Maximizing BIM for Optimal Outcomes

Berkley Design Professional
a Berkley Company
Better By Design®

When properly implemented, Building Information Modeling (BIM) can have a significant positive impact on architecture and engineering projects by increasing the productivity, efficiency, and quality of the work. Initially used primarily for vertical (building) projects, BIM is now also being frequently used on horizontal (infrastructure) improvements. In both cases, BIM enables designers and engineers to make better informed decisions earlier in the design process through an efficient process of investigation and analysis of alternatives and options. As with any new or emerging technology, firms should carefully consider the risks. When entering the world of BIM, three main areas to consider are Practice, Technology, and Legal/Risk Management.

Practice Considerations

BIM is both a "process" and "design technology." While BIM implementation can have meaningful and positive impact on the project delivery process, it will also cause disruption to the more established CAD-oriented process. To fully maximize its benefits, BIM requires careful planning among the design disciplines, construction managers, contractors, and other project team participants.

BIM project delivery is most effective when implemented in a collaborative and integrated project team environment. Architects, engineers, general contractors, major trade contractors, and sometimes even key manufacturers' representatives should be included. A BIM Execution Plan (BEP) should be created at the very forefront of the project by the BIM leader, which is usually a member of the lead design firm. The BEP establishes clear-cut objectives for use and reliance of the models, technical and IT requirements, protocols, and responsibilities, and identifies and empowers a BIM leader for the entire project team.

Production inefficiencies are to be expected when team members do not have equivalent levels of skill and dexterity with BIM protocols- and an understanding of the need for enhanced collaboration between all team members, the latter which may represent a significant culture change. While individuals may be used to working in isolation, BIM planning and implementation is most successful when data is shared and coordinated regularly between design and construction disciplines in accordance with the BEP.

The data-rich and integrated nature of BIM not only allows for, but requires, early decision-making on planning concepts, building systems, materials, and related technical aspects to ensure proper outcomes. This is a major shift in the project process and requires project design leaders and clients to invest the necessary time and energy (and professional services fees) to the early phases of design and to be more facile and timely in reaching design decisions.

Accelerated decision-making can be a challenge for institutional and corporate owners who have extended internal approval processes. However, the benefits of streamlined project delivery and enhanced quality can be realized throughout the process, if properly adapted. The ability to provide advanced 3D images, even supplemented by 4D (time) and 5D (cost) data through BIM enables user groups and owners to better visualize the project, provide timely and meaningful input to enable prompt design revisions, and overall promote informed decisions by the owner.

Embracing and shifting to BIM requires design firm- and team-wide commitment. Everyone involved must understand both the benefits and challenges since the transition from traditional CAD methods can be besieged with short- and medium-term inefficiencies. In many ways, BIM is like learning a foreign language that includes a host of new terms such as "families," "components," "parameters," and "libraries." Here are seven recommendations for speeding the transition:

- Establish BIM processes, protocols and standards. Remain flexible to changing project requirements, enhanced knowledge gained through experience of use of BIM on projects, while maximizing consistent use throughout the firm
- Recreate CAD libraries in BIM. This is a necessary and worthwhile investment in productivity, effectiveness, and quality management
- Have skilled BIM personnel work closely with senior staff to enable quality assurance of the BIM content and stronger adoption of the new standards and processes
- Discourage "work-arounds," which can detract from the consistent adherence of practices, while compromising productivity and quality. Rather, share lessons learned on each project and improve the firm's standards and processes.
- Implement a BIM Execution Plan, including a Model Element Table, to establish the expectations for use of BIM and required protocols, including definition of the Level of Development [LOD] and the author of each model element. The lead design firm should develop the BEP collaboratively with input of the project team
- Establish a template to facilitate the creation of the BIM Execution Plan to enhance the efficiency of the BIM planning process on subsequent projects. The productivity, efficiency, and coordination for the entire design and project team can be best realized through the use, monitoring, and adjustment of this important planning tool
- Refer to reputable industry resources, such as the following, for further information:
  - Guide, Instructions and Commentary to the 2013 AIA Digital Practice Documents (https://www.aiacontracts.org/resources/69541-guide-instructions-and-commentary-to-the-2013-aia-digital-practice-documents)
  - Penn State University BIM Project Execution Planning Guide (http://www.bim.psu.edu/Project/resources/default.aspx)
  - LOD specification published by the BIM Forum (http://bimforum.org/lod/)

Technology and Training Considerations

Like any new technology, BIM requires a meaningful and often significant investment in time, materials, and expenses mostly in computer hardware, software, and employee training:

- Robust IT networks (LAN and WAN) and related infrastructure such as file servers. BIM involves the storage and exchange of data rich files, which are much larger than CAD files and can stress insufficient IT infrastructures
- Employee training and communication. Initial training should be intense and thorough with communication platforms and ongoing training programs established to enable the continuous development of standards and processes to promote firm-wide efficiencies and consistencies

- Creation of a content management system (library), where the firm's BIM standards are stored and easily accessible. The content library may require separate software and a dedicated server(s). Ongoing feedback and input from BIM users will enable the BIM library to become increasingly comprehensive, while maintaining consistency with the firm's QA/QC criteria and protocols
- Expanded network security and data backup features and protocols, which are necessary to mitigate cyber and disaster recovery risks

Legal Considerations

Clients and contractors will likely have expectations for a higher level of coordination and quality of construction documents with the use of BIM. It is important to have a legal agreement that clearly establishes expectations and intentions of BIM without elevating the design professional's normal standard of care.

Project team operational protocols including file and data exchange procedures should be established in Client-Design Consultant and Client-Contractor agreements in alignment with the BIM Execution Plan. AIA documents E203-2013 and G202-2013 provide thorough definitions outlining the use of BIM on projects and each project team member's roles and expectations through a common contract exhibit. (follow this link to the AIA digital protocol documents: https://www.aiacontracts.org/resources/69541-guide-instructions-and-commentary-to-the-2013-aia-digital-practice-documents

We recommend that BIM be considered as a "tool of convenience" with reliance for construction solely based on the stamped and sealed construction documents (drawings and specifications). While BIM contains valuable project information that project team members can benefit from, the design and construction industry is not yet ready to elevate BIM to the level of a contract document. Stay alert and informed – that day is coming!

About Berkley Design Professional

Berkley Design Professional was started in 2013 by a team of people with deep roots in underwriting, loss prevention and claims handling for the Design Professional community. The genesis of Berkley DP was the combination of our team's passion for bringing fresh ideas to the products and services Design Professionals need together with W. R. Berkley Corporation's desire to commit its superior financial strength and A+ rated paper to this industry segment. Berkley DP's motto is: "Better by Design." By this we mean that our policyholders are better businesses because we've designed comprehensive coverage and current risk management solutions that make their practice less susceptible to loss.

For more information, contact:

Andrew D. Mendelson, FAIA
Senior Vice President,
Chief Risk Management Officer
amendelson@berkleydp.com

Diane P. Mika
Vice President,
Director of Risk Management Education
dmika@berkleydp.com

Berkley Design Professional
a Berkley Company
Better By Design®

berkleydp.com | 855.534.7285