COMPANY
IKERD Consulting

LOCATION
Dallas, Texas

SOFTWARE
Autodesk® Advance Steel

Advanced coordination for steel

IKERD Consulting uses Advance Steel to develop construction-grade virtual models for project coordination

With Advance Steel, we can tackle construction issues with a mouse and a keyboard, instead of a torch and a sledgehammer. And compared to other detailing solutions, it costs less, requires less training, has exceptional interoperability with widely used design solutions, works seamlessly with laser-scanned data, and is a familiar modeling environment for current and prospective staff.

—**Will Ikerd**
Principal
IKERD Consulting

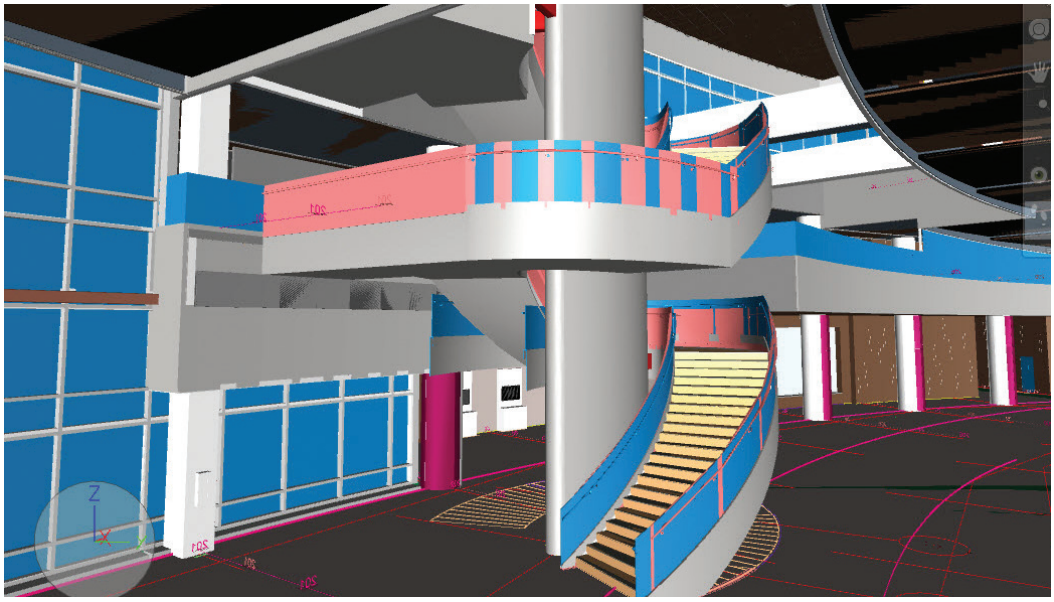

Image courtesy of IKERD Consulting.

The firm

IKERD Consulting is a Dallas-based structural engineering firm that provides consulting services for building owners, contractors, and designers with a focus on integrated projects utilizing Virtual Design amd Construction (VDC) and Building Information Modeling (BIM). IKERD's services include engineering and modeling of trade content, often incorporating 3D laser scanning data. The firm routinely uses Autodesk solutions, including Autodesk® Revit,® Autodesk® Navisworks,® and Autodesk® ReCap.®

The project

One of IKERD's recent projects was a new three-story, 300,000 square-foot technology center for the telecommunications company CenturyLink, in Monroe, Louisiana. IKERD provided overall BIM coordination services on the project, as well as modeling services for a variety of trades. One of these virtual models was the building's million-dollar "monumental" staircase, prominently located in the building's atrium. The staircase spirals up three stories around an oval pillar, which hides structural steel columns surrounded by a cold-formed metal frame. Curved LED acrylic panels cover the frame and illuminate the staircase area. The staircase is supported by a series of steel beams that protrude from the oval pillar. The treads of the stairs are several feet from the pillar, creating the illusion of the staircase floating up this pillar of light.

The challenges

"The geometry of the building is very complicated, with a lot of slopes and curves and very expensive finishes," says Will Ikerd, a principal at IKERD Consulting. "The use of highly detailed 3D models that accurately reflected planned and in-process construction was essential for project coordination." To facilitate that coordination, IKERD was also hired, independently, by several project subcontractors to develop these "construction-grade" models of their building trades, including the manufacturer of the staircase. And all of the discipline-specific models had to work seamlessly within the Navisworks software environment used by IKERD for project coordination and clash detection.

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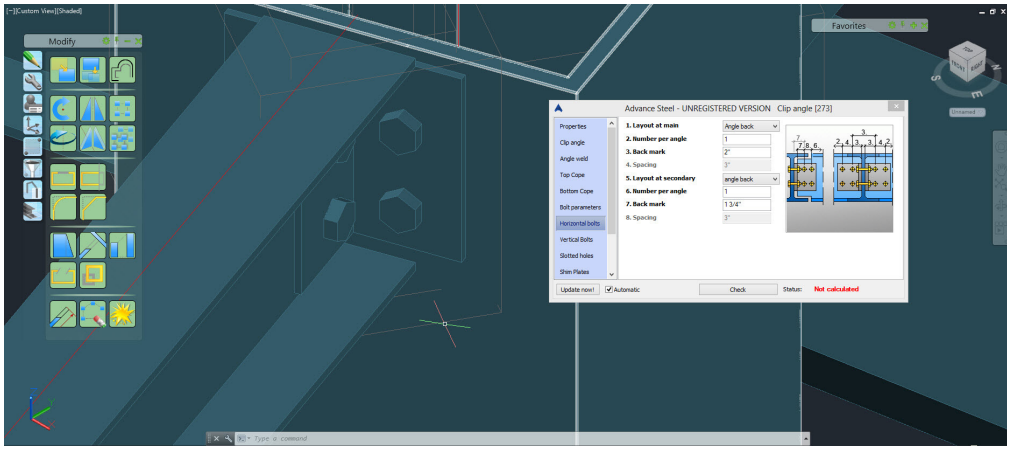

Image courtesy of IKERD Consulting.

The solution

IKERD used Autodesk® Advance Steel, Autodesk's 3D model-based software solution for steel detailing, to create a virtual model of the central staircase that would match the constructed staircase. This model was used to coordinate the staircase with the adjoining structural support beams, cold-formed metal frame, and acrylic panels. Built on the AutoCAD platform, the software's parametric 3D modeling environment and intelligent objects enables firms to efficiently develop extremely precise models of steel structures that contain all the structural steel beams, plates, bracing, welded assemblies, and so on down to fasteners and connections.

Construction-grade level of detail

"The geometry of this staircase is very complicated," explains Trevor Koller, a project coordinator for IKERD. "The overall form mirrors the oval-shaped central pillar as the stairs spiral upwards and every tread of the staircase is a unique quadrangle. The central structure included numerous acrylic panels that were manufactured remotely and represented the majority of the staircase's million-dollar price tag. Needless to say, coordination between the staircase and these panels was very important."

The team began by using the architect's Revit model to develop a Revit structural model of the staircase and surrounding steel and supports. These models were then used in Navisworks for clash detection and clearance checking. "But design models can be both highly precise and horribly inaccurate at the same time," says Ikerd.

The level of detail and tolerances of design models are sometimes insufficient for construction-grade spatial coordination, especially on a project like this with such tight clearances and complicated geometry. "We decided that we needed to model every little detail of the staircase and supporting structure, down to the connection level. And that's when we turned to Advance Steel." says Koller. "The parametric modeling flexibility of the Advance Steel software and its specialized tools and wizards for stairs made it easy for us to develop the model, helping us figure out the tread size and spacing of the stairs as they curved around the oval center."

"Moreover, the level of detail in the Advance Steel model helped us study the constructability of the staircase," says Ikerd. "For example, would the fireproofing material on the main steel create interferences, was there enough room to fit up the staircase connections, and so on."

Short learning curve

Although the IKERD team on this project had experience with Autodesk modeling solutions such Revit and AutoCAD, this was the firm's first use of Advance Steel. "With Advance Steel, it is very easy to model steel objects and connect them," says Koller. "The software is very intuitive and easy to learn and use."

"We found Advance Steel to be much simpler to learn than some of the other steel detailing tools we had used in the past—easily 30 percent faster," adds Ikerd. "In particular, our AutoCAD users quickly took to Advance Steel."

Laser accuracy

In addition to creating a construction-grade model of the staircase, IKERD also used a laser scanner to capture the as-built conditions of the central pillar's core and metal frame. "It was important to know exactly where steel beams would penetrate the metal frame and these acrylic panels," says Ikerd. The ReCap software was used to process the data and create a point cloud of the as-built structural beams and metal framing. That data and the Advance Steel model were imported into Navisworks to validate the position of the new construction and coordinate it against the planned staircase—ultimately reducing the number of "requests for information" (RFI) during the construction phase.

"The interoperability of Advance Steel with other Autodesk products like ReCap, Revit, and Navisworks is crucial on a project like this and is a big advantage for our business," says Koller. "We don't have to worry about file formats or unsupported model elements. They all just work together."

Results

"A designer's drawings and models represent design intent," says Koller. "But, as the saying goes, 'the devil is in the details'. Advance Steel helped us quickly model those details and reduce the RFIs between the contractors and design teams, saving our client costly construction schedules delays."

IKERD has been using Advance Steel for over a year since this project, and continues to use the software for fabrication/construction-level coordination. "With Advance Steel, we can tackle construction issues with a mouse and a keyboard, instead of a torch and a sledgehammer," says Ikerd. "And compared to other detailing solutions, it costs less, requires less training, has exceptional interoperability with widely used design solutions, works seamlessly with laser-scanned data, and is a familiar modeling environment for current and prospective staff," says Ikerd.

For more information, visit **www.autodesk.com/advancesteel**

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> **—Trevor Koller**
> Project Coordinator
> IKERD Consulting

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