

BIM Creates Change and Opportunity

Contributed by Glenn W. Birx, AIA

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SUMMARY

Ayers/Saint/Gross implemented building information modeling (BIM) in its practice. Glenn W. Birx, AIA, explains that the BIM design process has allowed for more cohesive drawings and eased transition to contractors and consultants. BIM will present new revenue opportunities as well, Birx predicts—it also may allow new architecture services to flourish.

CONSTRUCTION DOCUMENTS MADE EASIER

Developing satisfactory construction documents is much easier if they start with a properly developed virtual building, which BIM enables. For example, with the old way, a good design development (DD) drawing set contains “typical” wall sections and details and “typical” door and window schedules. With BIM, upon completion of the DD phase, there are no longer any typical details, as they are already designed into the model. Additional sections and details are simply cut through the model, and schedules of doors, windows, and finishes are populated automatically. This is precisely where BIM reduces staff work hours.

How far to take the model? The software can allow development of all details to a fine degree. It can show all nails, screws, nuts, and bolts—but this is neither practical nor necessary. Some firms stop the development of the model at some point and complete the final level of details in AutoCAD®. This practice can make sense during the transition period to full-BIM construction projects, but it is not necessary, and this final “tuning” of the documents will eventually disappear.

One of the best features of BIM software is “interference checking,” a command that highlights in red all coordination problems. It senses when two objects occupy the same space. In the old way of checking for coordination problems, two or more drawings must be compared and combined with an experienced eye to locate potential conflicts. This method often misses numerous problems, which are then discovered during construction, leading to cries of “errors and omissions” and requests for change orders and payment by the architect. With BIM,

press the button and, during design, not even the least experienced staff member will ignore all the red marks.

ANY DOWNSIDE FOR RISK MANAGEMENT?

Since there is limited BIM history, potential risks are difficult to discern. For now, we believe the most important thing is to retain ownership of the documents. The B141TM-1997 Standard Form of Agreement Between Owner and Architect with Standard Form of Architect’s Services assigns ownership to the architect, but many clients and their attorneys insist that they become the owners of the documents. This may become a deal-breaker in contract negotiations.

BIM CREATES IMAGES, SERVICES THAT SELL

Starting the design of a building in 3D on Day 1 is not only a design advantage, but it also allows for constant presentation of the design to our client in rendered form. The ability to send our model to a rendering engine to develop movies and fly-through animation goes a long way toward selling our design. This is both a blessing and a curse, as clients learn that it is relatively easy to request and obtain such views, so the number of requests greatly increases. This can become an additional revenue source because many renderings can be sold at low prices for a profit after an initial set-up charge for the assets, such as people, cars, trees, site furniture, and so on.

The construction database that is BIM has allowed for the creative development of several new services:

- **Visualization.** Renderings are more easily done in-house and can be sold as additional services.
- **Fabrication and shop drawings.** The ultimate use of a BIM model will be to continue its development all the way through construction. It is easy to see how shop drawings for sheet-metal ductwork, for example, can be completed within the model.

- **Code reviews.** Some fire departments and other code officials currently require BIM models for their review of building projects.
- **Forensic analysis.** A BIM model can easily be adapted to graphically illustrate potential failures, or leaks, or evacuation plans, and so on.
- **Facilities management.** Owners with facilities management departments greatly appreciate the use of the model for renovations, space planning, and maintenance.
- **Construction information database.** The hundreds and hundreds of people and companies required to supply and build a new building all benefit from having a single source for construction information.
- **Cost estimating.** BIM software has built-in cost estimating features. Material quantities are automatically developed and adjust with any change to the model.
- **Construction sequencing.** Ultimately, with a savvy contractor, the BIM model can effectively be used to create ordering, fabrication, and delivery schedules for all building materials and systems.

Virtual modeling for design is not new to the world, only to architects in the United States. It has been used by industrial designers, automobile designers, and aircraft and spacecraft designers for almost 20 years. If a virtual model of a spacecraft can be done prior to fabrication, in order to reduce flaws, then a model of a building ought to be able to be assembled prior to construction, for the same reason.

With all its advantages to the industry, a BIM database will quickly become required prior to construction. Architects are uniquely qualified to be the creator and maintainer of that database but are not without challenge in the construction industry. The time to meet that challenge is now.

ABOUT THE CONTRIBUTOR

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RESOURCES

More Best Practices

The following AIA Best Practices may provide additional information related to this topic:

- 10.04.02 Getting Started with Building Information Modeling
- 10.04.03 How Building Information Modeling Changes Architectural Practice
- 10.04.05 BIM: Potential Legal Exposures

For More Information

See also “Virtual Design and Construction: New Opportunities for Leadership” by James R. Bedrick, AIA, *The Architect’s Handbook of Professional Practice, Update 2006*, p. 33.



See also the 14th edition of the *Handbook*, which can be ordered from the AIA Bookstore by calling 800-242-3837 (option 4) or by email at bookstore@aia.org.



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Keywords

- Practice
- Information management
- Project management automation
- Building information modeling