Add a Tool, Expand the Franchise

BY MICHAEL K. MITCHELL

A steel detailing firm's commitment to develop BIM skills turned out to be a good investment in its future.

REMEMBER THE "GOOD OLD DAYS" when work was plentiful for steel detailers and office rates were higher than the breakeven point? Our "good old days" ran from 2002 through 2008. We had more work than we could handle and our detailing rate had been steadily rising. It was during that time that we made a decision that would determine the future of our company.

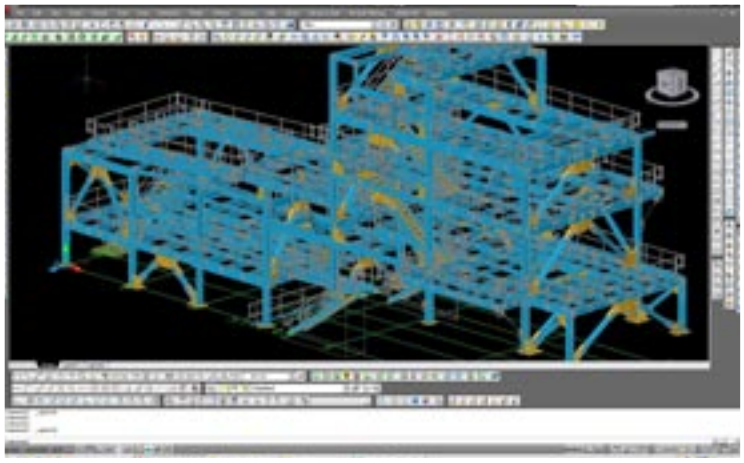
We could see the need to increase our production in order to keep up with our customers' demands. That meant either hiring more employees or making the ones we had more productive. We chose to make the employees we had more productive by purchasing a modeling program.

With that decision came some concerns:

- Price. Not only was there the cost of the modeling software, but hardware upgrades were required to run the program.
- Learning curve. We realized there would be a loss in production during the training and during the first few projects.
- Differences in shop standards. Each fabricator we work for has its own standards and preferences for shop drawings. As new users, we were unsure how easily we could modify the model's shop drawings to please each fabricator—or even if it could be done.

Opposite page: The Salt Lake City Library building consists of two parts—a crescent-shaped structure, shown here under construction, which wraps around a separate triangular structure. The two are connected by an extensive skylight. Detailing the steel for the new building relied heavily on modeling.

This page: Besides the similarity in names, one of the reasons Advance Steel Design selected Graitec Advance Steel modeling software was because of its ability to easily model the miscellaneous steel and tie it in with the structural steel. Including increased detail, such as handrails, facilitates a finer degree of clash detection. On the industrial project shown here, this feature allowed the detailer to alert designers of a stairway that had a direct clash with a column base plate. As a result, designers were able to move the stairway 2 ft to the side in the model, rather than having the problem surface later in the field.



After comparing modeling programs we purchased the software and within three weeks were trained and ready to begin. At that point we set up the output portion of the program to produce the shop drawings for each of our customers. We realized that no matter how nice the model looked, the shop drawings are the product we provide to our customers, and we needed to focus on them. Therefore, we made the drawings look as close as possible to those we would have submitted prior to using modeling software.

One of our first modeling projects was an addition on top of an existing hospital. Prior to beginning the project we met with our fabricator to share our intention to use the model and ask for his input. The fabricator was very receptive to the idea, although he had not previously worked with modeling either. In the end, we learned together and both benefited. For example, we knew that there would need to be adjustments made when the existing roof was opened, but we also had been told that modeling makes the revision process easier, which should help in this type of situation. It did. The fabricator helped us in deciding where to break up the submittal packages, and at the same time was pleased to learn that the model allowed us to directly provide CNC data that could be used by the fabrication equipment.

On a subsequent BIM project, a children's hospital, we created our model and began detailing the members. Every week we would upload our model into the contractor's project model. We would then meet with all of the trades and go over problems and clashes in the model. In the walls and floors of a hospital there are all types of pipes, wires and supports that need to coexist. Working out the conflicts in the modeling phase saved time and money in the construction phase. The disadvantage the detailers have in the BIM project is we are not usually brought onto the project until the fabricator is hired. By that time the project model and most of the other trades' models are going, so the detailer has to play catch-up

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to get the steel model created. As the BIM projects evolve, the detailer needs to somehow be brought into the project earlier, possibly during the design phase.

In the four years since that first project we have modeled and detailed large industrial projects, office buildings, hospitals, stadiums, homes, handrail and ladders. Many of those projects have been of a size and scope that we simply could not have handled prior to developing our modeling capabilities. With the help of understanding customers, the learning curve turned out to be a positive time during which we customized our program to suit each of our fabricators. They also have relaxed some of their conventional requirements to accommodate the modeling program. For example, one fabricator we work with had always insisted on a rather involved naming convention for piece marks. Although we could have set up the program to accept such complexities, that fabricator realized we were able to get the same result—clearly and accurately marking individual pieces—in a much simpler way. As a result, they adapted their requirements to suit our new tools.

The challenge during the first year with a modeling program is to keep using it. We trained everyone in the office on it and required its use unless special circumstances required otherwise. With everyone working on the program, shortcuts and time-saving procedures found by individual detailers were shared at model efficiency update meetings.

We have realized some unexpected advantages, which include:

- Renewed interest in detailing. Modeling is new and the new technology energized our detailers.
- Clash detection. Modeling has helped us see clashing members and catch design problems that would not have been caught until the steel was on site.
- Productivity. Depending on the type of project, we have seen our production at least double.
- Dealing with changes. When design revisions occur they are easily handled and tracked.
- Machine data. The ability to easily produce CNC and DXF files for the fabricator's use is something they appreciate.
- Ongoing availability of material lists. Even though they are an acknowledged work in progress.
- Advance material lists. We have been hired by fabricators to work with them on their take-offs for estimating. We create a model of the project, without connections, and create a material listing that they then use as take-off quantities.

We made the decision to move from 2D into 3D modeling during the "good old days," when there was plenty of work and not enough detailers. I am convinced that decision is a big part of the reason we have been able to make it through the recent slow years, and it has us well positioned to welcome the next "good old days."

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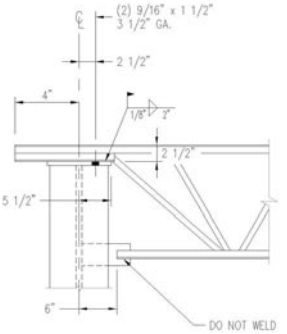
Another Good Example

The recently developed ability to easily model open web steel joists within BIM recently paid off on the Joint School of Nanoscience and Nanoengineering project in Greensboro, N.C. The structural steel package was a completely digital design, as required by the architect and general contractor. In the process of constructing and reviewing the digital model, New Millennium Building Systems designers detected a design error, clearly viewable in the digital joist model, that likely would not have been found in a traditional 2D plan.

The discrepancy was in regard to a joist that had different dimensions at its ends, where they should have been the same. The correct information was entered into the digital plan and with a click, the fix was made.

Finding that error within the virtual joist model prevented a multi-thousand dollar fix during the real-world erection stage, demonstrating a key advantage of the digital approach. To learn more about the company's free digital design software, visit www.newmill.com.



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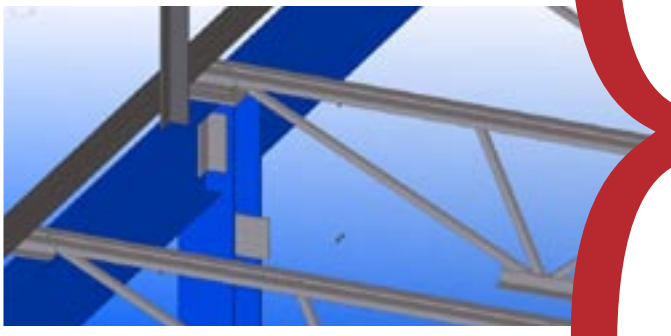
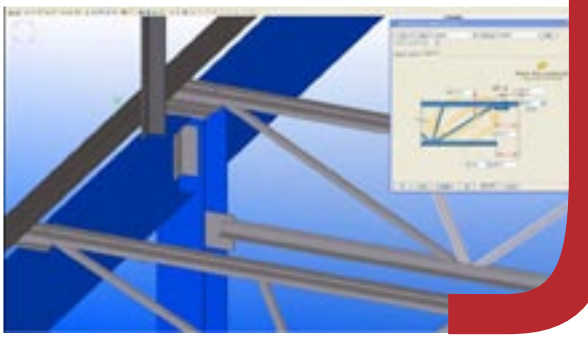
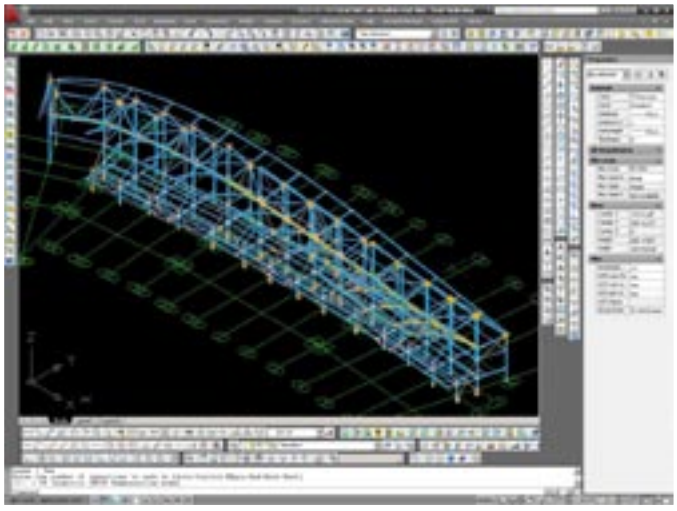


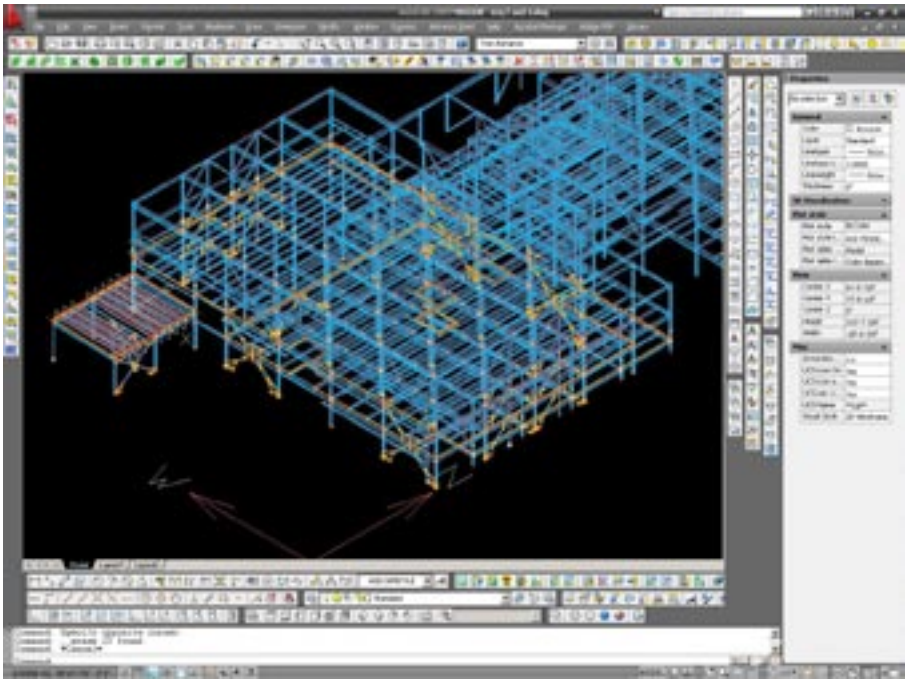


New Millennium Building Systems

A faster Request for Interpretation (RFI) process is one of the advantages of a digital plan review. In this project, an error was zoomed in on and confirmed wrong. A traditional 2D plan would not have flagged the problem. Image 4 shows the problem resolved, before going into production.



Above and right: "There's no way we could have done this project without 3D modeling," says Advance Steel Design's Mike Mitchell. The company's modeling expertise enabled it to take on the task of detailing the Rio Tinto Stadium, located in Sandy, Utah. The 20,000-seat stadium opened in 2008 and is home to the Real Salt Lake Major League Soccer team.



Advance Steel Design recently completed detailing and modeling for Utah's new Multi Agency State Government Office Building in Salt Lake City. Previously taking on such an extensive project would have meant outsourcing much of the actual detailing, but the company's modeling capabilities permitted all the work on this 1,400-ton project to be done in-house.