COMPANY
TSI Structures

LOCATION
Norwich, U.K.

SOFTWARE
Autodesk® Advance Steel

An early delivery for steel detailing

Advance Steel and BIM collaboration help steel fabricator deliver a hospital's new maternity unit on time

The Advance Steel software's ease of use, speed of modeling and connection design, and integrated design checks on the fly—combined with the ability to reuse the structural engineer's Revit model—helped us reduce our anticipated schedule time by approximately 20 percent.

—**Adrian Betts**
Drawing Office Manager
TSI Structures

Image courtesy of TSI Structures

The project

Kettering General Hospital in Northamptonshire, England completely replaced its old maternity and gynecology units with a new UK£4.5 million expansion and renovation. The project included two new obstetrics/gynecology operating rooms and supporting accommodations constructed in a compact new extension to the front of an existing wing of the hospital. The project also involved remodeling the existing operating rooms to provide modern recovery and support spaces. Steel fabricator TSI Structures provided steel connection design, detailing, fabrication, and erection for the new expansion.

The challenges

The hospital's existing maternity operating rooms and facilities had become outdated and were causing inefficiencies in services. As such, the hospital was eager for the project to be delivered and the new facilities operational. "We had an aggressive schedule for our drawings and steel works," explains Adrian Betts, TSI's drawing office manager. "Adding to our schedule challenge was the requirement that we provide full connection design to the new Eurocode 3 building code that is gradually replacing an existing British Standard code." Many steel connection design software products do not yet include support for Eurocode 3.

In addition, the extended project team (including TSI, the general contractor Interserve, and BWB Consulting for structural engineering) were required to use some of the collaborative Building Information Modeling (BIM) practices that will soon be mandated for all U.K. government public projects, including the sharing of model-based project data amongst the project team.

The solution

TSI used Autodesk® Advance Steel software for its steel connection design, detailing, and fabrication on this project. "The bidirectional link between Advance Steel and Autodesk® Revit software—used by BWB's structural engineers—made it easier to reuse their design model and work more efficiently with their engineers using a BIM workflow," says Betts. "Due to this link, as well as the accuracy and detail of BWB's model, we did not have to waste time recreating the steel model in Advance Steel and could immediately start adding our steel connections." TSI used Advance Steel's built-in steel connection design engine (which fully supports the Eurocode 3 building code) to check connections in real time. Furthermore, the Advance Steel model was used to automatically generate CNC data for TSI's fabrication processes.

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Real-time design checking

TSI used the built-in connection design and checking features of Advance Steel to more quickly design the steel connections and check them using the Eurocode 3 standard. "We had to perform checks on the main shear loadings of the beams as well as secondary checks for disproportionate collapse," says Betts. "The Advance Steel software easily handled these multiple load cases."

Moreover, TSI used Advance Steel to provide fully calculated reports of all the connections—based on the formulas used and with views of each connection—that were then issued to BWB for their approval and sign-off. "This all-in-one functionality helped decrease our steel design and detailing times—saving us both schedule time and the use of additional designers on the project." says Betts.

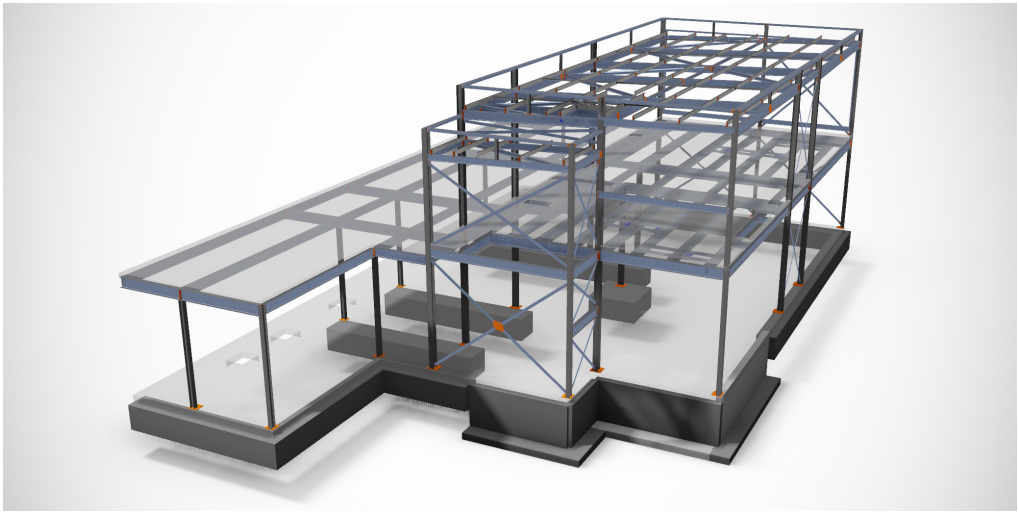

Image courtesy of TSI Structures

Model-based processes

During the project, TSI uploaded its Advance Steel model, drawings, and reports to the contractor's common data environment—a requirement of the U.K. BIM mandate, which is used to collect, manage, and disseminate all relevant approved project documents for multidisciplinary teams and ultimately the facility owner. Along with the native Advance Steel model, TSI also exported and uploaded Industry Foundation Classes (IFC) models of its steel design, as IFC is a commonly-used open format for data sharing on BIM projects. In addition, the company provided a brief instructional video for the extended project team members who used Revit—and eventually the hospital if they choose to use Revit for their ongoing facility operations—that explained how to get the Advance Steel Plug-in for Revit® from the Autodesk® App Store and how to open TSI's model in Revit to help synchronize or check it against their own models and drawings.

"In particular, we used model-based collaboration with the structural engineers to aid in streamlining their approvals and help us quickly and efficiently manage their changes," says Betts. "When a quick turnaround on a change was required, they would just send us their updated Revit model. We imported that model, along with their previous model, into Advance Steel to help us quickly identify what structural elements had moved and what connections we needed to redesign. In fact, the main contractor commented to us on what a well-coordinated and managed project this was."

Results

The project was completed on schedule in the fall of 2015, and the first baby was delivered in the hospital's new wing on September 23rd. "The interoperability between Advance Steel and Revit, which is the design tool of choice with many of the structural firms we work with, is excellent," says Betts. "And on this project, the structural model was outstanding, so with the click of a button we could immediately start detailing."

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For more information, visit
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