaches by recognizing that the design and construction stages should be cooperative, collaborative, and interrelated. This requires all participants—owners, design professionals, and constructors—to cooperate and interrelate their respective expertise into areas previously reserved to the specific individual services of other participants. This level of coordination and interrelationship creates both management and liability issues for the design professional.

A. Principles of Lean Construction

Lean construction is lean production theory[1] adapted to the construction industry that advances the goals of decreasing inefficiencies, time, effort, and cost through the integration of project responsibilities and collaboration among all project participants. Lean construction "challenges the generally accepted belief that there are always trade-offs between time, cost, and quality."[2] The fundamentals of lean construction[3] are:

- *Value:* An intense focus on understanding the value proposition from the customer's perspective. In other words, what is important to the customer.

• *Value Stream:* Ensures that all activities in the design and construction process support the customer's value proposition.[4] The process should focus on the outcome to determine where value is added and waste is eliminated. Seek to optimize the whole, not the individual parts. Value stream "encourages projects to look beyond the local and individual efforts and study the overall outcome to determine where value is added or waste is included in each step."[5]

• *Flow:* Shifting project delivery and management to a more integrated and collaborative process that promotes the continuous movement of work without repetition. One way to achieve a reliable workflow is through early collaborative planning among the trades, in which expectations are set and constraints are identified.

• *Waste:* Seeking to minimize those process points that add repetition and resulting waste, such as overproduction, just-in-time inventory, transportation delays, defects and rework, wasteful motion, and underutilization of creativity and talent of the project team members—in other words, workers waiting for work or work waiting for workers.[6]

• *Pull:* Only employ the services, materials, and/or labor when required or when there is a project demand for it. Plan ahead to determine the exact demands of the project and when those demands will be needed to avoid waste.

• *Perfection:* Seeking to perfect the process through continual improvement. Lean construction demands an environment where experimentation is encouraged and manageable failure is acceptable if the goal is to constantly improve. This atmosphere can drive innovation and benefits the value stream through value creation.[7]

B. Lean Construction Techniques and Impact on Project Design

The following lean construction design phase techniques emphasize collaborative planning and design, which requires the involvement, communication, and cooperation among all project participants beginning in the preconstruction phase.

Target Value Design

Target Value Design (TVD) is "a collaborative, team-managed design process that is used throughout all stages of design and construction to ensure that projects are delivered within the allowable budget, that projects meet the operational needs and values of the users, and that projects promote innovation to increase value and eliminate waste."[8] In this technique, the project team understands the customer's value propositions and works collaboratively within the budget constraints to deliver that value[9] to the owner.

The design professional's role in TVD differs from the conventional design-then-evaluate model as follows:

• *Cost:* Cost is an input to the design decisions, not a design result.

• *Information:* Design information and decisions are cooperatively shared from the earliest design iteration rather than after the design stage is complete. Rather than verify the cost of the design upon completion, design decisions are informed by real-time cost estimates.

• *Estimates:* Design stage estimates are developed from detailed three-dimensional models, thereby eliminating time-consuming and expensive two-dimensional take-off-based estimates.

• *Solutions:* Design professionals maintain multiple design solutions for as long as possible instead of making an early commitment to a single design solution.

• *Input:* Provide cost feedback to concepts rather than completed designs.

In the TVD model, the design professional makes incremental design decisions to achieve the identified value. The design professional is designing to achieve the estimate versus having the design estimated upon completion. This process adds the constructor as an integrated member of the design team who supplies real-time information relied upon by the design professional in developing design alternatives. While intended to provide for a more streamlined process, the interplay between the design professional and constructor has the potential of creating issues for the design professional should the constructor-supplied information be incomplete or erroneous.

Pull Planning Design

Pull Planning Design (PPD) is a scheduling process that works backwards from a target completion date (milestone) by defining and sequencing all approval and design tasks so that their completion releases the work of others.[10] Collectively, the project team starts with the last activity and schedules to the first activity; through that process, the restraints to each activity that prohibit its completion are identified. The PPD process encourages all project team members to work together by improving communication and limiting competing interests.[11] In PPD, all project team members commit to the schedule requirements, support their own roles for each activity, assess their own performance, and assess recalibration to the rest of the project should commitments be missed.[12] As such, PPD projects are more likely to stay on time as team members have clear goals and steps to follow, with responsibility and communication streamlining the process.[13] In this model, there is constant reevaluation and rescheduling based on the actual tasks that are currently available and achievable at a point in time.

Under the PPD model, the design professional's role differs from conventional approaches in the following ways:

• Deliverables are information handoffs rather than completed drawing sets.

• Design decision points are identifiable milestones and not a submit and review date for a design iteration.

• Design decisions are vetted before the design is memorialized in a complete document set.

By planning from the target completion date, the design professional obtains input from the constructor on cost and constructability concerns that, in turn, drive design decisions.

Design Assist

Design Assist is the process of inviting specialty subcontractors into the design process to offer suggestions on systems, equipment, materials, and distribution. Design Assist subcontractors provide specialized expertise to help achieve economic efficiencies on both procurement and installation cost. Typically, the subcontractors make suggestions for the design professional's consideration and the design professional is not relieved of the responsibility for the suitability of the ultimate design. The design professional's retention of liability sometimes serves to undercut the viability of the Design Assist subcontractor's advice in favor of more conservative design solutions.

Utilizing Technology to Advance Lean Construction Goals: Building Information Modeling

Building Information Modeling (BIM) is a process that begins with the creation of an intelligent, three-dimensional digital model that enables project participants to document, manage, coordinate, and simulate during the life cycle of a project (concept, design, build, and potentially operation and maintenance). While BIM is utilized outside of lean construction, a more robust use of BIM supports lean construction[14] as follows:

1. *Cost Estimation:* BIM permits faster, more accurate cost estimates in the preconstruction phase of the project, which can be used to develop the initial design decisions.
2. *Scheduling:* BIM can be integrated with the project schedule and updated to reflect the as-built schedule as the project progresses.
3. *Clash Detection:* BIM permits improved MEP installation by identifying space conflicts between systems and supports the potential for prefabricating systems and components.
4. *Submittals:* Electronic submittals, shop drawings, and samples can be linked to the model's components, which provides the ability to monitor and forecast submittal requirements in real time.

Tools like BIM help facilitate the transparency, communication, and efficiency among project participants required to successfully employ lean construction techniques.[15]

II. Overview of Project Delivery Methods and the Impact of Current Project Management Techniques

A. Design-Bid-Build

Design-bid-build (DBB) is the most traditional project delivery model in the construction industry. Its essential attribute is a rigid and phased project delivery method. In DBB, the preconstruction, bidding, and construction processes are linear and typically require that one phase be completed before the next phase can begin. The owner contracts with the design professional and constructor separately, and the design and construction phases are segregated.

In DBB, a design professional is engaged to deliver 100 percent complete design documents. The design professional has exclusive control over the design's preparation in an attempt to achieve the owner's goals for cost, time, and quality. The owner then uses the design documents to solicit fixed-price bids from constructors to construct the project and thereby verify the cost of the design. Through the bid process, the owner either determines that the design is not economically viable (and returns to the design phase) or awards the project to a single constructor. If hired, the constructor performs the construction based on the design, and the design professional independently verifies that the in-field construction is consistent with the design. Typically, the design professional and the constructor have no contractual privity to one another, with the owner assuming the risks associated with incomplete or deficient design documents—except those created by the design professional's breach of its standard of care/contract responsibility.

Under DBB, each project participant is siloed and the design stage is typically void of input from the constructor. As such, the roles and responsibilities in DBB are segregated and fixed. This structure often leads to contentiousness, less flexibility to accommodate change, and little opportunity for collaboration. The inefficiencies associated with DBB create the types of economic waste that lean construction techniques seek to eliminate.

Design Professional's Liability

In DBB, the design professional owes the owner an obligation to render its services to a professional standard of care. While contract terms can alter this standard with inclusion of additional terms and duties, typically a design professional's standard of care is to use reasonable care and competence in rendering its services.[16] If the design professional breaches the applicable standard, the design professional alone is responsible for the damages stemming from that breach. Depending on the contract's terms, these damages may include indemnity obligations to protect the owner from additional costs, corrections to work, and time that the constructor incurs as a result of that breach.

Problems with DBB

While the scope of the design professional's liability and risk is clearly defined in DBB projects, the broad risk profile can promote protection of the individual participant's economic interests over the successful achievement of the owner's value goals for the project. Specifically, the lack of collaboration between the design professional and other project members generates inefficiencies and value loss to the client. Because the constructor is not engaged until completion of the design, there is no opportunity to integrate construction expertise into the design process. Thus, if the design is incomplete, contains errors, or is not economically viable, such issues are not realized until the bid process or after construction is under way. As a result, potential design errors are more likely to create schedule delays and increased costs if design revisions are required. Moreover, the rigid roles and responsibilities can create an adversarial relationship among project participants. If something goes wrong, or an unforeseen issue arises, project participants may blame one another for resulting cost overruns or schedule changes in a zero-sum game that typically sees no real winners.

Schedule

Because the constructor is not engaged until design completion on DBB project, there is little opportunity to integrate the design schedule into a comprehensive overall project schedule to meet a predetermined completion date. Thus, if the design completion is delayed, the construction phase duration may become compressed. This places considerable pressure on the design professional to release the design documents by a date certain even if those documents are incomplete. It is common that multiple design addenda are issued during the bidding phase as the design documents are completed. This practice increases the possibility of estimation errors and potential claims during construction.

BIM

The use of BIM is increasing as the technology improves and cost barriers drop, but liability concerns limit its potential benefits. Those concerns include: (1) copyright ownership, (2) control over unauthorized modifications to the model, (3) the level of development for the model, (4) the status of BIM as a contract document, and (5) the reliance project participants should place on the model. As a result, design professionals sometimes place significant restrictions on access to the model. In the DBB model, if BIM is utilized at all, it is typically limited to clash detection. If issues are discovered, it still results in construction phase redesign with resultant cost and time implications. This is only a marginal improvement over in-field discovery of the issues during installation.

B. Construction-Manager at Risk

The Construction-Manager at Risk (CMAR) model attempts to interject construction expertise into the design phase to provide better cost certainty, constructability, and schedule management for the project. The construction manager (CM) is typically brought into the project at the Design Development stage (i.e., well before Issued-for-Construction drawings and specifications are issued) and is immediately tasked with estimating the completed Design Development package after the significant design decisions have been implemented.

It is not unusual that the projected construction cost of the Design Development package exceeds the owner's budget. The disconnect between the construction cost and the owner's budget can send the design into an unwanted and unplanned value engineering stage as the design professional and the constructor attempt to reduce the overall project cost. This can become an expensive and time-consuming process that can then adversely affect the overall project schedule, leading to more inefficiencies through compressed construction processes.

Once the design documents are sufficiently completed, the CM provides a construction cost typically on a cost reimbursement basis with a not-to-exceed guaranteed maximum price (GMP). During the construction phase, the GMP is subject to adjustment for similar reasons that permit adjustment under the DBB model (i.e., design omissions and errors that were not identified in constructability reviews still increase the owner's cost and the design professional's liability exposure).

Design Professional's Liability

In the CMAR model, the owner still separately contracts with the design professional and CM. The design is controlled by the design professional and is subsequently reviewed by the CM at the conclusions of the design stages. While the CM's input provides value to the design, inefficiencies resulting from design revisions remain and the design professional's liability in the CMAR model is virtually identical to its liability in the DBB model. Arguably, the involvement of the CM in the design phase creates the possibility of more accurate design documents, but it is not guaranteed. The same types of omissions and errors plague CMAR projects as do DBB projects.

Problems with CMAR

While the CMAR approach injects some construction expertise into the design phase, the design professional still holds ultimate responsibility for the design. As such, there may be reluctance from the design professional to allow CM input into substantive design decisions. Additionally, the CM's expertise is brought into the design process only after the major design decisions have been made and approved by the owner. If the CM provides advice that alters the fundamental basis of earlier design decisions, a redesign process may be required. As a result, there is a natural reluctance to revisit the design due to cost and time concerns, rendering the full benefits of this collaborative approach not realized. Moreover, under the CMAR model, design still informs costs and constructability and there is no integration of design and construction. Therefore, the economic waste and inefficiencies prevalent in DBB also exist in CMAR.

Schedule

The CM is typically charged with the responsibility of developing and maintaining a project schedule that integrates remaining portions of the design phase with the construction phase; this requires the design professional to ensure sufficient time for completion of the design to a professional standard, including the time necessary to incorporate the CM's preconstruction services. This process sometimes creates conflicts of interest when the CM desires to allocate more time to the construction phase and less to design completion (a conflict that can be intensified if the project schedule is already aggressive).

If a substantial value engineering service is required to align the design to the owner's budget, schedule concerns are magnified because value engineering is not a typical schedule activity. This sometimes results in major modifications to the design delivery. Rather than the release of 100 percent completed design documents, the design documents are sometimes released in phases—i.e., foundations, frame, enclosure, and finishes. The phased release of design documents increases the likelihood of errors, omissions, and inconsistencies between the various design document releases and/or field modifications where they interrelate.

BIM

BIM has greater utility in the CMAR model than the DBB model. There is the ability to use the model for cost estimation, schedule, and clash detection during the design phase (when appreciable benefits can be realized). These benefits are only realized if the model is developed to a level of detail that supports these functions and the CM is provided the requested access to design documents in a format that can be best utilized for BIM optimization. Again, liability concerns can still prevent the full benefits of BIM. In some cases, this lack of access forces the CM to create its own three-dimensional model merely to conduct such detection services, which can be inefficient and economically wasteful.

A. Design-Build

Liability of the Designer

The design-build (DB) delivery method is characterized by a single contract between the owner and the entity responsible for both designing and constructing the project. In DBB and CMAR, the designer provides to the owner the professional standard of care, and the contractor is protected by the *Spearin* doctrine, whereby the plans and specifications are presumed to be fit for their intended purpose.[17] In DBB and CMAR, if there is a problem with project performance, the owner sits in a "liability gap" because (i) the owner cannot assert more than breach of the professional standard of care against the designer, and (ii) by providing prescriptive specifications to the contractor, the owner warranted that the design is constructible and will perform as anticipated.

In contrast, a DB contract consists primarily of performance requirements rather than prescriptive specifications. In addition, because the design-builder controls both design and construction, the design-builder is a "one-stop shop" for liability if contractual performance requirements are not achieved. The design-builder assumes more liability than a contractor or constructor in any other delivery method. The designer's position in the DB model is different than in other delivery models because, in most cases, the chain of privity flows through the design-builder. Unfortunately for the pure designers, many design-builders attempt to shift the responsibility for achieving the performance requirements in the DB contract to the designer. However, the reasons for not holding the designer responsible for the performance of the project hold true for DB as for DBB. As in DBB, the designer only controls the design and holding a designer liable for a standard of care higher than the normal professional standard of care is problematic.

Performing work on a DB project does not substantially increase the responsibility of the designer.[18] Errors and omissions insurance for designers continues to be limited to the professional standard of care, and because designers do not manage the construction work, designers do not take on the responsibility for meeting the performance standards in the contract. Indeed, the DBIA Design Consultant Contract (DBIA 540) holds designers to the professional standard of care:

> **2.2.1** The standard of care for all design professional services performed by the Design Consultant and its Design Sub-Consultants pursuant to this Agreement shall be the care and skill ordinarily used by members of the design profession practicing under similar conditions at the same time and locality of the Project.

Design-builders must manage the "liability gap" that owners occupy in DBB. Successful design-builders have done so by creating collaborative working environments and integrating their design and construction teams. The DB industry is a ripe environment for the utilization of lean construction techniques and BIM to manage risk.

Traditional Design-Build

There are several different types of DB arrangements, and each presents its own issues for designers. In traditional DB, the procurement consists of either bridging documents or a design competition. In a bridging a DB project, the owner issues "bridging" designs of approximately 30 percent; short-listed proposers review and complete bridging design to a point where they can price the project. Bids from the short-listed proposers consist of both a completed design and a price. In a design competition, the owner issues performance requirements and short-listed proposers both design and price the project in the submitted proposal. The first issue that DB team members should discuss is the extent to which the designer will be compensated for work performed during the procurement phase. The DBIA Form Teaming Agreement (DBIA Form 580) includes options for direct compensation and proportionate share of the honorarium or stipend that owners pay as part of the procurement. Of course, if owners do not provide a sufficient stipend to cover a substantial portion of the required design work, designers must give such funding consideration before making a go/no-go decision to bid the project.

Under both methods discussed above, the design is typically incomplete even when the proposal is submitted; it is advisable that the design-builder should include a "design contingency" in its price to account for further design required to complete the project. One of the biggest issues recently with traditional DB is that the design-builder and the designers fail to effectively communicate the extent of potential design contingency necessary for the project bid. Design-builders claim that they should be able to do a take-off from incomplete plans submitted by the designers; designers claim that the design-builders should have been clearer regarding the extent of the design required to submit the proposal. The reality is that the time frame in most traditional procurements is condensed and teams often do not have sufficient time to thoughtfully discuss the extent to which design contingency should be factored into project cost. Unfortunately, designers have been caught in the crosshairs and have been held liable for omissions in the documents that the design-builder did not include in its price,[19] even though the parties knew the design was still incomplete at the time of bid.

DB teams have increasingly turned to lean construction techniques to manage the risk of the design contingency. Robust integration and collaboration between the designer and constructor encourage communication. In addition, the use of TVD focuses the design on the budget rather than building the budget off the design. Finally, increased use of BIM streamlines early detection of errors.

Progressive Design-Build

In progressive DB, the owner selects the DB team based primarily on qualifications with the selection factor on price usually reduced to the overhead and profit percentage for the project. The DB team does not produce a design during the procurement; rather, the project progresses through phases. In the first project phase, the owner and DB team collaboratively develop the final basis of design documents as well as the price and schedule. The design-builder then provides a proposal to the owner to perform the second phase of the project. Assuming the parties agree, a contract amendment is entered into that incorporates the design-builder's proposal as negotiated by the parties. The design-builder's proposal to perform the second phase of work typically includes (i) either a GMP or a lump-sum price beyond which the design-builder will not be compensated, (ii) a project schedule, and (iii) the project Basis of Design Documents or scope.

Because the design is not developed during a typically condensed procurement period, and collaboration is (usually) valued by all participants, the design contingency is not as big a risk as in traditional DB. Rather, the largest risks in this delivery method sit with the owner because the project price, scope, and schedule are not established at the beginning of the project. Owners are increasingly requiring lean construction techniques to manage this risk. Because TVD develops design to budget rather than developing budget to design, it is an effective tool to stay within budget. In addition, the capacity of BIM to incorporate pricing into the model allows the parties to collaboratively develop pricing with the design.[20] Progressive DB contracts should address the design management process by clarifying that the design-builder will either submit designs consistent with the project's commercial terms or provide notice that the design submitted is inconsistent with the commercial terms (signaling that the design may result in a change to scope, schedule, or budget).

The requirement that a design meets a budget has the potential to increase a designer's liability in DB. Designers are not typically accustomed to merging pricing exercise with the design. The designer and design-builder should discuss the extent to which the designer is responsible for providing designs that are within the budget. In addition, because progressive DB is more collaborative, the designer should discuss with the team the number of designs and redesigns anticipated to be provided to the first project phase. The DBIA Design Consultant Agreement (DBIA 540) contains the following provision regarding redesign:

> **2.6.6** Design Consultant will, at its own cost, revise any interim design submission or the Construction Documents to correct any of its errors, mistakes or omissions. Such revisions shall be performed timely and so as not to jeopardize the Design Schedule and/or the Project Schedule.

While instructive, this provision only addresses cost resulting from an error or omission, and not because of a design-builder or owner requested redesign; parties are encouraged to draft language addressing this commonplace event.

Schedule

Designers often see increased liability in DB for schedule-related issues. The DBIA Design Consultant Agreement (DBIA 540) contains the following provision:

> **11.7.2** Notwithstanding Section 11.7.1 above [the consequential damages waiver], Design-Builder shall be entitled to recover against Design Consultant (i) any liquidated damages that Owner may assess against Design-Builder which are attributable to Design Consultant, even though both parties recognize that such liquidated damages may include some damages that might otherwise be deemed to be consequential and (ii) consequential damages that may be imposed upon Design-Builder by the Design-Build Agreement.

This provision is typically passed down through the chain of privity to design subconsultants. The theory behind the provision is that the project schedule starts at design rather than at construction. Therefore, a designer may be responsible for delays in the overall project. Designers, however, are unaccustomed to taking on schedule liability during a project's design phase. DB teams are increasingly relying on the Last Planner System™ to manage this risk. Last Planner is a collaboratively developed system that builds the schedule from the end date rather than from the start of the project. Each team member, starting from the last, inputs their required durations backing off from the anticipated scheduled date. Only that team member may move the durations that they establish. Last Planner provides a more accurate and manageable system for the project.

Building Information Modeling

BIM is the primary tool for design-builders to help manage the increased risk profile they assume, particularly on complex projects. BIM may take many forms from simple clash detection in drawings to the incorporation of schedule, price, and deliveries into the model. For progressive DB in particular, BIM allows the design-builder to provide real-time (or close to real-time) pricing on design changes made during the first phase of the project.

On a DB project, BIM also provides a mechanism by which designers can better coordinate the design materials from disparate sources. Designers frequently struggle with requirements to coordinate drawings from entities with whom they do not have a contract. The lead designer is often tasked with coordinating designs from specialty design-build subcontractors who have a direct contract with the design-builder. The lead designer usually does not want to have a direct contract with the design-build subcontractors because designers are not typically set up to manage these subcontractors' construction works; however, effective incorporation of their design is crucial to the project's success. The use of BIM for clash detections can help mitigate this challenge. Of course, parties should enter into an agreement outlining the responsibilities and liabilities associated with the BIM model.

D. Integrated Project Delivery (IPD)

Designer's Liability

On Integrated Project Delivery (IPD) projects, multiple parties enter into a single agreement for design and construction. The minimum parties are the owner, the lead designer, and the lead constructor. The basic responsibilities of the parties are much like the CMAR model: the designer is responsible for providing the design; the constructor is responsible for reviewing the design and construction; and the owner is responsible for providing timely information, reviewing and approving the design, and payment. The AIA describes IPD as follows:

> Integrated Project Delivery (IPD) is a project delivery approach that integrates people, systems, business structures and practices into a process that collaboratively harnesses the talents and insights of all participants to optimize project results, increase value to the owner, reduce waste, and maximize efficiency through all phases of design, fabrication, and construction.[21]

IPD was developed to take full advantage and utilize lean design and construction techniques, with these techniques mandated in each of the IPD form contracts. These techniques include decision making and dispute resolution through consensus rather than a claims process, collaboration and open communication, BIM, compensation structures based on a philosophy of shared risk and reward, and limited liability.

IPD contracts usually do not have an upper limit for cost or a maximum date for project completion. Instead, the parties agree on a target budget and completion date. If the project does not meet these targets, regardless of fault, the entire team shares the impact of the failure through a reduction in fee. If the project performs better than expected vis-à-vis the targets, the entire team, regardless of responsibility, shares in an increased fee. It is anticipated, however, that the designer and constructor be compensated for their reimbursable costs.

The extent to which the parties' liability is limited in IPD depends on the type of contract used as well as the state law regarding the ability to limit liability for designers. Most states have statutes or developed case law that restricts a designer's ability to limit liability through either limitation of liability or indemnification clauses. Case law and anti-indemnification statutes focus on construction to discourage unsafe design and construction practices. The cases discuss the public policy requirement that designers are incentivized to perform their work with the appropriate amount of care. In *1800 Ocotillo v. WLB Group Inc.*,[22] the Arizona Supreme Court discussed the need to regulate designers' contracts by holding that a limitation of liability in a designer's contract was enforceable:

> Although it is possible that a limitation of liability provision could cap the potential recovery at a dollar amount so low as to effectively eliminate the incentive to take precautions, this is not the case here. Under the Ocotillo contract, WLB remains liable for the fees it earns. The fees undoubtedly were WLB's main reason for undertaking the work. Thus, WLB retains a substantial interest in exercising due care because it stands to lose the very thing that induced it to enter into the contract in the first place.[23]

The Florida Supreme Court, however, reached a different conclusion in *Witt v. La Gorce Country Club, Inc.*,[24] when it upheld a contractual limitation of liability as to the company but held that a geologist was personally liable for a professional error. This case was effectively overturned by statute enactment via the Florida legislature;[25] however, each state has different rules regarding the extent to which a designer may contractually limit its liability, thus potentially impacting the efficacy of such limitations in IPD contracts.

Lean Techniques

IPD contracts usually require the use of lean design and construction techniques. Accordingly, a significant risk on IPD projects is when the parties fail to understand the importance of the balance between limitation of liability, communication, and collaboration. Such was the case in the design and construction of the Denver VA Hospital, which finally opened in 2018, more than one billion dollars over budget. The VA does not have the authority to let IPD contracts; instead, the VA used an "Integrated Design and Construction" (IDC) approach more akin to CMAR. The theory behind the VA's use of IDC was that the constructor would be selected early in the design process; however, for the hospital project, the GAO determined that the VA switched to the delivery method too late in the project life cycle and after the designs were already completed.[26] Regardless, the VA attempted to move forward with its model while not understanding that models such as IPD provide that the designer and constructor be compensated regardless of the actual cost and that this compensation model relies on the limitations of liability.

Even though the VA decided to implement this delivery method to take advantage of lean techniques, failures of process resulted. Among other things, the project failed to: (i)require the designer to produce a design within budget, (ii) reconcile the cost estimates from the design team and the constructor, and (iii) implement communication requirements for a "difficult to work with and not cooperative" designer.[27] The contractor provided suggestions for significant cost reductions to bring the project back within budget, but these were both rejected by the VA and the design team. The VA asserted that the contractor should be responsible for constructing within the budget, despite the lack of a final construction cost, thus setting up a claim by the contractor for the increased cost. One of the reasons that the changes suggested by the contractor were rejected was that the designer's compensation terms included disincentives to redesign.[28]

The moral of the Denver VA project is that lean construction techniques do not arise from the intended delivery method. Rather, they must be carefully implemented through contracts that encourage communication and collaboration and by parties who have fully bought into the process (and have been afforded such opportunity) from the outset.

III. Professional Liability Overview

A. The Traditional Roles

In DBB, the designer performs to a professional standard of care. Typically, this standard is set as the care and skill ordinarily used by members of the design profession practicing under similar conditions at the same time and locality of the project. This standard is insurable and manageable by the design professionals. Owners, however, are sometimes frustrated by this standard because it is based on the actions of the community and no designer achieves perfection; therefore, the professional standard assumes a certain level of errors or omissions. Owners have attempted to overcome this concern by requiring designers to provide the "highest" standard of care. If the owner gets the benefit of that language (i.e., that there is a difference between an ordinary and highest standard of care) the owner may face challenges in recovery contribution from the designer's errors and omissions insurance policy that might otherwise be a viable source of funds available for these risks.

B. The Blended Roles

In CMAR, designers and constructors often have "blended" roles, meaning that the constructors review the designs for constructability and value engineering. Cases have recognized the increased responsibility for the design by the CMAR. Although the owner's implied warranty of reliable plans and specifications applies in a public CMAR contract, the differences between the responsibilities of a general contractor in DBB versus CMAR affect the scope of the implied warranty. The general contractor in a DBB project may benefit from the implied warranty where it relied on the plans and specifications in good faith; but the CMAR may benefit from the implied warranty only where it has acted in good faith reliance on the design and acted reasonably in light of the CMAR's own design participation. The CMAR's level of participation in the design phase of the project and the extent to which the contract delegates design responsibility to the CMAR may affect a fact finder's determination as to whether the CMAR's reliance was reasonable.[29] For example, in *Coghlin Electrical Contractors, Inc. v. Gilbane Building Company*, a Massachusetts court held that the CMAR could recover under an implied theory of warranty of the documents; however, "[t]he amount of recoverable damages may be limited to that which is caused by the CMAR's reasonable and good faith reliance on design defects that constitute a breach of the implied warranty."[30] Therefore, it is vital that the owner/CMAR contract specifically describe the CMAR's responsibility for design.

In CMAR contracts where the constructor maintains a meaningful role in the design process, the responsibility for realized errors may be more difficult to determine; for example, a designer may argue that it relied on the constructability review from the constructor to identify design issues. An additional issue arises when the constructor provides a prescriptive design as part of a value engineering suggestion. Of course, if the CMAR actually provides the design, the CMAR will not be able to argue that it relied on the design provided by the owner.

In DB, the design-builder assumes the liability for achieving the contractual performance requirements for both design and the construction. As noted above, designers have slightly more liability with respect to the design contingency as well as for schedule delays. However, best practices dictate that designers are not held liable for the contractual performance requirements in the same way as design-builders because designers do not control construction; therefore, designers cannot control the entire process to determine whether a performance requirement is met.

C. Consensus "Team" Roles

In IPD, the designer's liability is often limited to the contractually stipulated at-risk fee. The owner takes on the significant risk/liability for the direct costs of the project. The parties use contractually mandated lean construction principals to manage the project's risks.

IV. Impact of Current Project Management Techniques on Professional Liability

A. Traditional Standard of Care and Liability Exposure

The blending of design with means and methods should have a positive impact on the design professional's liability. Traditionally, a design professional is responsible to use reasonable care in rendering its professional services.[31] Contractual terms, however, can alter that standard by requiring the design professional to warrant these professional services to be suitable or fit for a particular purpose. Absent express warranties, if the design professional breaches the applicable standard of care, it assumes responsibility for the damages stemming from the breach, including damages for the cost of correction and the resulting compensable constructor delays. Traditionally, while the scope of the design professional's liability is clearly defined, it is still considered a zero-sum game in which a significant error or omission in the design documents provide the contractor the ability to receive additional compensation.

This traditional zero-sum mentality is the very thing that lean construction attempts to eliminate by promoting cooperation and collaboration. If a constructor or owner is influencing and shaping design decisions with information that is, in whole or in part, erroneous, then these same parties should not avoid responsibility for a resulting mistake; rather, responsibility should be spread proportionally among the parties.

B. Standard of Care and Liability Exposure in Lean Construction

Despite its growing usage, the use of lean construction techniques in DBB and CMAR have not altered the traditional liability standards and risk allocation methods.[32] The goal of lean construction is to limit the competing interests among the project team for the benefit of the project. Accordingly, a collaborative risk model should be employed. The project team should function as a cohesive whole—identifying, mitigating, tracking, resolving, and sharing responsibility for problems as they arise. As the construction industry adapts to these delivery techniques, the design professional must balance the benefits of collaboration with its retained liability. This is of particular importance given that individual professional liability insurance policies do not reflect a shared risk model. Thus, if the design professional offers input regarding construction means and methods, respective contracts should reflect that ultimate building responsibility remains with the constructor. Likewise, all collaborative design decisions remain subject to the design professional's judgment and, accordingly, ultimate responsibility remains with the design professional.

Define Expectation Loss Though the Contract

For the design professional, the allocation of responsibility for collaborative professional service actions should be clearly delineated in the design contract. This can be achieved by traditional means such as: (1) monetary E&O claim thresholds, (2) limitation of liability, or (3) waiver of consequential damages provisions. Further, consideration should be given to placing some of the responsibility for design errors and omissions upon all project team members who provide design guidance (e.g., design-assist and design-build subcontractors). Alternatively, the collective sharing concept prevalent in the IPD model can be adapted to other delivery methods. This collaborative approach to expectation losses, sometimes without regard to fault, ensures that all project team members have "skin in the game"—so long as project decisions are truly collective. To the extent that individual project team expectation loss liability is retained, it should be limited to eliminate the incentive to adopt conservative positions for fear that a more collaborative approach will increase exposure.

Limit Risk Through Insurance

The use of insurance to manage liability exposure to design professionals has long been an effective risk management tool. In many situations, insurance represents the only available asset that can be employed to respond to an errors and omissions claim. Such policies are typically issued as "project policies," covering all of the design professional's engagements for the stated period of time. The use of project-specific policies devoted to a single project should be explored to provide sufficient economic coverage to buffer against unacceptable expectation losses to aid the collaborative process. Indeed, every project team member who is involved in collaborative design decisions could be required to provide some form of errors and omissions insurance coverage for any collective design decisions that are made.

BIM

BIM is often created and controlled by the design professional. Indeed, AIA E203-2013 tasks the design professional with creating and distributing BIM protocols as well as managing the model. As such, the design professional is responsible for BIM and liable for errors contained in the model. Due to liability concerns and fear that other participants may alter the model, design professionals often exercise their control over BIM to limit, or even exclude, other project participants from obtaining access. In doing so, the design professional prevents utilizing BIM to achieve more collaboration among the project team.

Barry J. Miller is a Cleveland-based partner at Benesch, Friedlander, Coplan & Aronoff, where he is co-chair of the firm's Construction Group. Throughout his nearly four-decade career, he has focused his practice on the construction industry. Jonathon Korinko is a Cleveland-based partner with the firm who focuses his practice on representing and counseling clients in all aspects of construction law. Robynne Thaxton, of Thaxton Parkinson PLLC in Woodinville, Washington, is an attorney and consultant known for her experience with design-build procurement and delivery.

Endnotes

1. Lean production theory is the continuous "effort to eliminate waste from a production system in order to deliver ever more value to the customer." Greg Howell & Will Lichtig, Speech Presented to Cascadia LCI "Introduction to Lean Design" Workshop: Lean Construction Opportunities Ideas Practices (Dean Reed & DPR Constr. Inc., Sept. 15, 2008). Lean theory is centered around predictability and flow. Conrad Mackey, *An Introduction to Lean Construction*, BuildingsGuide.com (2019).

2. 1 Philip L. Bruner & Patrick J. O'Connor Jr., Brunner & O'Connor on Construction Law § 2:19.

3. Christian Pikel & John Draper, LCI Educ. & Training, Last Planner System Design Phase (Oct. 13, 2015).

4. This principle focuses on what happens next and who does it. For example: "If you are producing desks for classrooms. You work with your team to identify every step it takes to go from a stack of raw materials, to a table ready to be used in a classroom. For materials, you'd ask questions such as: Where does the wood go when it is delivered by the supplier? What happens next? Does it come to the factory pre-cut or do we cut it to specifications? Who does that? Where do we get wood glue, nails, and finishing seal? For production: Where do we keep the tools needed? What happens next? Does it change if the order is for 50 tables or for 5,000? For sales and customer service, you'd ask: Do we know who the decision maker is in each childcare center, or school, or school district? Do we know what their current inventory looks like or if they plan to build more schools, install more portable classrooms in the coming years? When a customer needs to order a table (or 20,000), what happens next?" Plan View, Inc., *5 Principles of Lean* (2020).

5. Daniel MacNeel & Dan Passick, LCI Education & Training, Lean Project Delivery Operating System (Oct. 16, 2017).

6. *Id.*

7. *Id.*

8. AIA, Lean in Design Forum (May 31, 2017).

9. Value is what the owner wants from the process and therefore is defined by the owner. The value definition is composed of statements that describe expected outcomes, or "value" that the project will deliver. *See id.*

10. Pikel & Draper, *supra* note 3.

11. *Id.*

12. *Id.*

13. *Id.*

14. *See* Patrick J. O'Connor Jr., *Productivity and Innovation in the Construction Industry: The Case for Building Information Modeling*, 1 J. ACCL 135 (2007); Andrew Chew & Meredith Riley, *What Is Going on with BIM? On the Way to 6D*, 30 Int'l Constr. L. Rev. 252 (2013); Dwight A. Larson & Kate A. Golden, *Entering the Brave, New World: An Introduction to Contracting for Building Information Modeling*, 34 Wm. Mitchell L. Rev. 75 (2007).

15. 1 Bruner & O'Connor on Construction Law, *supra* note 2, § 2:19 (Project delivery methods—Collaborative alliancing, lean project delivery and integrated project delivery) (citing Howard W. Ashcraft Jr., *Negotiating an Integrated Project Delivery Agreement*, 31 Constr. Law., Summer 2011, at 17 (providing a detailed discussion of integrated project delivery issues and noting that although integrated project delivery does not require building information modeling, "there is significant advantage to its use")).

16. Eric M. Larsson, 41 COA2d 105 (2009) (collecting cases regarding designers' and engineers' standard of care).

17. *Spearin v. United States*, 248 U.S. 132 (1918), holds that the owner warrants the sufficiency of the performance of prescriptive drawings and specifications for the purposes for which the project was intended. Subsequent cases have added the requirement that the contractor's reliance on the prescriptive plans be reasonable.

18. Although there is some additional liability for designers in design-build, it does not rise to the level of warranting the performance of the project.

19. CL Maddox, Inc. v. Benham Grp., 88 F.3d 592 (8th Cir. 1996).

20. Clash detection is the act of determining whether multiple drawing sets conflict with each other.

21. Am. Inst. of Architects, Integrated Project Delivery: A Guide (2007).

22. 196 P.3d 222 (Ariz. 2008).

23. *Id.* at 225.

24. 35 So. 3d 1033 (Fla. Dist. Ct. App. 2010).

25. Fla. Stat. § 558.0035.

26. U.S. Gov't Accountability Off., Report 13-302, VA Construction: Additional Actions Needed to Decrease Delays and Lower Costs of Major Medical-Facility Projects 18 (Apr. 2013)

27. Dep't of Veterans Affairs, Review of the Replacement of the Denver Medical Center, Eastern Colorado Health Care System, 15-03706-330 (Sept. 21, 2016).

28. The designer for the project would not be compensated for the redesign of the project, which disincentivized the designer from agreeing to any design changes. *Id.*

29. Coghlin Elect. Contractors, Inc. v. Gilbane Bldg. Co., 472 Mass. 549, 560 (2015).

30. *Id.* at 561.

31. Larsson, *supra* note 16.

32. 1 Brunner & O'Connor Construction Law, *supra* note 2, § 2:19 (citing Howard W. Ashcraft Jr., *The Transformation of Project Delivery*, 34 Constr. Law., Fall 2014, at 35, 38 (". . . As parties seek to engage more deeply, they realize that their contractual systems are not tuned for collaboration"); Zach Peterson, *One Small Step in Mindset, One Giant Leap for the Construction Law Industry: How the Judicial Stage Is Set for IPD and the Only Thing Missing Is Willing Participants*, 39 N. Ky. L. Rev. 557 (2012) (analyzing the integrated project delivery method, and encouraging lawyers and the construction industry)).