Welcome to the World of BIM

Building Information Modeling (BIM) probably won't be The Next Big Thing in the electrical market. But it will forever change how architects and engineers work with electrical products in their designs.

Photo courtesy of **Bentley**

LendLease Corp. used Bentley Architecture BIM design software to incorporate sustainable design techniques in its new corporate headquarters in Melbourne, Australia.

By Jim Lucy, Chief Editor

Imagine a world where you can click on any product in a three-dimensional blueprint for a construction project to access that product's source of supply, pricing, maintenance and installation instructions, warranty, catalog cut sheet, and other pertinent technical data.

In the rapidly changing world of building information modeling (BIM), this is a few miles over the next hill for most architects, engineers, electrical contractors, as wells as the electrical manufacturers and the distributors and independent reps that supply the products. But with the help of some of the electrical market's biggest BIM advocates, the groundwork needed to shape and organize the digital product information standards that will make this dream a reality is underway. Some electrical manufacturers who want to

get a head start on preparing their data for the supply and product information aspect of BIM designs are already developing the digital CAD icons for their electrical products that designers will use in their three-dimensional building models. Several BIM experts say these CAD icons will function as a branded marketing presence in digital BIM databases of product options for designers. Others companies and independent product information providers, like Trade Service Corp., San Diego, Calif., and Catalog Data Solutions, San Jose, Calif., are preparing their product data so it's ready to link into BIM designs.

Building information modeling, which McGraw-Hill Construction defines as "the process of creating and using digital models for design, construction and/or operation of projects," has its roots in the Graphisoft ArchiCAD software package launched in 1987. Today, BIM offers architects, designers and engineers the ability to do much more than just design buildings in three dimensions. By analyzing their designs in three dimensions and being able to see how the various structural and MEP (mechanical, electrical and plumbing) systems fit together, they can avoid costly mistakes like laying out a conduit run that would interfere with an air handling system, before they become a reality on a construction site. According to a 2009 McGraw-Hill Construction research paper on BIM entitled "The Business Value of BIM," some of the most popular aspects of BIM are clash detection, as shown in the example above; avoiding the costly rework of these problems; productivity improvement; and reducing conflict and change orders on jobsites.

On the flip side, while the McGraw-Hill report said 50 percent of the AEC (architecture, engineering and construction) industry is now using BIM, the usage rate is highest with the largest AEC firms and tails off once you get down to various subcontractors, who in many cases don't want to invest in the costly BIM software or the training necessary to get their design departments up to speed.

Photo courtesy of **Bentley**

When Utility Engineering, Denver, was designing this gas desulfurization system with a wastewater treatment system at coal-fired power generating plant in Roxborough, N.C., designs were changed in the model before procurement errors and installation conflicts were encountered, which helped minimize interferences and eliminate redesign and construction rework.

That being said, some intriguing success stories exist with some of the electrical contractors already involved with BIM. Hunt Electric Inc., Salt Lake City, Utah, says on its website that it used "intense electrical BIM modeling" on a $300 million data center in South Jordan, Utah, and that BIM software helps the company "develop accurate 3D interactive models of projects that can be virtually explored and evaluated."

Its website also says, "The latest BIM software allows these preliminary models to be easily revised and changed. This assists owners, architects, municipalities and others to conceptualize multiple options for their projects early in the design stage. Utilizing BIM for coordinating electrical conduits with structural steel and available ceiling space, mechanical piping/ductwork, and all other trades involved in a project enables us to detect conflicts between these trades automatically and make the design revisions early on in the preconstruction process."

Hunt Electric's involvement with BIM showcases the tantalizing potential of BIM, but the reality is that relatively few electrical contractors or other regular customers are very far along with building information modeling. Two notable exceptions are the U.S. Army Corps of Engineers, which requires BIM on some projects, and the General Services Administration (GSA), which manages all federal government facilities, and is also moving quickly toward BIM.

Several executives and trade associations in the electrical market who are already active with various BIM initiatives have little doubt that it will play a much bigger role in the electrical market's future. The National Electrical Manufacturers Association (NEMA), Rosslyn, Va.; IDEA, Arlington, Va.; Datagility, a Chicago-based provider of data management services; and Trade Service Corp.; are already helping electrical manufacturers and distributors get ready for BIM. Sources from these companies contacted for this article agreed that a key reason most distributors, manufacturers and reps haven't been more active with BIM is because to date, the primary focus of BIM has been the design and evaluation of 3D building designs and there hasn't yet

been major demand for their digital product-level data to be integrated into BIM designs.

That's all changing with what's called 5D BIM, which integrates the supply chain directly into BIM designs at the product level, and requires exactly the type of digitized product data that IDEA is collecting for the Industry Data Warehouse (IDW) and that Trade Service develops for its electrical product database and its suite of related services for the distributor and end user market segments. Mike Podoris, Trade Service's director of product management, says his company has been busy over the past year building up its library of digital documents that will support BIM objects in a project design. These documents include but are not limited to a product's operation and maintenance, installation instructions, Material Safety Data Sheets (MSDS), the catalog page itself, and other technical specifications. "We have seven different document types that we are capturing that all could be associated to that BIM object," he says.

Podoris adds that the pricing data Trade Service has provided for years in an electronic format meshes well with what BIM software developers need, and that the company is now working with several large developers to create the dimensional product data (size and performance characteristics) that 3D BIM designs require.

John Henry, the company's director-business development, says Trade Service will support any BIM standards for electrical products that NEMA and a broad coalition of construction industry trade associations develop through the buildingSMART alliance, Washington, D.C. But because Trade Service wanted to start working with some high-profile BIM software companies that needed assistance with the product content, the company is moving forward before any industry-wide product standards are developed. "That requires building-specific content to contain certain schemas that are going to meet those needs," he says. "We are definitely going to recognize any standards and reflect standards that are created through those organizations like the buildingSMART alliance, because we always want to be onboard with what the industry is doing. But we just want to be able to move ahead when opportunity presents itself. We are taking those steps now to build content that will be BIM-centric for these companies."

Working on these BIM standard with the buildingSMART alliance are Jim Lewis, manager of NEMA's High Performance Buildings, and Deke Smith, executive director of the buildingSMART alliance. Smith, who gave attendees at last year's IDEA E-Business Forum an update on progress in BIM standards, is one of the building community's leading advocates for BIM and the Specifiers' Properties information exchange (SPie), an open standard now being developed for product data utilized by architects, engineers, specifiers, contractors, subcontractors, procurement personnel, operators and maintenance personnel. Once a base-level standard is developed for how product data needs to be organized to be imported into the SPie database, manufacturers and the trade associations for their industries can build out the data to suit their market's particular needs.

It's a massive undertaking that will require the close cooperation of several dozen construction industry trade associations. But if Smith and the buildingSMART alliance can pull it off, SPie will serve as the foundation for the next generation of BIM designs and will tie electrical manufacturers and their products directly into the design process. Smith says that while BIM was initially used as a visualization process for construction project designs, the focus has now shifted to

BIM BASICS

Interested in learning more about BIM? Here are four things you need to do to get started.

Spend a little time on the websites on the most popular BIM software programs. Two of the most common BIM design packages are Revit (*usa.autodesk.com/revit-architecture*), which is owned by AutoDesk, the producer of several popular CAD software programs, and Archicad (*www.graphisoft.com/products/archicad*). These websites will give you an idea of just common BIM already is in the design community.

Familiarize yourself with the buildingSMART alliance. While electrical distributors and reps don't need to memorize every excruciating detail of the SPie standard that the buildingSMART alliance, Washington, D.C., is working on, the consortium's website, *www.buildingsmartalliance.com*, has a lot of good information for BIM beginners.

Find out which manufacturers are already into BIM. Those funny-looking little CAD objects that represent products in BIM designs will one day be some of best marketing tools manufacturers have to make sure their products are represented on the ground floor of BIM. If their products aren't represented in BIM designs in the early going and designers have to rely on generic CAD objects for those products, chances aren't too good their products will be in the job when it comes up to bid, which costs distributors and reps potential sales.

Get local. Learn which local architectural and engineering firms and larger electrical contractors are already into BIM. You may be surprised what you learn, as several construction industry surveys show that BIM is already commonplace at the larger, more sophisticated firms in the design community.

the "I" in BIM — information. He believes BIM has the potential to offer building owners an incredible amount of information about the operation and maintenance of their buildings, but that if the product-level information is either missing or inaccurate, then they won't be able to see where a specific product was purchased, or find out about its annual maintenance requirements.

"We have some cultural issues that we have to overcome," he says. "Architects, engineers and contractors historically have not been very good about providing data that was of much value to facility managers. Now that we have the ability to produce higher quality value in a better timeframe, they don't have to recollect the data. Right now what ends up happening is that information from the AEC side doesn't get really delivered to the facility manager until a year later. What we are looking at is how can we use that info during commissioning and provide it to them immediately after so they can use it for operations."

Steve Horton, IDEA's director of product portfolio management, says IDEA's role in BIM will be to support the industry standard NEMA develops along with the buildingSMART alliance and to then work with manufacturers to ensure their product data in the IDW has the necessary BIM-related information. Melissa Longnecker, IDEA's business analyst and project lead, says that much of the data they already provide for the IDW will be what's needed for BIM. She says IDEA is watching the SPie standard development very closely. "It's important to keep up where that sits and when that will become a business need," she says.

Datagility is another electrical player already working with BIM, which it expects will have a major impact on the data management and preparation services it provides for electrical distributors and electrical manufacturers. Angela Baraks, the company's manager of data synchronization, and Marty Brett, NEMA's BIM Task Force manager and marketing manager for Wheatland Tube, will be doing a BIM presentation at the upcoming IDEA E-Biz Forum entitled, "A Practical Guide to Data Syndication in the BIM Environment." Datagility also developed a workbook for NEMA electrical manufacturers to help them get started with BIM.

Denise Keating, Datagility's president, believes 80 percent of what's already been defined in the electrical industry's existing product data standard will be also required by a BIM standard, and that the other 20 percent is related to the 3D modeling that's needed for

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BIM objects. She says that gives the electrical industry a big head start over other trades within the construction business that in many cases don't yet have product data standards. Keating also says there are some commonalities between the BIM attributes that may be required and the transactional product data already required in the electrical market for web-based selling.

"There is a lot of overlap," she says. "Part of the go-forward plan is to look at those BIM templates that are in the process of being developed and see how they are aligned with the current standards and where we have to make the enhancements. Where the templates on the BIM side haven't been built out yet is the 3D modeling and the physical and performance characteristics that need to be defined by product type."

Summary. Several industry executives contacted for this article said while electrical distributors may not feel the impact of BIM right away, they should be proactive and start learning about BIM (see sidebar on page 20). Electrical distributors have two other things going for them with BIM. As mentioned earlier, having a product data standard in place puts them ahead of many other distributors of construction supplies. And on the distribution software front, users of the Eclipse and Prophet 21 ERP systems will be happy to know that their systems will probably not require any additional modifications to tap into BIM data, according to Aung Latt, director of sales operations, Epicor Software Corp., which recently merged with Activant. "Both Prophet 21 and Eclipse have embedded functionality to allow document linking, including images, URLs, that sort of thing," says Lang. "We also have standard functionality for data imports and creating user-defined data elements, giving our systems the flexibility to maintain this data."

While there hasn't yet been a groundswell of demand in the construction community for the product-level digital data that electrical manufacturers, distributors and reps already have in place, if the SPie product standard that buildingSMART alliance is working on becomes a reality, it should go a long way toward creating this demand. Until then, several BIM experts said it's important that electrical manufacturers start developing the CAD icons used on BIM designs.

Says Mike Podoris of Trade Service, "If your object is not in that BIM model, there is a less likely chance that you are going to be in that job. Designers are going to look to the top object in the model. When it comes down to spec it or buy it, they are going to say, 'I want the exact stuff that is put into this BIM model.' And if the distributors want to have some influence on or ability to keep involved with or support BIM, it's to make sure their brands or manufacturers have the BIM libraries out that they will need. That's going to put them in a better position to win the business down the road."