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Model Makers

Building information modeling is changing how apartments get built—but owners may have to drive its adoption to realize BIM's full potential. BY JOE BOUSQUIN

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Model Makers

Building information modeling is changing how apartments get built—but owners may have to drive its adoption to realize BIM's full potential. BY JOE BOUSQUIN

WHEN POMPANO BEACH, FLA.-BASED CURRENT BUILDERS was still in the design phase of 440 Flagler Village, a 218-unit luxury mid-rise apartment community it's building in Fort Lauderdale, Fla., the design staff started noticing unplanned "bump outs" in the hallways.

Using building information modeling (BIM) software, which allows designers, builders, and owners to see highly detailed, 3-D models of buildings on their computers before any ground is broken, Current's design team realized that the fire-wrap used on several of the building's structural columns made them fatter than anticipated. That was a problem, since Current's contract with the Orlando, Fla.-based ZOM Co., 440's owner, called for open, smooth hallways.

"It was actually in our contract that the fully framed-out, finished product not have any structural bump outs in the corridors," says David Thirlwell, a BIM specialist and construction manager at Current Builders, which has built more than 19,000 multifamily units

throughout Florida. "In the end, we used the model to figure out the optimal position of those columns and moved them before we got into the construction phase."

While Thirlwell declined to put a number on the costs Current avoided with early detection, he did say that, in general, the company has reduced overrun costs on BIM projects by 95 percent, while trimming as much as three months off build times. "The return on investment is out of this world," Thirlwell says. "We're not only seeing better construction, but a smoother project."

Current Builders' experience is one example of the advantages multifamily architects, builders, developers, and owners are realizing using BIM technology. A spin-off of the virtual prototype software that's been used in the automotive and manufacturing industries for more than a decade, BIM is 3-D modeling software for the building industry that also coordinates communication across the myriad trades involved in a construction project.

"The old saying was that you measure twice and cut once," says Cameron C. Curtis, manager of business development and BIM at New York-based Turner Construction Co. "Well today, we build it twice—once on the computer and once in the real world."

CHANGE ORDER

As with anything, BIM's difference lies in the details. By asking for specific information such as what materials and finishes will be used in a building and the exact dimensions of its elements during the design process, BIM forces designers and builders to make decisions about what goes into a project early on.

When a designer draws a wall, for instance, the software will ask how thick the wall is, what electrical or plumbing systems are inside it, even the color of the façade on its exterior. In a traditional computer-aided design (CAD) drawing, though, that wall would simply show up as a plain, straight line. "You can't fool BIM," says Larry Cohan, managing principal at Miami-based BC Architects, which specializes in multifamily design. "It asks you for so much information that you really have to think about what you're doing."

BIM programs—such as San Rafael, Calif.-based Autodesk's Revit; Exton, Pa.-based Bentley System's Architecture; and Budapest, Hungary-based Graphisoft's Ar-

Mark Wood



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chiCAD—also detect potential conflicts before they happen. That’s where “clash detection,” perhaps BIM’s greatest benefit so far, comes in.

To understand the significance of clash detection and BIM today, it helps to understand how buildings have been designed and built in the past. Traditionally (and the way most design firms work today), a building’s design drawings originated from an architectural firm, which used 2-D CAD software to produce lines on paper representing a building’s form. A construction company reviewed those drawings and made practical changes for building it in the real world. Finally, electrical, plumbing, and other subcontractors would create “shop” drawings to show where their pieces of the building puzzle fit in. Once everything was complete, all those different sketches would go back to the architects for approval, and they would then produce construction drawings for workers to use in the field.

With so many parties contributing so much information to the process, though, components end up hitting each other, and those “clashes” can be hard to see in 2-D diagrams. A last-minute jog to the left in a plumbing pipe, for instance, might run directly into a structural column that was moved on another set of drawings. Using BIM helps eliminate those problems by unifying all drawings and designs into one, universal 3-D model.

“With a 3-D BIM model, you’re actually inside the building,” says David Burt, director of the multifamily studio at Charleston, S.C.-based architect LS3P Associates. “You can see up into the ceiling, and you can tell whether that ventilation duct is going to hit that recessed light and move it before it does.”

A SLOW START

While firms are beginning to adopt it, BIM has yet to take the building industry—or multifamily design—by storm. One reason is cost.

Tim Douglas, senior product manager at Autodesk, says using BIM typically adds about 0.5 percent to a project’s total cost. Those costs come from the hardware, software, and training needed to bring all parties involved in a construction project up to speed with BIM and getting them to use the system together. In that sense, BIM’s greatest potential—to unify all parties in the design, development, and construction process—is also its biggest hurdle. A dedicated BIM workstation with 64- or even 128-bit processing power, an intensive graphics card, and full-powered BIM software can cost up to \$15,000. Then, there’s the time it takes to master the technology. “There’s definitely a learning curve associated with it,” Burt says.

Still, the savings are clear. Gordon Holness, incoming president of the American Society of Heating, Refrigerating and Air-Conditioning Engineers, which has studied the use of BIM in construction, says BIM projects cost 5 percent to 7 percent less overall. The challenge comes down to a question of who pays for the technology, and when.

“In all the owner presentations I’ve done, I’ve never had anybody say they weren’t convinced,” says Current’s Thirlwell. “The disconnect comes when they have to turn around and convince their backers that this is a worthwhile investment from the beginning. By the time we’re talking to owners, they’ve already worked out their pro forma.”

TOMORROW’S TECHNOLOGY

Even with these challenges, some developers have started requiring the use of the technology for their projects.

At Parkway 22, a 37-story, 254-unit luxury condo project scheduled to open in 2010 in Philadelphia, Israeli-based developer Naveh Shuster called on designers and contractors to use BIM. “Clients are starting to demand that the process for design,

documentation, pricing, and coordination gets improved,” says Steve Brittan, principal at Philadelphia-based architect Burt, Hill, which is working on the project.

Thus, for BIM to really take off, owners will have to shepherd its use. “We find that owners are really in a unique position to drive that behavior across the value chain,” says Autodesk’s Douglas. “It’s really hard for the architect or contractors to set a policy that can be adhered to by everyone else.”

For Chris Texter, a principal at Irvine, Calif.-based architecture firm KTG Group, BIM’s ultimate adoption is inevitable. But he says it will take time for it to really catch on. “It’s like going to a teenager’s swim party,” Texter says. “No one wants to be the first one to jump in the pool, but once somebody does, everybody else jumps, too. For now, everybody’s still at the edge of the pool.” **(M)**

Contributing Editor JOE BOUSQUIN is based in Sacramento, Calif.

Modeling Musts

Implementing BIM?
Consider the following.

► **INCREMENTAL ADVANTAGE.** BIM is complex, so start small. Many design firms begin by using BIM to double-check projects they’ve already drawn with 2-D CAD software.

► **ONUS ON OWNERS.** Because BIM’s biggest advantage comes from coordinating across trades, it’s up to owners to require its adoption on projects. You can do so by implementing less costly “review” software, such as Autodesk’s NavisWorks, on the investment side, while making BIM capabilities a must-have on the design and construction side.

► **LEVERAGE LEARNING.** A cottage industry is popping up to teach people how to use BIM programs. Invest in your own staff by sending them to training seminars.