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MODERN STEEL CONSTRUCTION

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Progress Report: BIM Adoption from a Supplier's Point of View

BY RICKY GILLENWATER

One steel joist and metal decking supplier shares what it has learned about BIM software selection, file-exchanges and process definition.

IN THIS ISSUE

**Turning Steel into
(LEED) Platinum**

**Structural Engineers
and Sustainability**

14 Secrets of the 14th Ed.

Progress Report: BIM Adoption from a Supplier's Point of View

TEXT BY RICKY GILLENWATER
IMAGES BY NEW MILLENNIUM BUILDING SYSTEMS

One steel joist and metal decking supplier shares what it has learned about BIM software selection, file-exchanges and process definition.

STEEL CONSTRUCTION PROFESSIONALS not familiar with Building Information Modeling (BIM) often contend that they have been sharing 3D CAD files for many years, so what else is new?

Those of us who have given BIM a serious go can attest to the fact that what's new about creating a building information "model" is that it is no longer just a model—it is a digital representation of the project. In today's virtual models, you can see and zoom in on any design element, and that element graphically exists as actual dimensional data. In addition, you can call up related information such as, in our case, the type of steel joist to be designed and the color of the paint. And once the model is approved, all of this information can seamlessly flow into our manufacturing systems.

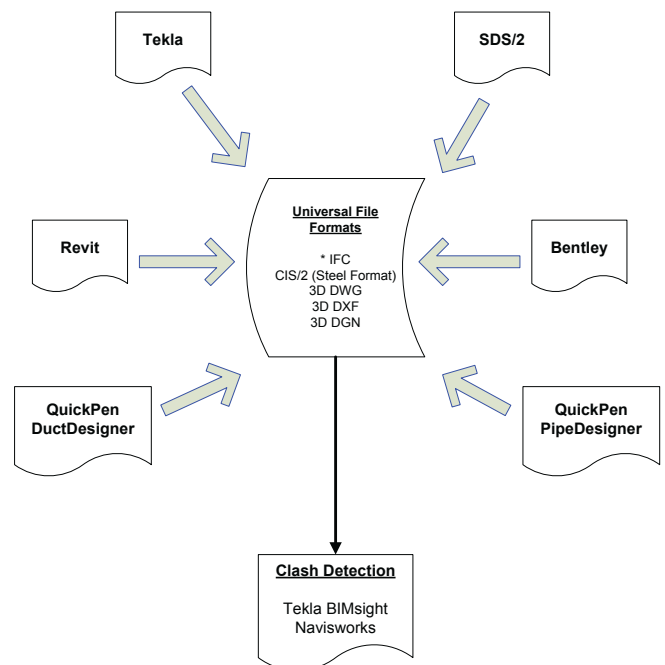
What's new about BIM is that it supports vastly improved collaboration toward project efficiency. We are getting involved early in the design process, and we are communicating more effectively and sharing more information with other trades on the project than we ever have.

This higher level of communication can make all the difference in the world, which is easy to appreciate if you have

been a long-time participant in the request-for-information (RFI) merry-go-round. That said, we've found that on any BIM project, all participants still must communicate with each other, so there's nothing new there; but in contrast, when we request information on a BIM project, we get it quicker. Moreover, we've experienced substantially fewer RFIs on BIM projects.



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▲ New Millennium has shared structural steel design files with other BIM project participants using several industry standard file formats. The company now prefers IFC, the buildingSMART International Industry Foundation Classes.

The impediment to BIM adoption has not been reluctance among participants to collaborate on this higher new level. What initially held us up was the need to define, from a supplier's point of view, our process for BIM collaboration. That includes addressing the fundamental challenge of who does what and when, and how communication needs to flow, regardless of the different software files being exchanged.

Getting Over the Software Hurdle

In our experience, what's *not* new about BIM is that it is software dependent. When several structural steel software products came onto the market a few years ago to serve the digital design and BIM approach, we soon came to the conclusion that we could not predict which brand of software might prevail or become most preferred. It was also not in our best interest to choose sides. So when we developed our own digital steel joist design software component, it was based on one of the leading structural steel software platforms; yet we needed our component to be universally sharable, regardless of what variety of structural software another participating company was using.

The most frequent solution, we found, came by way of buildingSMART International and its Industry Foundation Classes (IFC). We soon began using IFC to exchange files, and it no longer mattered whether your brand of software did not match ours—we could still exchange files. The IFC is imported into a master model for clash detection and coordination with the other trades.

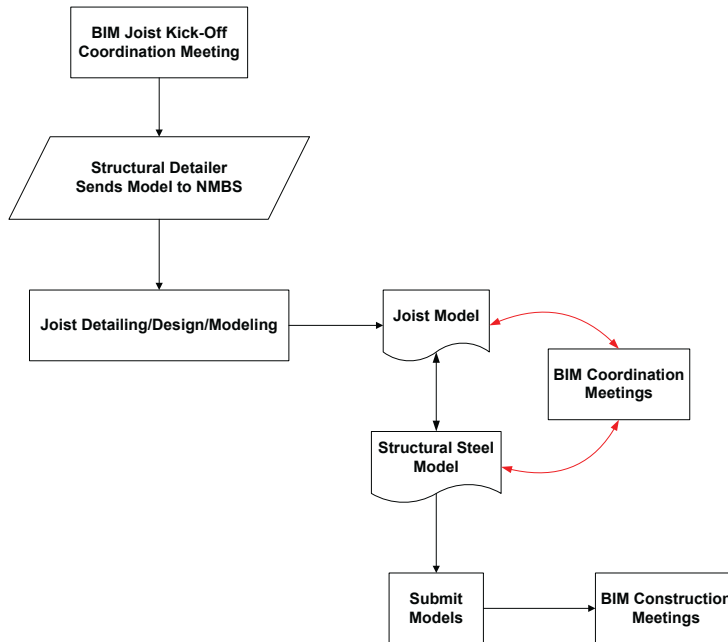
This dovetails with the change we also have been experiencing with regard to how some structural detailers prefer to receive our steel joist models. In the past, a structural detailer using Tekla would ask for a Tekla model file, would then export our joists along with the rest of their model to an IFC file, which would then be imported into a master model for clash detection. Then they began to recognize the remote risk that the joist information could be changed accidentally during the process. Today many prefer to receive an IFC file, even if they are using the same modeling software we use. They now have become more comfortable with our generating the IFC file for the joists; and we prefer doing so because we, too, want to ensure the accuracy and integrity of the joist information.

Getting Over the Process Definition Hurdle

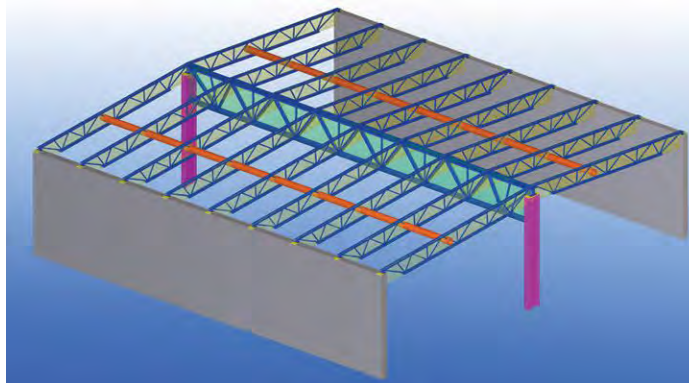
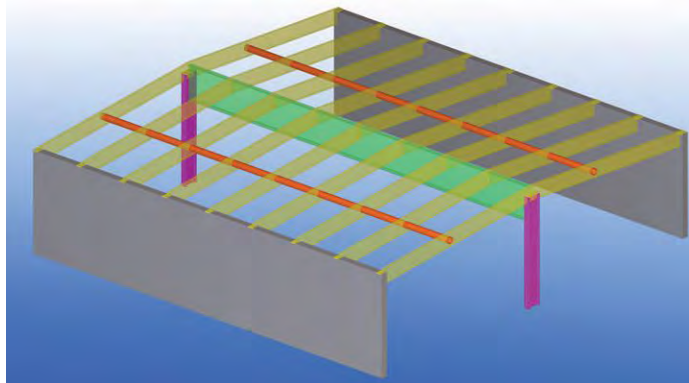
Having moved beyond the software and file exchange problem, we have since often been reminded that BIM is centrally not about the software or the digital, 3D screen grab images you see now in so many construction trade articles (like this one), implying that this is what BIM looks like, and isn't it cool? The next and more daunting challenge has been to establish, from our supplier-based point of view, the process for our successful participation on BIM-based projects.

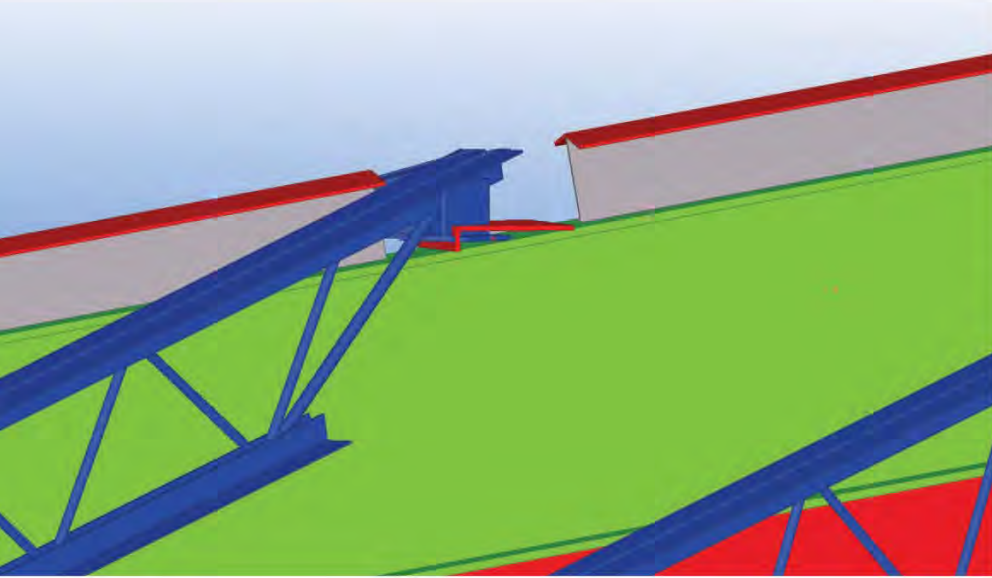
New Millennium has participated in a range of BIM projects, most of which can be called true BIM. It may be indicative of the confusion around what constitutes a BIM endeavor that on several occasions we have been approached at the end of projects to develop digital steel joist models, based on already developed traditional 2D plans.

There may be some utility in this, such as giving a building owner a virtual model to more effectively evaluate

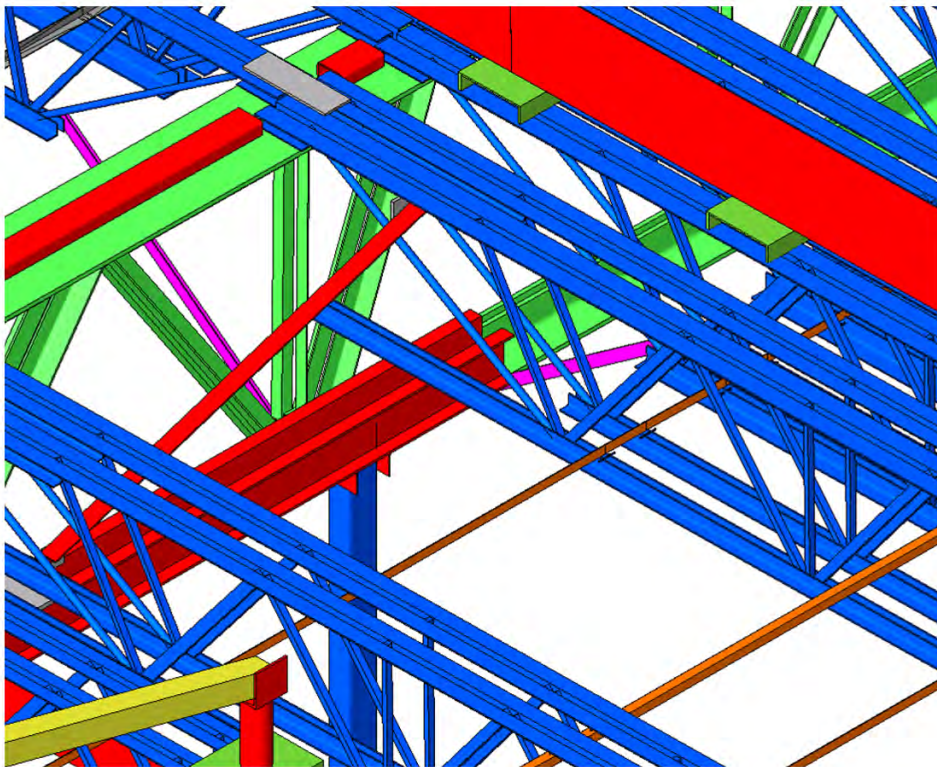


- ▲ New Millennium's BIM project participation begins with early collaboration on the design of the steel package, using a digital steel joist design plug-in developed by the company. The design process culminates in construction meetings that reference a master model generated from all other IFC imported models.
- ▼ Using the IFC file exchange format, various supplier-created plug-ins can readily be exchanged with various structural steel software programs. The upper image is an initial Tekla Structures file with the joists generically represented. In the lower image, New Millennium has replaced the joist images with as-built joist objects, using the company's Dynamic Joist plug-in.





▲ During the design phase of a recent project, collaboration briefly focused on the seat bearing of a sloped joist. The structural steel detailer needed to place a shim under the joist bearing, but didn't know exactly where to place it. New Millennium designed the joist and updated the object in its joist model. The company then quickly created a small IFC file of the joist and sent it to the structural detailer, who immediately inserted the IFC joist into the structural steel model.



future space planning, evolved building automation, HVAC and MEP revisions, or structured cabling moves-adds-changes. Nevertheless, for those projects fully BIM-based, we have in all cases been expected to contribute from the outset to the design of a comprehensive structural steel package. Our own methods for BIM participation have developed from this standpoint, and it was in response to this high expectation that we began to develop the procedures and milestones of a process that was not provided to us, but was expected of us.

While broad interoperability guidelines had been published for BIM-based projects and are still being published today, these guidelines are not specific to the participating supplier's point of view. This, in our view, is the way it should be. Each participant brings to the project a different set of expertise. The process we have developed, in and around the basics of sharing files between our steel joist model and the structural steel model, may not suit the approaches of other participants.

Moreover, we have refined our process based on post-project evaluations and other participating trade feedback that is unique to our joist discipline. For example, some steel detailers prefer to place generic Tekla beam joists in the initial steel model, to reference the placement of the joists. From this, we established guidelines for placing beam objects. Other procedures have evolved by collaborating with detailers, contributing to further development of the plug-in. Similarly, our joist BIM process increasingly accounts for additional project dimensions: 4D, for improved project scheduling and logistics management; 5D, with regard to improved estimating and cost/value decision management; and 6D, lifetime owner-operational management.

Ultimately, this is where we all are headed. Whether by way of Integrated Project Delivery (IPD) or some other team concept, BIM is a proven, improved approach that building owners and their advocates will increasingly demand. **MSC**

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