



TEKLA® Structures



TEKLA STRUCTURES IN PRACTICE:

UNIVERSITY OF VIRGINIA SOUTH LAWN PROJECT

BY BARTON MALOW, US



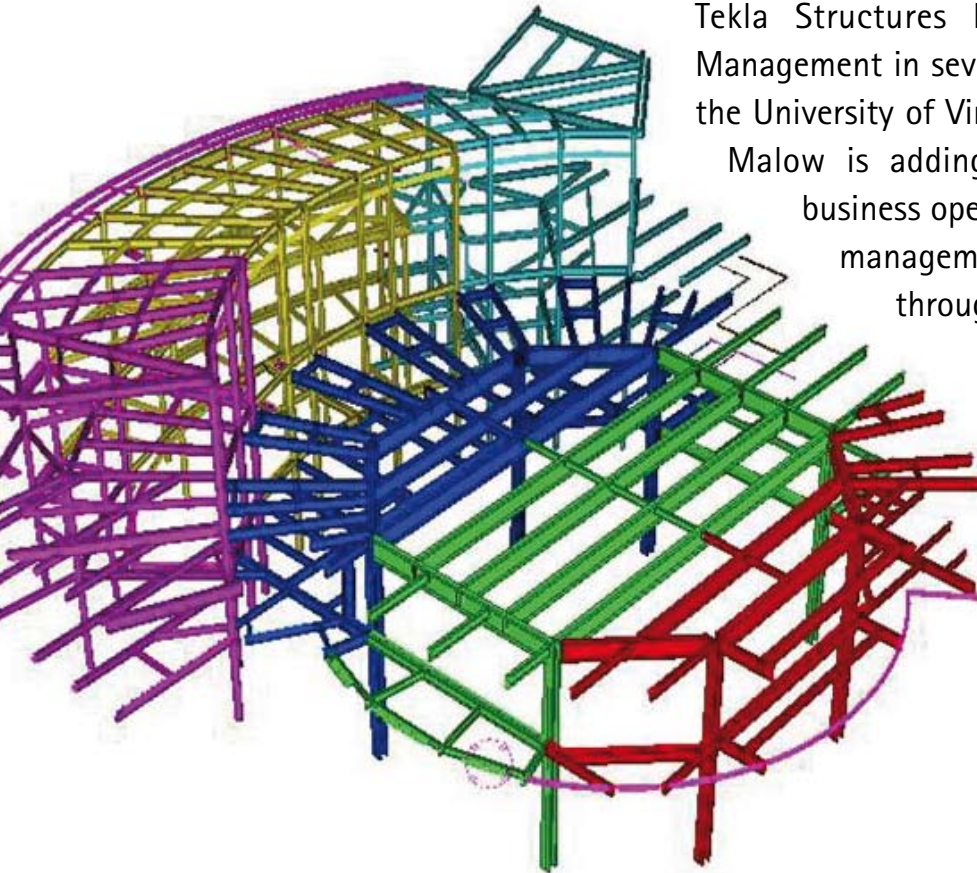


TEKLA Structures



BIM FOR CONSTRUCTION MANAGEMENT

> One of the largest general contractors in North America, Barton Malow Company, has utilized the Tekla Structures BIM solution for Construction Management in several innovative projects, including the University of Virginia South Lawn project. Barton Malow is adding efficiency and value to their business operations by managing construction management information in a 3D context, throughout the entire project lifecycle.



> Barton Malow Project Engineer Nathan Mallory comments on the use of Tekla Structures for Construction Management:

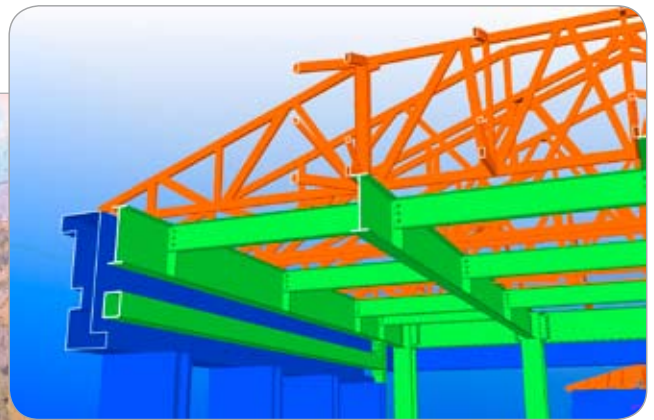
"Much of this effort really begins before any work takes place or the first object is modeled. We began our efforts by clearly defining our Building Information Modeling requirements and including them in all of Requests for Proposal on the project. This provided a platform to discuss each subcontractor's capabilities with respect to BIM and assess what we could achieve with each of them."

COOPERATION IN PIONEERING PROJECTS

> Barton Malow values Tekla Structures BIM (Building Information Modeling) software for its ability to integrate and analyze building and construction information, from BIM and non-BIM sources, as well as its user-friendly and easily customizable environment. Barton Malow previously used Tekla Structures in 2006 to speed up and streamline the expansion of the Lynchburg General Hospital in Virginia. "We've been very happy with Tekla's initiative and cooperation in these pioneering BIM projects that have considerably improved our project management processes," says Vice President **Phil Kirby** of Barton Malow in Charlottesville, Virginia. "We have firm plans to utilize the Tekla Structures software in future projects that require

optimized construction data management," says Kirby.

The University of Virginia's South Lawn Arts and Sciences project is the most ambitious undertaking on the University's Central Grounds in over a century. The challenge was to accommodate the contemporary program requirements of the College and Graduate School of Arts and Sciences while respecting the Jeffersonian architecture of the nearby Academic Village. The University of Virginia was founded by Thomas Jefferson. In addition to being America's third President, he was also an accomplished early American architect and inventor. Today, the university educates many of the country's architects.



FAST-TRACK DESIGN COORDINATION

> The Tekla Structures for Construction Management solution was used to support structural steel and precast design and construction as well as coordinate between structural systems and the mechanical system. Tekla Structures for Construction Management was also used for clash analysis and tracking between the mechanical and structural systems.

Barton Malow Project Engineer **Brian Larson** comments on design coordination and clash detection with Tekla Structures:

"When the first mechanical models were received, the mechanical contractor did not have the capacity to model in 3D," says Larson. "Instead they created shop drawings in an older 2D drafting program and used a third-party program to convert them to 3D. This has allowed us to directly observe the inadequacies of a traditional 2D coordination process. On just one floor, in just one wing, we observed nine areas of clashes between mechanical ducts and structural steel.

If these clashes had not been found using BIM, the incorrect pieces of duct would have been shipped to site, causing schedule delays and rework."

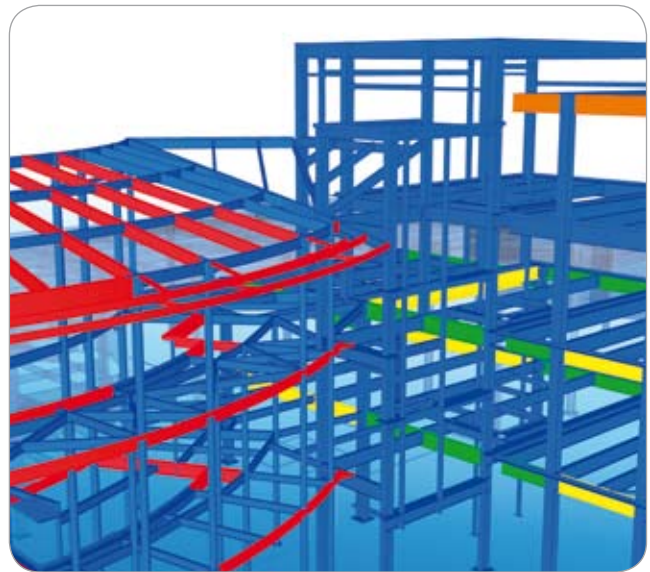
"During the precast modeling process, design issues between steel and precast were recognized. It is unlikely that these issues would have been found without the use of BIM. As we caught these issues early, we were able to get them resolved before submittal review. This led to more accurate shop drawings and a quicker precast review period."



ANALYSIS FOR CONSTRUCTABILITY

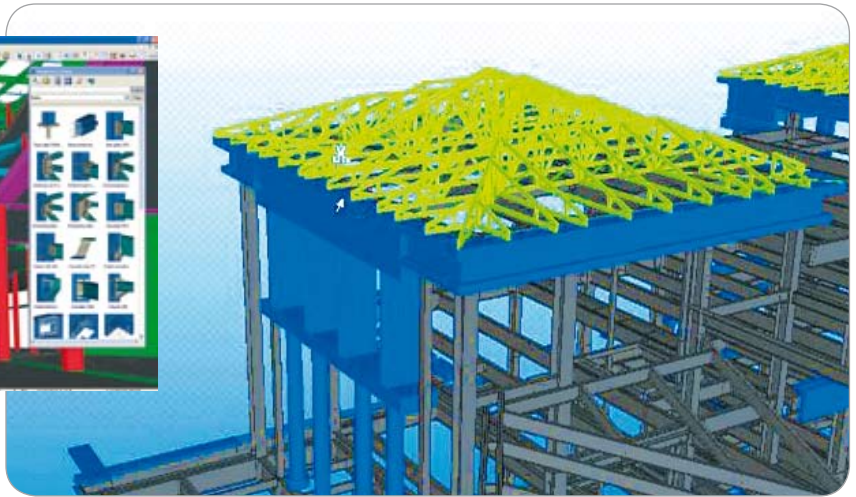
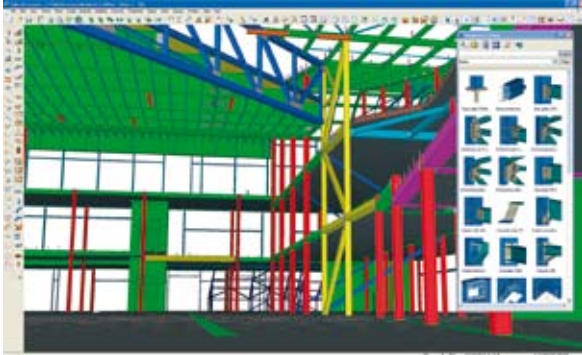
> "For structural steel, we used reports to generate a list of all steel assemblies and their profiles," explains Larson. "The ability to report on steel materials and the drawings on which they are located gives us information that we could not have gotten from paper shop drawings. We then used these reports to log the design team's review status for each assembly. This information was fed back into the model to view the locations of pieces that had not been approved. The visual part saved a good amount of time in prioritizing which unapproved pieces were critical and which were not."

"This is just a start," Larson notes. Analyzing the Tekla structural model for constructability includes, for example, 4D simulation of cast-in-place concrete and structural steel installation. The model can be colorized on the basis of project data, phasing and scheduling. "We have also put change order data in the model to better help sequencing and scheduling," says Larson.



University of Virginia, South Lawn Arts and Sciences Project

- > Construction Cost: \$65 million
- > Scope: 116,000 square feet of classroom, office and common space with a 90' wide landscaped pedestrian street crossing
- > Contract Type: Construction Management Agency



Founded in 1924, Barton Malow Company has served as a general contractor in the U.S. market for nearly fifty years. Offering both design and construction services, the company is organized by markets. Barton Malow's Preconstruction group supports these markets with a diverse estimating system, in addition to their 25 full-time engineers and architects. Their expertise includes all facets of project planning, value engineering and manpower planning. The corporation employs 1,550 full-time staff and has experience in 37 states and the District of Columbia. Company revenues for the previous five years are in excess of \$1 billion annually. Barton Malow is consistently ranked among the top ten builders in the country in their niche markets. Headquartered in Southfield, Michigan, the company has regional offices in Maryland, Virginia, Arizona, Ohio, Illinois, Florida and Georgia. Project control centers are established at all major project sites.

COLLABORATION BASED ON A VISUALIZED STRUCTURE

> There are more than 500 shop drawings for steel, precast and roof trusses in the U.Va. South Lawn project. Leafing through numerous paper plans, elevations, and sections makes it very time-consuming to figure out coordination issues. According to Brian Larson, having all the information in the Tekla model to review at once or output to an Excel file saved considerable time and reduced frustration during the project.

"Early in the precast modeling, we had a coordination meeting with precast provider Shockey Precast," Larson says. "Instead of pulling out all the steel and precast drawings to review issues, we reviewed the composite steel and precast model. The number of issues resolved in that short meeting would have taken days if we only had paper drawings!"

"When the design team stated that they could not locate certain pieces in the shop drawings, we used the model to find the pieces and colored them red," Larson explains. "When it was noticed that the steel contractor had not shown certain precast support angles in their drawings, we used the Tekla Structures model to color all assemblies missing these angles."

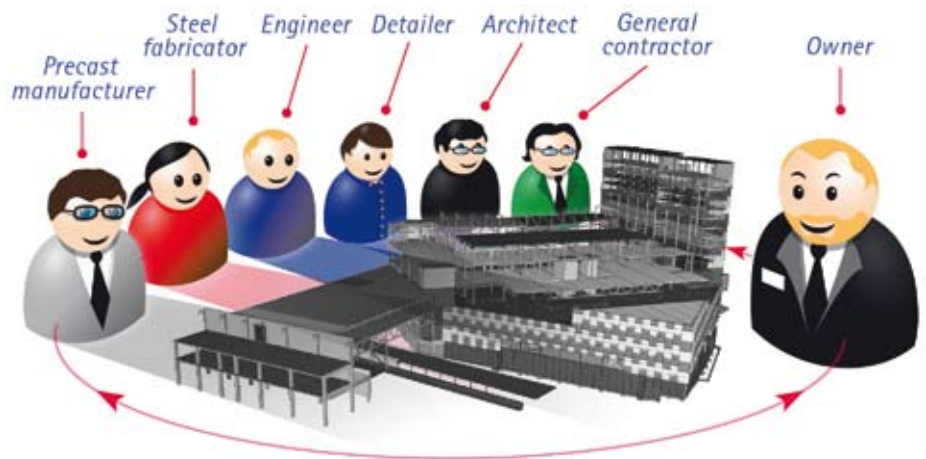
"For RFIs, instead of trying to create our own sketches of the problem, we attributed any affected pieces in the Tekla model. We then created a Tekla Web Viewer model of the area to attach to the RFI and to easily review it on the Internet browser with non-BIM team members. This saved considerable time in communicating these issues to the design team," concludes Larson.

For the South Lawn project, the use of BIM brought about further innovation and value past the traditional 2D-based information exchange. Project team members dramatically benefited from the accessibility and visual nature of data presented, stored and reported from the Tekla Structures for Construction Management system.

TEKLA STRUCTURES – INTELLIGENT MODELING



Tekla's model-based software products make customers' core processes more effective in building and construction and infrastructure management. Tekla Corporation has area offices and partner organizations worldwide. International operations account for 85% of net sales. Founded in 1966, Tekla is one of the most established companies in its field. Tekla Structures BIM (Building Information Modeling) software encompasses specialized configurations for structural engineers, steel detailers and fabricators, precast concrete detailers and manufacturers, and construction companies.



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