

IPC Joins The Design Team Through Building Information Modeling

Building Information Modeling (BIM) is becoming the new catch phrase in the building design community, and an Iowa precast concrete company is using its high tech visual capabilities to impress customers and gain new business.

While 3D modeling is not a new concept for many architects, computer-generated BIM has only recently come to the forefront, bringing together architects, project managers, and general contractors for more of a team approach to design.

BIM is the practice of creating computer-generated 3-dimensional building models, incorporating information relative to different areas of a project in a detailed, comprehensive visual example of a building's construction. BIM grants an integrated approach for design, construction and management teams, bringing owners, architects and builders to the planning table early in the design process.

IPC, an Iowa-based precast concrete company, has recently begun using BIM to address material needs, budgeting and scheduling requirements, and in-depth discussion of design/build concepts with their potential and current customers. As one of the only precast concrete companies in the region to use BIM, IPC is saving their customers time and as much as thousands of dollars with the accuracy and detailing 3D modeling provides. The company has been awarded numerous project bids based largely on their presentations using 3D models of building concepts, illustrating with precision how their product fits into the "big picture."

“BIM gives a very clear definition of the scope of work and the number and type of components involved in a design,” said Dan Doran, manager of sales and marketing for IPC. The model enables the company to give designers an accurate piece count thus drastically reducing errors in estimations. “We want to give our customers a good value while we turn a fair profit. When a mistake occurs on a job due to error in interpretation, it’s usually at our expense. BIM allows us to price with great accuracy. Additionally, these models ensure customers get what they want, enabling us all, as a team, to see exactly what they’re going to have to work with,” Doran added.

Michael Slotter, project consultant for IPC, said BIM is extremely useful for exploring the various options for designers, including price effects of each design decision. “We can come up with solutions at an early stage in the planning,” said Slotter. Designers are able to see exactly what’s being priced, and if they want to explore different design options, BIM provides instantaneous cost updates. When one component of a model is changed, all other elements affected by that change throughout the model are automatically updated. “By virtue of not missing important components in the estimating process, BIM is ideal,” Slotter adds.

Rick Strawn, design principal for HNTB Corporation in Kansas City, worked with IPC on a design/build competition in which BIM was used. “While working with IPC, I was able to review a live 3D model of the precast components, which helped me to work out the design and make necessary modifications with IPC. This one-half day process of

interaction with IPC saved the project \$167,000. That is the first time in 25 years as an architect that I've had the benefit of that kind of experience," Strawn said.

Jeffrey Morgan Architecture Studio (JMAS) of Des Moines announced in May a new \$33 million mixed-use development project slated for construction in downtown Des Moines in 2007. JMAS worked with IPC for the first time on the project and was impressed with the company's use of BIM early in the design phase.

The OPUS_001 is a 220,000-square-foot development designed to include 96 residential units and 60,000 square feet of commercial/retail condominiums.

"The design allows for an urban, funky, architectural experience. The market for the building is the creative class – creative, urban professionals. The unique aspect of the design is that the mix of residential/commercial space can be adjusted according to market forces," said Jeffrey Morgan, principal of JMAS.

Morgan said when his company was developing preliminary floor plans and discussing construction systems for the building, which would involve steel or concrete, they immediately looked at precast and cast-in-place concrete as two viable options.

IPC had given a general abilities presentation to the firm, and when Morgan mentioned the OPUS_001 project specifically, Doran proposed preparing a 3D model illustrating how precast would be the ideal product for the project. "IPC has a strong presence in

Iowa and Des Moines, and they were our first consideration,” said Jordan Collins, intern architect and project manager.

“We gave IPC the plans to help them understand how the building would work. They ran with it, using the 3D modeling to create the basic structure of the building. Their model informed us of the size of the members and beams and how the building would come together structurally,” said Collins. IPC’s precast concrete will support the shell of the structure, providing all interior and exterior columns, walls, and floors.

He explained that often buildings are designed from the outside in by forming the shape circulation and then working into a structural system. In working with IPC, the company reversed their thinking to design the building from the inside out.

“This maximized the efficiency,” Collins said. “The basic structure was there and then we took it and worked out how the architectural pieces of the building would fit into that structure. For our purposes, it was an informational piece of how we start fitting the pieces within and around the structure.”

One of the primary values of IPC using BIM for the project, said Morgan, is that they were all able to sit down and have a conversation about the various possibilities in the project. “We’d ask if we could do [something in the design], and they’d say yes or no. And they could almost instantaneously give us a cost for the different options. They could give us cost and scheduling implications about as quickly as one could ever possibly imagine,” Morgan said. The two companies were able to work through a

number of issues, editing down to the essential requirements of the project very quickly, he added.

Because JMAS had already started doing some designs in 3D, and IPC had the capability of using BIM, Morgan felt working together was a natural fit. "We assumed we might have to do our own modeling. [IPC's BIM capability] was a pleasant surprise and a welcome addition to the design process," Morgan stated. He anticipates the evolution of BIM incorporating the entire construction team contributing to the same 3D modeling through integrated software.

In fact, Morgan sits on the National Council of Architects Registration Board (NCARB), which is looking at what affect BIM will have on architectural engineering and the construction industry. Members of NCARB believe it will have a revolutionary effect on the way the construction of a building is designed.

"I've only started hearing the term 'BIM' within the last twelve months," Morgan said. "[The popularity of the concept] may just be a matter of marketing the term, just as 'LEED' [Leadership in Energy and Environmental Design] recently became the craze," he added. He believes someday architects will be able to feed information into BIM, adding things like windows, doors, fire rating systems, while the suppliers, like IPC, would also include their information into the same model.

For now, though, Morgan said having IPC at the table with his staff, helping to design through BIM, is an excellent first step toward the more integrated overall design approach.

Doran agrees. "IPC has embraced this concept to bring true value to the design/build partnership," he said. People in the industry often talk about "partnering," he said, and producing models like these help all the players in the design process act more like a team. "I sincerely think the entire construction industry will evolve into using more of a BIM concept as time goes on," he said.

In fact, the company is in the process of hiring more staff to build their pre-construction team, which currently includes three designers dedicated to BIM. "We're committed as a corporation to this initiative," Doran said. As long as their customers continue to value the service, IPC will continue to offer it. "We made a presentation to an owner the other day and walked him through his building with BIM. He said 'this is the first time I truly understand what my building is going to look like.' It helps everybody to understand what we're all going to build. We want this concept to bring true value to design/build partnerships."