

Integrated project delivery and building information modeling: **A new breed of contract**

Brad C. Parrott and Michael B. Bomba

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From the early part of this decade, the construction industry has been flooded with discussion about collaborative approaches to the design and construction of projects. In this time we have seen integrated models that can process and calculate massive inputs to resolve discrepancies ordinarily undiscovered until a project is being constructed in the field. Many industry participants viewed this discussion as little more than construction-industry aspiration. However, it is clear that building information modeling (BIM) will change aspects of construction.

Before complete adoption, there remains a need for pragmatism, particularly regarding the collaborative manner in which BIM operates. This paper introduces basic contract terms involved in the use of BIM, the form contract documents, and the broad issues that should be of concern. This paper also presents a new and related delivery method called integrated project delivery (IPD).

BIM

Several years ago, an article in *Under Construct* succinctly described BIM as follows: “BIM can be summarized by project information that is digital, spatial, measurable, comprehensive, accessible, and durable. Instead of a beam being represented by a static line, in a fully realized BIM environment that beam would be represented by an intelligent digital object which might contain (when you click on it) the beam’s sizing, connections, structural forces acting upon it, when it is scheduled for fabrication, its delivery schedule and cost.”¹ Although this level of integration and utility may be a few years away, the ultimate benefits of BIM include significant risk reduction, quality improvement, and efficiency improvements.

BIM moves the design drawings from a two-dimensional representation to a three-dimensional one. BIM promises the fabricator the opportunity to streamline the shop drawing and shop ticket process. The request for infor-

mation (RFI) process can be greatly improved through both more discreet coordination and quicker responses.

Like the introduction of computer-aided drafting software in the 1970s, BIM is likely a game changer. There are a number of projects that are now using BIM.

Integrated project delivery

BIM is really a component of a shift toward greater collaboration. In fact, it may be the primary catalyst. You can think of BIM as a component part of an IPD method (sometimes referred to as collaborative project delivery). IPD likely means different things to different people, but in short, it is a framework that requires owners, designers, and contractors to work together. IPD is based on a new (or at least modified) way of thinking about the process of design and construction.

IPD mandates that owners, designers, and contractors be involved in all phases of the project. In some ways, you can think of IPD as a highly modified and advanced design-build approach. For a number of years, Australia and New Zealand have tested a collaborative approach described by one commentator as follows: “Alliances are incentive based relationship contracts in which the parties agree to work together as one integrated team in a relationship that is based on the principles of equity, trust, respect, openness, no dispute and no blame. In alliances all parties are bound to a risk/reward scheme where they all share savings and losses depending on the success or otherwise of the project.”²

In both the ConsensusDOCS and American Institute of Architects (AIA) form IPD documents, risks are shared among the owner, architect, and contractor. Success (that is, profits or a satisfactory building) or failure for each participant depends on the others’ performance. That certainly sounds like a communistic approach in which one participant’s mediocrity drags down others, and in some regards it is. For that reason, many commentators are less than enthusiastic about IPD. In a recent article in *Engineering News-Record*, Art Gensler is quoted as saying, “IPD is almost all hype.”³ Principal perceived problems with IPD include the following:

- Profits are at risk related to the total project.
- Parties may execute no-sue clauses.
- The cause of project problems is not relevant.
- No insurance products are available.
- There is no competitive bidding.
- IPD fails to recognize or capitalize on self-interest.
- The lack of precedent-setting court decisions may lead to uncertainty if problems arise.

Many of these perceived problems are, in fact, misperceptions. For example, IPD does not fail to recognize or capitalize on self-interest but in fact relies on it. IPD simply operates within the confines of a collaborative framework in which the team wins or loses (like our athletic teams).

IPD agreements seek to motivate the participants in such a way that their individual self-interests are aligned with project interests. The intended result is a project in which self-interest encourages the parties to work together to solve problems as they arise and to resist the instinct to hunker down and point fingers. Whether joint incentives are the best way to wring out the greatest reductions in risk is the biggest point of current debate. As many leading economists have opined, however, self-interest is the greatest incentive for behavior.

Regardless of whether you agree with the approach taken in creating incentives, there is much to be said for the simple goal of increasing collaborative and nonadversarial communication. In this regard, IPD presents a step in the right direction. While IPD does not remove all project risks (and some would argue that it adds new risks), increases in collaboration and communication reduce the parties’ exposure to these risks.

Furthermore, IPD seeks to eliminate the adversarial posture of many in the industry. Contractors and designers often view each other as adversaries. Designers put stamps on submittals/shop drawings saying that they are actually blind and their review is meaningless. Contractors and subcontractors expect designers to be perfect and act as though they can simply build their portion of the project with tunnel vision, giving no consideration to adjacent work. Owners draft contracts of adhesion and hold mammoth amounts of money with no consideration to the time value of money. Lawyers pump their clients with the perceived inequities at issue and stoke the flames of dispute. It is fair to say that current delivery methods create enormous opportunities for dispute. Everyone points fingers, and no one accepts responsibility.

The common method—owner engages designer, designer prepares designs that various contractors then attempt to execute with wildly varying degrees of designer involvement—is at best a fragmented process that encourages each participant to avoid as much responsibility as possible. IPD attempts to join these aspects in a manner that renders cohesive a formerly fragmented process. In this respect, IPD can be viewed as a complex teaming agreement. While we may argue with the manner in which we achieve the goal of greater collaboration (that is, IPD forms or some contract not yet created), it is clearly necessary to reduce the fragmented and adversarial nature of construction. One might argue that changes in construction processes are long overdue.

BIM industry forms

While there are a number of contract forms that attempt to address BIM, the leading and most-intensively thought through are those prepared by the AIA and ConsensusDOCS. AIA and ConsensusDOCS approach contracting for use of BIM in different ways.

AIA's principal BIM document is AIA E202-2008. It provides a fairly comprehensive framework for development of the model, level of development, and responsibility/liability for aspects of the model. Alternatively, ConsensusDOCS 301 (CD 301) sets forth more of a checklist of considerations in constructing a BIM contracting framework. Both are discussed more in the following sections.

AIA E202-2008

AIA E202-2008 is broken into three principal parts:

- protocol
- level of development
- model elements

In addition to the principal parts, other key elements include the definitions section and paragraph regarding ownership. Each key element is discussed in the following sections.

Section 1.2: Definitions

- Level of development (LOD): describes the level of completeness of each model element
- Model element: portion of the BIM representing a component, system, or assembly within a building or building site
- Model element author: party responsible for development of specific model element content to the specified LOD
- Model user: any party authorized to use the model

Section 2.2: Model ownership—One of the primary concerns raised in use of BIM is a blurring of intellectual property rights. AIA seeks to resolve this concern in a simple and sensible fashion. Section 2.2 provides that “in contributing content to the Model, the Model Element Author does not convey any ownership right in the content provided or in the software used to generate the content.” Furthermore, section 2.2 clearly provides that no use or related works may be created by any party except as it relates to the specific project that is the subject of the contract and model. The intention is that traditional rules regarding ownership of intellectual property rights remain intact.

Model management—AIA E202-2008 provides the architect as the manager of the model unless otherwise

stated. However, it does contemplate others serving as the manager during different phases of the project.

Level of development—AIA E202-2008 describes levels of completeness. To understand the framework, first consider the progressive nature of construction. For example, site work occurs prior to foundations/footings/piers and the like. AIA E202-2008 contemplates that the model will be built in a similarly progressive fashion. Thus, the level of development relates to both specific content requirements and progression. Attached to AIA E202-2008 is a table that is subject to variation depending on the job. Each LOD will have its own specific content and timing requirements for each model element. A precast concrete parking structure's design content (that is, structural precast concrete model element) would not be integrated into the model until footings and foundation drawings were integrated. Similarly, architectural precast concrete panel design content (that is, architectural precast concrete model element) would not be integrated until the structure on which it hangs is integrated, and so on.

Another important aspect of the LOD in AIA E202-2008 is that it defines authorized uses at each stage. If there are four levels of development, a model that has only progressed through two levels would not be allowed to issue for permit or construction of the building in its entirety. The drafter using an AIA E202-2008 form must be careful to describe the uses that are authorized at each level of development.

Reliance on model elements—AIA E202-2008 provides that each user of the model may rely on each model element. If you are the contributor of the structural precast concrete model element, designers and fabricators of other work that relates to or attaches to the precast concrete can rely on the precast concrete model element. Without directly stating as much, it seems that the intention of AIA E202-2008 is to maintain traditional notions of causation-based liability. In short, if you draft it, you are responsible for mistakes that may cause damage. As discussed in the following section, we believe that there will remain traditional causation-based liability but the lines between who or what is the cause will become more blurred.

CD 301

CD 301 takes a somewhat different approach and uses entirely different language. CD 301 sets forth some important general principles that are intended to clarify party relationships and risk allocations.

General principles

- No restructuring of contract relationships or risks is allowed except as stated in CD 301.

- No privity of contract is created among project participants.
- Each party to the governing contract shall incorporate a similar BIM addendum in all subcontracts.
- There may be no diminishing of roles or duties of architect or engineer.
- Contributions to the model by the contractor and subcontractors shall not constitute performance of design services.
- The model cannot be used to extract material or object quantities.
- The design model controls over any other model (that is, component part).
- Tolerances in specifications carry into the design model.
- There are addendum controls over the governing contract.

Although the authors believe that these guiding principles are useful, there are aspects that are nonsensical. For example, there are many occasions in which a subcontractor (such as a precaster) serves as a specialty engineer. To the extent that a subcontractor is engineering its own product, such subcontractor is performing design services. From the perspective of an owner, the contractor is responsible for all subcontractors, so the contractor is also responsible for some design services. Therefore, the attempt to remove contractors and subcontractors from design liability fails to acknowledge reality.

On the positive side, privity of contract is one issue that causes litigators concern. Traditionally, one subcontractor cannot sue another for money lost due to some negligence (that is, economic losses as opposed to personal injury or property damage). Several commentators have questioned whether BIM will create privity among BIM users/contributors. CD 301 seeks to avoid the dispute by stating that no privity is created. Whether this self-serving statement is effective is likely to depend on the state and whether the state meaningfully enforces an economic loss rule.

Definitions

- **Affiliated contract:** any contract relating to the project with the BIM addendum attached
- **Construction model:** aspects of project modeled and identified in BIM execution plan
- **Contribution:** any contribution to the model shared with others
- **Design model:** model that reaches a level of completeness equal to what you would see in traditional two-dimensional drawings
- **Model:** anything less than a design model.
- **Federated model:** linked but distinct models
- **Full-design model:** architect- or engineer-completed model

- **Information manager:** party responsible for BIM information management program
- **Project model:** federation of one or more construction models as a full-design model

In our opinion, one of the failings of CD 301 is that there are so many different models that dispute seems not only invited but inevitable. Why there is a need for so many different model definitions (six total) is hard to understand. Of course, the use of BIM is in its infancy, so these documents are likely to undergo an evolution as we learn how best to implement BIM and as courts interpret its meaning.

Information management—Like AIA E202-2008, CD 301 provides for a framework for information management and a single party who is the information manager. In general terms, this section is intended to serve a gatekeeper function so that construction of the design model proceeds in a sensible fashion and the data is secure.

BIM execution plan—CD 301 contemplates that project participants will meet and plan ways to build the design model. This is the most dramatic difference in approach compared with AIA E202-2008.

AIA E202-2008 spells out levels of development, responsibility, and the like. In other words, AIA E202-2008 has an execution plan already prepared. In CD 301, guidelines are provided that discuss the sorts of issues that the BIM execution plan should address. CD 301 is, in part, an agreement to meet at a later time and then agree on how to actually build the design model.

We believe that this is a potential problem in using CD 301. In all jurisdictions, an agreement to agree is not an enforceable contract. In CD 301, the participants agree to meet and discuss some or all of the BIM elements listed in the addendum (that is, no current agreement on those elements). For example, one of the elements to be agreed on is the standard dimensional accuracy representations to be assumed by the representing party (that is, accurate, somewhat accurate but must look at two-dimensional drawings, or no representations). Until the BIM execution plan is set and agreed to, there may be no enforceable agreement.

Risk allocation—Like AIA E202-2008, CD 301 states that no change in risk occurs. In other words, each contributor is responsible for the accuracy of its contributions to the design model. An important distinction is that CD 301 has a mutual waiver of consequential damages that might be quite valuable to both contractors and subcontractors.

Intellectual property rights in the model—CD 301 goes to significant lengths in describing intellectual property rights. Below is a summary of the intellectual property terms:

- Each party indemnifies the other from any allegation of infringement or misappropriation.
- There will be no granting of any intellectual property rights except as expressly stated therein.
- A nonexclusive license is granted for purposes of the project only. This grant extends to all affiliated contracts (that is, subcontractors).
- If the owner does not pay, its intellectual property licenses are terminated.

Integrated project delivery forms

For purposes of this paper we only examine AIA C191-2009. Furthermore, because this document is in its infancy and not likely to be used, our review of the contract is broad. AIA C191-2009 is the AIA-standard IPD contract. The purpose of the IPD approach is to integrate the owner, designer, and contractor in the process from planning through construction.

Key aspects of AIA C191-2009 agreement

Owner, designer, and contractor are parties to the contract—One key departure from traditional delivery methods is that in an IPD contract, the owner, designer, and contractor are all parties and in privity of contract. Notwithstanding certain waivers, each has the opportunity to sue the other.

Management team—AIA C191-2009 contemplates an “executive management team” and a “project management team.” The project management team executes the directives of the executive. The project management team maintains a project work plan and reports to the management team (project managers report to project executives).

No competitive bidding and no firm price—Because the intent of IPD is collaboration from design through start-up, competitive hard bidding is not possible. AIA C191-2009 contemplates the initial establishment of a target cost. The target cost is not a guaranteed maximum price. However, incentives are based on this target cost, and there can be serious consequences to the parties if the target cost is exceeded.

Incentive compensation—If the actual project cost is less than the target cost, all parties share in the savings. This works much the same as cost-share clauses in GMP contracts work today. The same incentive is created to be conservative in the target cost.

Goal-achievement compensation—AIA C191-2009 contemplates that there may be certain goals for which the owner is willing to compensate. The documents are not specific as to what these goals are, but one example might be the goal of completing design work by an aggressive date. Another might be tied to LEED points. In any event, the parties have the opportunity to set somewhat aspirational goals and are given incentives to attain them.

Insurance—One of the biggest obstacles to IPD is the absence of insurance products. As discussed in the following section, risk is shared. Current insurance products are fault based and do not fit well within the IPD structure. The authors are aware that several underwriters are working to resolve the challenges presented and create insurance products to go with IPD contracts. The development of insurance products addressing IPD is likely the next stage in the advancement of IPD. As it becomes clearer what types of insurance policies parties can obtain to cover IPD, the contractual models will be able to evolve toward more useable structures and terms.

Risk sharing—Article 8 of AIA C191-2009 provides that risks will be shared among the parties and that all but a handful of claims are waived against the other. Thus, owner, designer, and contractor waive all claims but the specifically enumerated claims, which are:

- willful misconduct
- warranty obligations
- nonpayment by owner
- indemnity obligations
- failure to procure insurance
- extent of insurance proceed to cover an occurrence
- liens and claims not subject to this agreement

In addition, owner, designer, and contractor waive claims for consequential damages.

Indemnification—Parties provide cross indemnities for claims of personal injury or property damage as well as for third parties who are not parties to the contract. However, can subconsultant and subcontractor claims pierce the waiver provisions?

For example, if a precaster claims damage due to bad structural design, then it will make such a claim to the contractor. Can the contractor present this claim to the designer for indemnity because it relates to the work of a party that is not a signatory to the contract? If the answer to that question is yes, then the waivers of claims are of

decreased value. The likely result appears to be that if the claim is something that would be covered by the designer's insurance, the claim would not be waived. Because these contracts are new, however, there are no court decisions to give guidance regarding their real-world application and interpretation.

IPD contracts are untested

As we mentioned, IPD contracts are new. As such, they have not been reviewed by courts and we do not know all of the implications of their use. IPD contracts face significant barriers to gaining widespread acceptance, including:

- Only a sophisticated owner can consider their use.
- There is no competitive bidding.
- No fixed price could affect the ability to finance.
- Designers and contractors are very hesitant to share risk with each other.
- No current insurance products are available.
- There is no guidance from courts.
- Risks are shared.

Conclusion

IPD will not likely be used in the near future, and IPD is certainly not the right procurement method for every job. However, BIM is the leading edge of a movement toward greater collaboration, and BIM is a reality. Although we may debate whether the current IPD documents are well or ill conceived, we believe that moving the construction industry toward greater collaboration is good for all involved.

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About the author



Brad Parrott is a partner at Shapiro Fussell in Atlanta, Ga. He is a litigator representing construction industry participants throughout the United States. Parrott represents a number of the largest precast concrete producers in the United States and has served as lead counsel for precasters in disputes in Alabama, California, Florida, Georgia, Kentucky, Louisiana, Maryland, Michigan, New York, Nevada, North Carolina, Ohio, South Carolina, Tennessee, Texas, Virginia, the District of Columbia, and Wyoming. He is a member of the American Bar Association Forum on the Construction Industry, the Construction Section of the Atlanta Bar Association, PCI, and Georgia/Carolinas PCI. He has been named a Super Lawyer Rising Star from 2005 to present.



Michael B. Bomba is an associate counsel on the AIA Contract Documents team at the American Institute of Architects in Washington, D.C. Bomba works actively in the creation and revision of AIA contract documents. He worked actively with the Documents Committee in the development of *Integrated Project Delivery: A Guide*, as well as the AIA's three families of standard form integrated project delivery agreements. He also worked with the AIA Documents Committee on revisions to AIA A201-1997, General Conditions of the Contract for Construction, and on the owner/architect agreements that replaced AIA B141-1997 and AIA B151-1997 in late 2007. Bomba obtained his JD from the American University Washington College of Law in 2002. Prior to joining the

AIA, he worked at a private law firm in Washington, D.C., representing design professionals in corporate and litigation matters. He is a member of the bar in both the state of Maryland and the District of Columbia.

Synopsis

From the early part of this decade, the construction industry has been flooded with discussion about collaborative approaches to the design and construction of projects. It is clear that building information modeling (BIM) will change aspects of construction. This paper introduces basic contract terms involved in the use of BIM, the form contract documents, and the broad issues that should be of concern. This paper also presents a new and related delivery method called integrated project delivery.

Keywords

Building information modeling, efficiency, integrated project delivery, quality improvement, risk reduction.

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