

What's the Buzz about BIM

Developing a Workable Contractual Structure for BIM Projects

By Beth Andrus and William Bender



Rendering of the Burj Dubai Tower, Dubai, UAE
Courtesy of Rowan Williams Davies and Irwin, Inc.

By now, most structural engineers have not only heard of Building Information Modeling, but many have seen presentations in which computer-animated buildings erect themselves before their eyes. Some have used BIM, or some version of it, on a project. But few have thought through the unique legal issues that should be addressed contractually before using BIM.

In traditional design-bid-build delivery systems, the design team typically has a contractual relationship directly with the owner, but has no such direct relationship with the contractor, or subcontractors, vendors or equipment suppliers. These entities may now be BIM participants. Does it make sense for all participants to sign a single BIM agreement, thereby creating a direct contractual relationship where it would not otherwise exist? Or does it make more sense to maintain traditional lines of contractual relationships, using a standard “BIM rider” to whatever contract would have otherwise signed?

Creating new contractual relationships where they have not traditionally existed, however, may lead to disputes over new duties and responsibilities, thereby increasing legal risks to the signatories of such an agreement. It may also be difficult to anticipate during the conceptual design phase who will ultimately be given access to the model down the road. It

may make more sense to develop a standard project BIM agreement that the owner and lead design firm execute and agree will flow down to

other design firms, contractors, consultants, suppliers, fabricators, or estimators.

Owners also need to understand that, although they will be gaining many advantages from the use of BIM on complex projects, there will be added costs and some additional risks. The additional costs and risks may require additional attention to contract drafting.

BIM Presents Unique Legal Issues

BIM is more than new technology. It has the potential to radically change the way in which projects are designed and built. In March 2007, the National Institute of Building Sciences Facilities Information Council published a Model Standard (NBIM) in which it defines BIM as a “collaborative process,” rather than simply a computer model. The goal of BIM is the generation of a relational database and a behavior model to capture and present building information dynamically as needed – a 3-D view, a 2-D drawing, a 4-D construction schedule, or 5-D cost estimating and constructability information.

Design professionals are familiar with computer-assisted design (CAD) software, such as AutoCAD®, but most are also familiar with CAD’s limitations. The software does not “know” that the lines being drawn graphically constitute a steel beam. The buzz about BIM is that designers now have the ability to use a single database to capture all design information about this beam, including non-graphical information, such as its dimensions, connection details and supporting structural calculations – which anyone accessing the database can manipulate.

The traditional design-bid-build project delivery system with its clearly-defined boundaries, responsibilities and disclaimers of responsibility as laid out in the standard AIA, EJCDC or AGC contracts, does not fit a virtual world where the “design” is collaborative, often hard to define and the result of a fluid process between collaborators. These standard contracts do not reflect real-time sharing of, reliance on, and manipulation of design information by designers from other disciplines, owners and contractors. Some unique legal questions to consider include:

How will BIM be used on the project?

BIM has been, and can be, used for architectural design, structural design, spatial validation, construction phasing, 3-D modeling, energy modeling, circulation design validation, cost estimating, quantity take-offs, lighting layouts, acoustics, ingress and egress, landscape design, erection sequencing, equipment design, fabrication, construction management, and facilities operations and maintenance. Participants should define how BIM will be used, and by whom.

Who is doing what to the information in the Model and Database?

This question cuts to the heart of the BIM issue – who is the *designer* and what is the *design*? If one designer’s work can be modified by another designer, or even automatically modified by the BIM software itself as a result of a change made by another designer, who is responsible for the modification to the design?

Moreover, a project design evolves as additional participants add information to the model or database, interferences are identified or constructability analyses are completed. When is the *design* in its “final” form for the various stages of the project development, such as permitting, bidding, shop drawings, construction and inspection?

Who is playing the role of “engineer in responsible charge”? Most state licensing laws require one engineer to be responsible for any engineering work done under his or her supervision or control. While there may be a lead architectural or engineering firm hosting the model and managing access to it, that firm is not likely capable of being “in responsible charge” for all design work that goes into the model. Any agreement should clearly indicate that the “host” firm is not acting as architect or engineer in responsible charge of all the design work within the model and that each individual collaborating in the design remains responsible in charge of his or her own design contributions, as may be required by design professional licensing laws or building codes.

The NBIM Standard also recommends the following contractual provisions:

- 1) Identify contractually who will own the model.
- 2) Develop an access protocol that allows access to the model, but ensures that access does not supersede ownership rights.
- 3) Identify who is “responsible for administering the model and providing the technical resources to enable connectivity, host the files, manage access, and assure security.”
- 4) Require the host to maintain insurance against loss or damage to the model.
- 5) Identify who is responsible for deciding what information is permitted into the model, and how conflicting information will be reconciled.
- 6) Maintain printed design documents as the official contract documents for archival purposes and regulatory review.
- 7) Make electronic “snapshots” of the model at key milestones, and preserve the electronic information at each major milestone event.

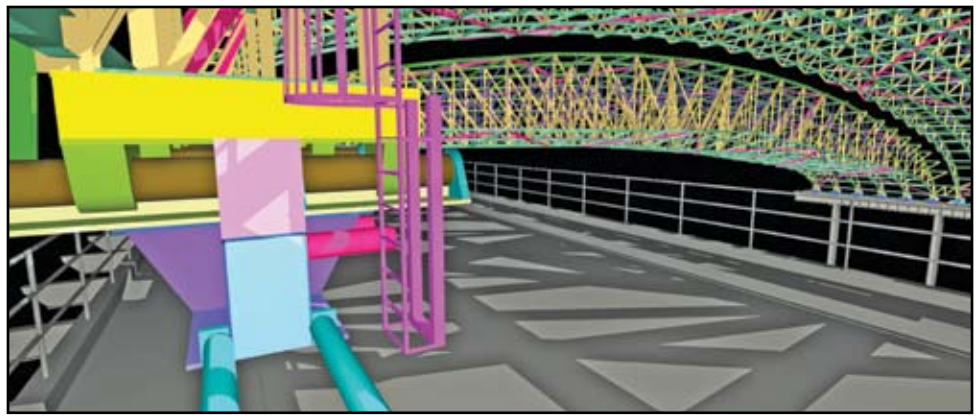
Periodic BIM design coordination meetings at defined milestones would be beneficial, so that participants can acknowledge that a *design* and the associated database have become “locked” into a format that follow-on designers, contractors, subcontractors, equipment manufacturers and other material suppliers can utilize to begin their work. The BIM lockdown may occur once or in phases, depending on the complexity of the project being modeled and the project delivery system employed.

Finally, members of the design team should produce final 2-D construction drawings with the required stamps or seals, despite the availability of an electronic model. Most state licensing boards still require registered architects and engineers to stamp or seal design drawings by hand. These 2-D drawings can serve as the final design to be consulted to resolve conflicts.

*Who owns copyrights to which part of the **Design** and Database?*

Federal copyright laws protect “original works of authorship” that are fixed in “a tangible form of expression.” Coverage extends to “literary works,” “architectural works” and “pictorial, graphic or sculptural works.”

The design of a building, set out in architectural plans or drawings, is subject to copyright protection as an “architectural work” under 17 U.S.C. § 102. Technical drawings may also be copyrighted as a “pictorial” work. According to the U.S. Copyright Office, automated databases may qualify for copyright protection as



BIM of stadium roof. Courtesy of Walter P Moore.

a “literary work.” Under present copyright statutes, the copyright in a contribution to a “collective work” is distinct from the copyright in the collective work as a whole. As a result, there are unique intellectual property rights issues that will need to be addressed, including the entitlement of any participant to claim exclusive ownership to all or portions of copyrightable works within the BIM.

Under the U.S. General Services Administration’s BIM guidelines, the Public Buildings Service requires ownership of all data and deliverables of architects and engineers. The GSA presumes that this requirement extends to BIMs. Yet, under AIA and EJCDC standard contracts, the

presumption is that the design professional retains ownership to all intellectual property, presumably including any work within a computer model. The NBIM Standard simply recommends that the project agreements should address the participants’ intellectual property rights “as appropriate.” Essentially, this means that design firms and their counsel need to craft contractual language addressing this issue.

To eliminate disputes over ownership, all A/E BIM participants could transfer only ownership of the automated database aspect of the BIM to the project owner in exchange for indemnity and limitation of liability provisions. The A/E participants could be

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granted a royalty-free, non-exclusive license to use the automated BIM database for certain identifiable purposes. If an A/E firm wishes to use the BIM for marketing or educational purposes, it could do so without the owner's prior written consent.

The individual "architectural works" or technical drawings that participants may prepare and input into the database should remain the property of the contributing party. Frequently, an engineering firm may have copyrighted standardized plans or details for certain types of projects, which it will want and need to use on future projects under different ownership. To the extent such plans or details are incorporated into a BIM, these firms should retain ownership of them.

Who will be responsible for BIM errors?

Using BIM may lead to unforeseeable errors, some caused by the software itself and some caused by miscommunication in this new collaborative process. The NBIM Standard recommends that professional and software liability be addressed contractually and explicitly "permit reliance without checking software functionality." It also suggests limitation of liability clauses and indemnification provisions to "assist [in] appropriately balancing design professional liability."

There may also be additional design and construction costs resulting from BIM errors. Who should bear the risk that such unforeseen events make the BIM more expensive or more time consuming than anticipated? The project agreement should specifically allocate the risk of delays or extra work arising from BIM errors.

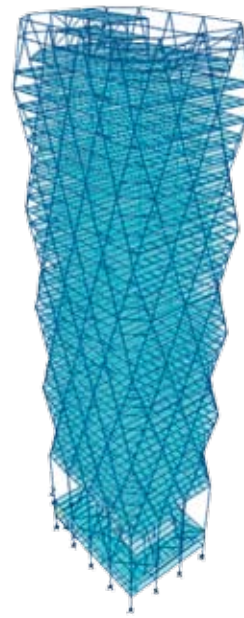
You may want to suggest a global covenant not to sue for BIM software errors. BIM participants can covenant not to sue the owner or any other BIM participant for errors or perceived errors in information in the model or database, or for delays caused by BIM software glitches or hardware problems. All BIM participants could, instead, have the right to request reasonable additional compensation and/or time to correct BIM errors caused by others. The owner could set up a "BIM Contingency Fund" to which participants could look for compensation, with such requests being resolved through a binding alternative dispute resolution mechanism, such as a BIM Dispute Review Board.

Another concern may arise from the fact that the software technology may be rapidly changing, making it somewhat difficult to determine what the standard of care may be for designing a BIM project. ASFE, a not-for-profit trade association of design firms that specialize in earth engineering and related applied science services, recommends an "evolving technologies" paragraph in environmental services agreements which could be adapted to fit BIM projects:

Evolving Technologies. *The use of BIM software and technology during design and construction involves technology which is rapidly evolving. Existing state-of-the-art technologies are often new and untried, and future technology may supersede current techniques. Client understands and agrees that the standard of care for Consultant's services will be based on current technology.*

This type of risk transfer provision from architects and engineers to owners will require careful explanation during contract negotiations.

Who gets to rely on the information once it's in the model and database?



BIM of the Hearst Tower addition, New York, New York. Courtesy of WSP Cantor Seinuk.

Everyone with access to the model wants to rely on the information contained in it. Designers have traditionally managed risks by disallowing reliance by anyone other than their direct client. The NBIM Standard recognizes that design firms are reluctant to share information unless their liability to third parties is limited. The NBIM Standard recommends a project-wide agreement that limits or waives consequential damages as a pre-condition to model access.

Conclusion

What is the best BIM contractual framework? The NBIM Standard contemplates a project-wide BIM agreement executed by all participants. BIM is inherently

a collaborative process. As BIM receives wider acceptance, designers, owners and contractors will inevitably seek more collaborative relationships. However laudable the goal of increased collaboration, participants should not lose sight of the risks that the construction process can create. "Collaboration" is a fuzzy concept and not defined by law. Parties seeking a less adversarial, and more cooperative, project delivery method should be careful not to create ambiguous contractual relationships that courts will struggle to interpret. No matter how jazzy the technology, risks inherent in design and construction should be identified at the start of the project and contractually allocated in a rational manner.

The notion of a fully-integrated project-wide database has the potential to rock the construction world. We are not yet there, but it is in the foreseeable future. Structural engineering firms and their counsel need to develop contracts with appropriate risk allocation to meet this challenge. ■

Beth M. Andrus and William J. Bender are partners with the law firm of Skellenger Bender, P.S. in Seattle, Washington. Their practice emphasizes the representation of architects and engineers.



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<p>Beth M. Andrus William J. Bender David K. Eckberg</p>	<p>Kara R. Masters Peter A. Offenbecher Lindsey M. Pflugrath</p>
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Terence J. Scanlan

1301 Fifth Avenue
Suite 3401
Seattle, Washington 98101
(206) 623-6501
www.skellengerbender.com