

How Building Information Modeling Changes Architecture Practice

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SUMMARY

Glenn W. Birx, AIA, describes how building information modeling (BIM) changed office culture and practice at his firm, Ayers/Saint/Gross (ASG). Birx asserts that after a firm begins using BIM, depending on the size of the practice, it can expect to see changes in its work culture, including its staffing model and even its fees. A firm will certainly find that working in BIM changes the design process itself while also increasing architects' ability to *manage* change as projects proceed.

HOW BIM REVOLUTIONIZED OUR PRACTICE

Do not think of BIM as "3D drafting." If you do, you will miss its significant, culture-changing benefits. Three-dimensional drafting tools have improved in recent years to incorporate "parametric object-based design," whereby every object used to create a portion of the model can contain many levels of data about that object. For example, when a window is inserted into the model, it immediately contains information on its dimensions, glass selection, color, hardware, cost, and its schedule for delivery. As such, a BIM database goes well beyond both drafting and basic object-based design.

Changing work requirements. One of the most notable culture-changing effects of BIM is the shift of many work hours from drafting to design. Architects can now spend less time drafting and more time designing. If managed properly, design can be more thoroughly studied and completed, as 3D visualization is automatic from the beginning of concept sketches all the way to construction documents. In addition, if managed properly, construction documents will be better—not perfect, but closer.

Changing staffing models. This shift has also changed the way ASG staffs a project. Now, with the BIM software doing much of the drafting, there's a great need at the outset of a project for those with the construction and design knowledge to build the models. Younger architects may have that knowledge but also need a lot of guidance.

Our traditional staffing model might have included oversight by a principal; a part-time project manager and part-time project architect; and a full-time architect 1 and full-time intern. In the new BIM world, more senior staff input is required earlier in the project. Our new staffing model requires about the same level of principal oversight, but both the project manager's and project architect's hours may increase while the architect 1's and intern's hours may decrease.

Changing duties for young architects. This is good news for young architects, however. Before BIM, they spent much of their time learning how to be drafters. This took years away from their education and training as designers. Now young architects can continue that design education immediately upon graduation, in their first jobs as interns. They can look forward to more design assessments and the opportunity to advance more rapidly in their firms as seasoned designers.

Changing fees and billing practices. BIM ultimately will change fee structures as well. With more experienced staff involvement from the start of projects, we have found that our average hourly rate has increased but also that we need fewer total hours to do the same job.

Because of the need for accurate development of the model in BIM during the schematic design (SD) phase, compared with our traditional billing, a larger portion of the total fee might be billed in the SD phase and in design development (DD) and a smaller portion for the construction documents (CDs). If the model is truly developed at the DD phase, then the CDs will require less of an effort.

Changing service offerings. In addition, with control of the data, the architect will have other areas for possible fee generation, such as shop-drawing production, manufacturing, and scheduling. The value of the model itself may generate additional fees. The BIM model makes visual imaging much easier, which can be a fee creator. Some architects are currently charging a monthly fee for access to the database for all who desire it, such as construction managers and subcontractors. This

may not continue as a trend but could benefit the producer of the database.

PROCEEDING IN A SINGLE FILE

The second most important culture-changing aspect of BIM—as currently implemented at ASG—is that the model is a database that exists in one file, unlike 2D computer drafting, which will have one file or more per drawing. This, of course, creates one very large file, but having a single, central database file is also the key to its distinct advantage.

Think of it as the creation of your building in a digital form. When a change is made to the model, such as moving a wall from one place to another, it changes in all views of the model. If we change a wall in 2D computer drafting, we must remember to change the reflected ceiling plan, to modify the dimensions layer, to also move the wall partition type tag, to adjust the door schedule if there is a door in the wall, and to change any other details associated with the wall. Not so with the single file.

A natural first question might be, “Can multiple users work on one file at the same time?” Our parametric BIM software has a central file system built into it, allowing building objects to be portioned off so users can work simultaneously. Depending on the structure of a project or design team, buildings can be divided hundreds of ways. In some cases, wings or zones of a building could be grouped together, or the building can be divided by exterior, interior, roofs, and so on. Obviously since two users should not modify the same door or wall at the same time, BIM software has features that restrict this.

Ideally consultants, owners, and contractors could read BIM files on their own. BIM has yet to gain dominance in the architectural field and especially not in the contracting and consulting fields. However, this is easily negotiated by “saving down” to traditional 2D drafting programs. In late 2005, almost two years after ASG began working experimentally in BIM, the firm is still “saving down” in order to coordinate with consultants.

This Best Practice is adapted from an article originally published in AIArchitect.

RESOURCES

More Best Practices

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

- 10.04.02 Getting Started with BIM
- 10.03.04 BIM Creates Change and Opportunity
- 10.04.05 BIM: Potential Legal Exposures

For More Information on This Topic

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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Key Terms

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