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Building Information Modeling, Integrated Project Delivery, and Collaborative Contract Trends in the Construction Industry

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The construction industry is abuzz with talk of building information modeling (BIM) and integrated project delivery (IPD).\(^1\) Each of these innovations is significant in its own right. Taken together, they have the potential to transform design and construction law and to revolutionize contracting practices.

This article provides an introduction to BIM and IPD, but it omits many of the important legal considerations presented by these developments. Much has already been written on the technical legal issues.\(^2\) The debates spawned by that literature will continue for years to come. I offer this overview primarily to explore how significant BIM and IPD may be for lawyers who negotiate and review design and construction contracts. As you will see, I think the prospects are remarkable.

1. Building Information Modeling

BIM is a spectacularly potent application of digital design technology.\(^3\) Unlike conventional computer-aided design and drafting (CADD) software, in BIM, the computer model uses data-packed objects capable of relating the attributes and functional characteristics of project details to one another. BIM technology can generate "a database of information about the objects that constitute the building" that "can be used by the designer not only to represent or display the design, but also to analyze its acoustical, thermal, or structural properties."\(^4\)

BIM technology is also much more than design software. The model is useful to many other project participants in addition to the lead architect or engineer, and it offers more than design capability. It is being used for scheduling and pricing purposes. Moreover, it provides a powerful new tool for identifying potential design conflicts. While BIM is still a relatively new technology, significant empirical evidence confirms that BIM allows the design and construction teams to identify problems much earlier than conventional design and construction, thereby reducing cost and avoiding many delays. For that reason, BIM can dramatically improve overall efficiency.

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2 See, e.g., Travis W. Brown & Joe R. Basham, Building Information Modeling, in SHARED DESIGN 4-1, 4-17 through 4-33 (Michael T. Callahan ed., 2011) [hereinafter SHARED DESIGN]; Ashcraft BIM, supra note 1, at 9-14.

3 See generally Michael T. Callahan, What is Shared Design? What is Delegated Design, in SHARED DESIGN, supra note 2, at 1-1, 1-14 through 1-19.

4 Id. at 1-15.
Building Information Modeling, ...

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In contrast to a conventional set of plans and specifications, which is essentially static, a BIM model is dynamic. The objects in the model may be thought of as intelligent. An object recognizes how its own distinct characteristics relate to one another. And the model knows how information concerning one object or component relates to information about other objects and components, the project as a whole, and the construction process. For example, a wall exists in the model not as a set of lines, but as a computerized version of the actual wall being designed. If the design is altered to move a door, BIM technology can recognize how that change affects other components of the wall in which the door is located. It can also recognize what impact the change will have on other building features, such as structural load calculations, engineered connections, electrical and HVAC features, and shop-engineered details. In this way, the model functions as a simulated project that the participants can manipulate with relative ease.

Because a BIM model is a far more comprehensive and data-rich representation of the project, BIM technology makes it possible to incorporate a wide range of design and construction information into a single digital tool. Plans and specifications need not be sent physically or electronically as discrete pieces of the design; they can be incorporated into a comprehensive model that multiple parties can use. For project participants who are prepared to utilize BIM to its fullest, the technology allows unprecedented capacity to collaborate with one another through the model. They can include in a computerized model all of the design and construction details for the project, no matter whether those details come from the primary design team, from the contractor's pre-construction analysis, or from the major subcontractors, specialty designers, specialty trades, suppliers, or manufacturers. And if the parties agree to share control of a single model (a practice that raises some significant liability and intellectual property issues), many different project participants can input changes and other data into the model on a real-time basis.

As already mentioned, another extraordinary benefit of BIM technology is that it is not limited to three dimensions. It can extend to fourth and fifth dimensions—scheduling and budgeting information. With BIM, the participants can work together simultaneously to build the virtual project before actual construction begins. This ability increases the efficacy of value engineering, radically improves and speeds conflict or clash identification and resolution, and facilitates scheduling and constructability review. The model can also include life-cycle information that the project's owner or manager can use after the project has been constructed.

BIM has been in use for several years, but its full potential is only now being imagined. The technology's significance depends on how it is used. If the project architect maintains complete control of the model, the impact on the other participants may be modest. In other situations, the general contractor may use a BIM program for a project that is being designed conventionally, or two or more project participants may use the technology independently from one another. In each of these cases, BIM merely improves efficiency for isolated aspects of the design and construction process. The most effective and significant use of BIM occurs when multiple project participants collaborate using a single model.5 Many in the industry believe that this more comprehensive application of BIM will soon

5 Brown & Basham, supra note 2, at 4-4.
dominate the design and construction process, thereby intensifying the interdependent nature of the relationships among participants.

II. Integrated Project Delivery

For decades, the construction industry has been pursuing an elusive collaborative alternative to the traditional design-bid-build contracting structure. Not only does the traditional arrangement theoretically maintain design and construction as entirely separate functions, but it also calls for a series of bilateral contracts to cover specialty design consultants and distinct construction trades. Under these circumstances, the highly individualistic and independent perspectives and competing economic incentives of those who participate in the design and construction of any project make full coordination and collaboration especially difficult. While many other considerations influence how project participants may structure their contractual arrangements, the industry as a whole looks for an approach that will incentivize better and more comprehensive cooperation and coordination and that will facilitate the efficient and congenial resolution of problems and disputes.

Over the past three or four decades, the industry has experimented with such alternatives as design-build, program management, construction management, partnering, and alliance agreements. While each of these structures encourages and supports greater collaboration, none fundamentally changes the incentives for each participant to act primarily to maximize individual interests without much regard for the effect on the project as a whole.

Integrated project delivery (IPD) has recently emerged as a promising system for establishing truly collaborative contractual relationships among the participants in a construction project. While the industry has not yet settled on a single understanding of IPD, several key features help to distinguish the method. One seasoned construction lawyer summarizes IPD as:

a project delivery method under which the key project participants (at a minimum, the owner, designer, and contractor) are involved in the job from an early stage of design, work under a single contract signed or joined by all, jointly manage the job, and share risk and reward based on agreed performance objectives. Generally, on such projects, the key project participants broadly waive the right to make claims against each other.

Note how significantly IPD departs from the conventional contractual structures that have been used in the industry for years. First, when a project adopts IPD, a single comprehensive contract or contractual structure applies to several key project participants. This is in marked contrast to the traditional approaches, which rely on a series of bilateral contracts. An IPD agreement may include not only the owner, the lead design professional, and the prime contractor, but also the principal consultants who make up the design team, along with major subcontractors. And the parties to the IPD contract manage critical aspects of the project jointly and agree to consistent terms on

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6 See generally Ross J. Altman, Project Delivery Systems, in CONSTRUCTION LAW 57-94 (William Allenworth et al. eds., 2009).
7 See Philip L. Bruner & Patrick J. O'Connor, Jr., 2 Bruner & O'Connor on Construction Law § 6:01 (discussing delivery systems in general), § 6:11 (program management); §§ 6:12-6:13 (construction management); § 6:15 (design-build); § 6:17 (partnering), & § 6:18 (alliance agreements) (Westlaw 2011), available at Westlaw BOCL.
9 Ralls, supra note 1, at 3.
certain selected issues of overriding concern, such as cost savings and loss sharing, liability caps, and a unified dispute resolution processes.

In its most powerful manifestation, IPD produces a set of functional and legal relationships in which all of the major players (1) begin working together during the earliest possible stages, (2) bind themselves to make certain key decisions collectively through a decision-making and project management structure in which each of them has a voice, (3) participate materially in the financial fate of the project by means of cost savings and cost overrun sharing provisions and incentive compensation systems tied to project goals, (4) substantially insulate one another from incurring liability to each other, and (5) bind themselves to a highly structured dispute resolution system that significantly reduces the prospect of litigation or arbitration. This is indeed a new world order for the construction industry.

Under one version of IPD, the major project participants organize themselves into a single-purpose business entity (SPE) to manage the project. Among other things, this structure means that some decisions that traditionally have been made by individual project participants may be designated for collective decision-making by a representative managing group of the SPE. This organizational device "furthers the parties' collaborative undertaking as it requires them to carefully consider governance and financial incentive questions critical to Project success." What is just as important is that, under the terms of the prototype arrangement, all members of the SPE will be bound by the collective decisions, and no member will be liable to any other member for actions taken in good faith in its capacity as a member of the SPE and in accordance with the IPD agreement. (Members will still be liable for obligations undertaken via separate agreements with the SPE for design and construction services.) Figuratively speaking, the parties to the IPD agreement get into the same boat, where they will float or sink together, with little hope of profiting individually unless all profit collectively.

In this way, IPD makes true joint venture out of the key project participants who otherwise would be acting out of individual self-interest. The owner still invests the hard capital, but the other parties to the IPD agreement, instead of participating in the project solely for a contractual fee, invest their time and talents in the venture collectively. Together, they take the investment-style risk that, acting in concert, they will successfully complete the project on time and within budget. This may mean that the compensation payable to each of the major project participants will be subject to increase or decrease depending on whether or not the project as a whole achieves its performance, budgetary, and scheduling objectives. Under one variation, a participant's entire profit, and even its ability to recover some of its costs, is at risk.

Similarly, all participants may benefit from consistent liability limitations enforceable against all other participants.

IPD liability models often shield participants from liability arising from collective decision-making. Similarly, service providers,

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10 See generally Cleves & Meyer, supra note 1, at 10-16.
11 Bruner & O'Connor, supra note 7, at § 6:18.80.
12 See Cleves & Meyer, supra note 1, at 12.
particularly those part of the collaborative team, agree to limit their rights of recovery against other team members, including the owner. Some models, like the Project Alliance, severely limit team members from seeking redress from one another.13

IPD also normally imposes a stepped and facilitated dispute resolution process binding on all of the major participants. Although the precise mechanism varies from one IPD version to another, the process may provide for decisions to be submitted to one or more project management or project governing bodies made up of representatives from each key participant, and it may vest final, binding authority in a panel composed of chief executive officers of the participants, together with a third-party neutral who may have been selected in advance.14 If a dispute gets to the final stage, the process may give the third-party neutral authority to function as a facilitator who will proactively pursue a mutually agreed resolution and, if that fails, who will make the final, binding decision.15

When taken to such lengths, IPD is unlike any other project delivery system. The parties not only agree to work together for the success of the project, but they back up that commitment with an elaborate and relatively comprehensive set of incentives and controls intended to make real collaboration the only viable option. Leading advocates have even characterized IPD as no-fault construction.16

III. How are BIM and IPD Related?

At first blush, BIM and IPD might seem to be entirely distinct developments that simply happen to be emerging contemporaneously in the construction industry. Indeed, they do not even fit in the same category. BIM is a technology; IPD is a project delivery system.

On closer consideration, however, the symbiotic potential inherent in BIM and IPD becomes clear. IPD recognizes and seeks to capitalize on the increasingly interdependent nature of design and construction activities. BIM accelerates and intensifies that interdependence. Moreover, if BIM’s powerful efficiencies guarantee its eventual dominance in the industry, it may generate a nearly irresistible demand for a new project delivery system that is more compatible with the complex network of relationships that BIM fosters among the key participants in the project.

The net result of the emergence of BIM and IPD may well be to transform the construction industry. BIM makes a technologically compelling case for extensive collaboration among all of the key project participants. IPD offers a contractual structure that incentivizes the participants to take full advantage of the highly collaborative process that BIM technology makes possible.

In discussing another important development in building design and construction, I previously argued that evolving practices have been moving in a distinctly collaborative

132 BRUNER & O’CONNOR, supra note 7, at § 6:18.90 (footnote omitted).
14 Id.
15 Id.
16 See Cleves & Meyer, supra note 1.
direction that may forecast a transformation in contractual relationships in the industry.

Over the past few decades, several developments have caused design and construction practices to call increasingly for shared responsibility, coordination, and cooperation among multiple project participants who have traditionally operated independently from one another. Call this phenomenon the collaborative shift in contemporary design and construction. This collaborative shift represents a major contractual challenge for an industry with a tradition of fierce independence, legendary combative ness, and internecine disputes.\(^\text{17}\)

BIM may supply the critical technological advance needed to encourage the construction industry as a whole to embrace the collaborative shift. As one commentator has quipped: “Collaborative projects can be executed without building information modeling (BIM)—but why would you?”\(^\text{18}\) If BIM becomes the industry standard for project design and management, legally meaningful and pervasive collaboration may soon become the dominant factor defining contractual relationships in the industry.

And the dominance of a highly collaborative project delivery system could, in turn, revolutionize the practice of construction law. Litigation and adversarial arbitration may eventually play a much smaller role in the industry than they currently do. It goes too far to suggest that the collaborative shift threatens to make the construction litigator an endangered species.\(^\text{19}\) But the construction bar may need to develop greater expertise in the law and practices applicable to cooperative ventures, limited liability business entities, and facilitated dispute resolution. Happily, this is familiar territory for ACREL fellows. \footnote{\text{17}}\text{Carl J. Circo, Will Green Building Contracts Transform Construction and Design Law?, 43 URBAN LAW. 483, 524 (2011). See generally Altman, supra note 4, at 85-89.}

\text{18} Ashcraft, supra note 1, at 23.

\text{19} See Allen L. Overcash, Will the New Contract Forms for Integrated Project Delivery Make Conflict Obsolete? (Or Are We Still Lost in Our Contract Obsession?), J. AM. C. CONSTRUCTION LAW., Winter 2009, at 19,

\footnote{\text{got programs?} If you’d like to volunteer, or communicate ideas for Plenary Sessions, Roundtables or Internal Webinars, contact Larry Shulman (lshulman@shulmanrogers.com) or Margaret Rolando (mrolando@shulhs.com).}