Building Design

The Summer of BIM (Tech Trends Column)

1 Apr, 2008
By: Kenneth Wong

A counterculture design festival breaks down the usual barriers.

What if one summer — or in this case, winter — a bunch of idealistic architects, designers, building owners, contractors, and consultants decided to do away with the professional hierarchies, business protocols, and legal constraints that have long prevented them from working together? What if they converged on a destination and simply spent the day exchanging ideas about the high-rises, hospitals, firehouses, and schools they envision building there?

The Woodstock of BIM (building information modeling), as the organizers prefer to call it, took place this winter (**figure 1**). On January 31, soon after sunrise, 133 individuals from Boston, Maryland, Hawaii, Canada, Mexico, Japan, the Netherlands, the Philippines, and elsewhere (http://bimstorm.com/LAX/play) began to transform the 60 city blocks east of Dodger Stadium in Los Angeles (**figure 2**). A day later, they left behind 420 buildings, encompassing 54,755,153 square feet. Perhaps the most astonishing number is the total mileage traveled by the participants: zero.

Figure 1. The Woodstock-inspired poster for BIMStorm LA.

How could this be? Because the 24-hour design fest took place in virtual space, courtesy of Onuma Planning System (OPS), a Web-based BIM collaboration platform.


Figure 2. The 50-million-square-foot area east of Dodger Stadium was the focus of BIMStorm LA.

The Fruits of a Dream

When Kimon Onuma founded his architecture practice in 1988 in Pasadena, California, he was following in the footsteps of his father, who began his Tokyo architectural firm in 1972. Onuma sincerely believes the building industry is ripe for a revolution. In December 2007, he had the idea for a free event that would bring together a cross-section of the industry. He dubbed it BIMStorm LA.

For the event to succeed, he figured it needed several crucial elements:

1. It had to be conducted in real time.
2. It had to be hosted via the Inter- net (so people could see one another's ideas).
3. It should have no lag time (so an architect wouldn't have to wait two weeks after he or she had submitted something to get feedback).
4. It had to be based on open and interoperable data standards (figure 3).

Onuma already had in his possession the technology that could facilitate this gathering. OPS, his company's flagship product, is the software-as-a-service (SaaS) model for BIM. You don't have to install software. You simply go online from a browser to use the OPS features.


Figure 3. The use of open standards allowed projects created in different BIM tools to coexist in Google Earth's virtual terrain within the Onuma Planning System.

The OPS IFC Model Server would function as the central repository to host all the projects and the entries. For modeling and analysis, players could use Graphisoft's ArchiCAD, Autodesk's Revit, Nemetschek North America's VectorWorks Architect, Roland Messerli AG Informatik's EliteCAD, Square One Research's Ecotect, Google SketchUp, or anything compatible with Industry Foundation Classes (IFC) standards. Supporting documents and site data could be supplied in Excel, Google Earth, and even pen and paper (so long as they could be scanned and brought into the communal environment).

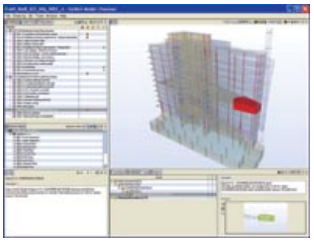
After a planning session and a practice run, teams began to form. Team A included two architects and a government agency employee with expertise on project request

submittals. Team V included an architect in North Caro- lina and two architects in Maryland, who also happened to be software developers from Nemetschek North America. In Team E, a Revit user was paired with an ArchiCAD user. Several people joined the foray as spectators. Code reviewers, structural analysts, LEED specialists, and green consultants also stood ready to offer input from the sidelines.

On the designated day, at 11 A.M. in Boston, 4 P.M. in London, and 6 A.M. in Honolulu, the BIMStorm struck.

Green Moon Rising

"Essentially, there were teams designing, teams analyzing, and they were all interacting with one another, too ... Analysts were submitting their reports without the teams even realizing that they were working in the background," said Onuma (**figure 4**).



One of the analysts was Karen Weber, a green-roofing consultant and cofounder of Earth Our Only Home. "I'm neither an engineer nor an architect," she admitted. "My company's main mission is to get green roofs on buildings."

Figure 4. While the design teams were working on the geometry, some analysts were running code checks (top); others were performing airflow analyses (bottom) on the available models.

Weber issued a general pitch to the teams, outlining the type of green roof that would work best in Los Angeles' climate and is currently being developed by Roofscapes (www.roofscapes.com) — "a dual-media green roof with specific drought-resistant plants that weighs about 40 pounds per square foot and costs about $15 [per square foot] to install," she said.

She points out that, aside from the aesthetic appeal, the green roof saves the building owner maintenance cost over time. "They won't have to replace the roof that often, because it controls roof expansion from weather, and it protects against damage from UV rays," she said.

The Open Standards Deployed in BIMStorm

Many of the energy-modeling software packages now include modules for solar-panel configurations, but Weber would love to see the same consideration for green roofing. "You can actually combine solar panels with green roofing," she suggested. "Solar panels are optimal at 77° F. A conventional roof on a hot day gets to 150°–200° F. So acting as temperature control, the plants can increase the solar panels' efficiency."

As a result of her input, one of the teams decided to put a green roof on a school to be built in Los Angeles. "Another team created a plan to park the cars under- ground and make a grade-level green roof," Weber said.

Weber also offered the participants an opportunity for water conservation. "The annual flushing of the fire hydrant lines [to check pressure] could cost about 1,000–2,000 gallons of water per minute. Generally, it takes about 5–10 minutes to check each," she estimated. The project site for BIMStorm contains about 300 hydrants. "That's about six million gallons of water to be flushed out of Los Angeles, where water is at a premium," she remarked. Her recommendation was to capture this water in cisterns and use it for irrigation of green roofs.

From LA to Tijuana

Finith Jernigan, the author of *BIG BIM little bim* (4Site Press, 2007) and an architect from Design Atlantic, was assigned to monitor the new buildings springing at the site and plan for adequate emergency services, which included uploading prototype fire stations and advising the teams about the size of the station that would be necessary to match the serviceable zone.

"At the same time, we were also helping another team build a real house in Tijuana, Mexico," Jernigan said.

Even though the event was officially meant for the 50-million-square-foot Los Angeles area known as "the Cornfield," the organizers were quite accommodating if someone wanted to explore design ideas beyond these boundaries. As participants watched, skyscrapers began showing up on Wilshire Boulevard, far beyond the project site.

To the players from Corazón, a San Diego–based group that has built more than 1,000 low-cost homes in Mexico, Jernigan advised via the support forum, "You would create what amounts to a squatters' community within the BIMStorm areas. It offers the opportunity to envision a better way to plan for people most in need. The community should include community gardens, community centers, and housing, all organized to respond to the needs of the types of people that Corazón serves."

Here Comes the Sun

Jeffrey Ouellette, a Nemetschek North America R&D specialist for VectorWorks Architect, worked with his colleague, Robert Anderson, Nemetschek North America's vice-president of Integrated Products, and Stan Rostas, AIA, a VectorWorks user and partner at Shook Kelley, to complete a project located east of the Los Angeles River. A few hours after they'd posted the building geometry and data in OPS, they found out someone from United Kingdom–based EcoDesign had performed sun studies on their project using Ecotect, an energy-modeling software, and posted the results as a PDF file.

"It's a really interesting exercise," Ouellette said. "You can find out relatively quickly how feasible it is to build two 20-story buildings instead of a single 40-story building on a site very early in the design process. A lot of architects struggle with that early design stage because they need to get the feedback, the data, that really matters, in a timely fashion."

During BIMStorm, feedback came as GIS data, demographics, county tax assessor's information on the

parcels, LEED requirements, and more. "In OPS, people could bring in information like seismic zone, flood zone, building code, or public transportation access," noted Ouellette.

This feedback allows the architects to see how their geometry fits into the site and also to predict how long and how far the future occupants would have to walk to get to the nearest Metro station.

More Storms Ahead

Before it made landfall in Los Angeles, BIMStorm hit Boston in November of 2007. The storm is now heading toward New Orleans. The Janis Joplins and Jimi Hendrixes of BIM are cordially invited to grace the stage when the time comes.

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