

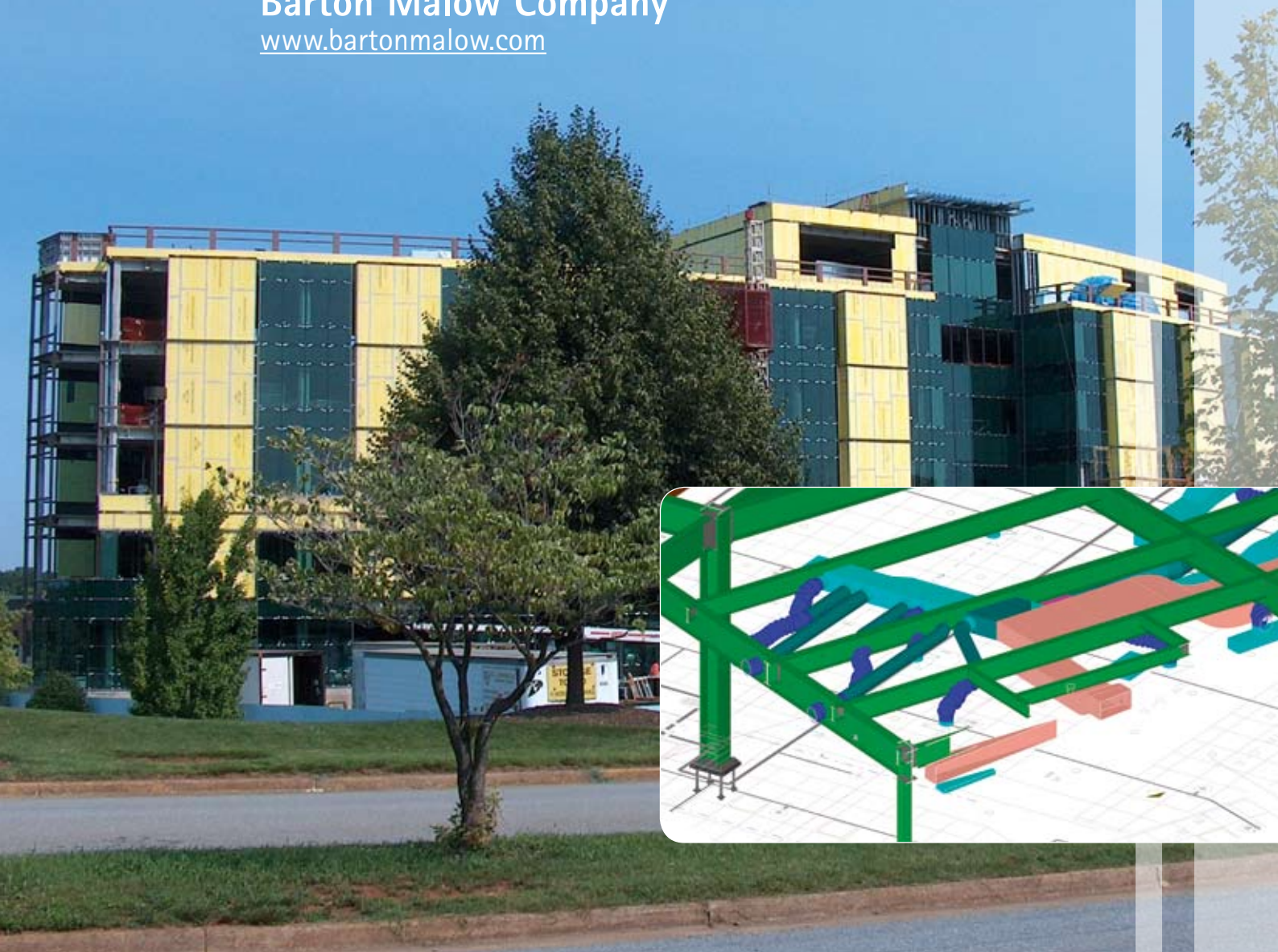


TEKLA® Structures



TEKLA STRUCTURES IN PRACTICE:
**LYNCHBURG
GENERAL HOSPITAL EXPANSION**


Barton Malow Company
www.bartonmalow.com





TEKLA Structures

CONTROLLING THE COSTS AND RISK OF CONSTRUCTION



Barton Malow, a prominent general contractor in the U.S. market, has worked with Tekla for the last couple of years to implement Tekla Structures software in construction management. Tekla's building information modeling (BIM) solution Tekla Structures is an open platform that greatly aids in controlling the costs and risk associated with construction. Consequently, the Lynchburg General Hospital expansion project carried out in the state of Virginia resulted in tangible cost as well as substantial time savings through the implementation of innovative process and technology.

BARTON MALOW COMPANY

> Founded in 1924, Barton Malow 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, one of them being health care. 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 10 builders in the nation 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.



> IN ADDITION TO THE TANGIBLE COSTS SAVINGS REALIZED ON THIS PROJECT, A WEALTH OF ERRORS AND COSTS WERE AVOIDED IN ADOPTING THE COLLABORATIVE WAY OF WORKING.

PROMOTING PROGRESS WITH EFFICIENT CONSTRUCTION

> Health facilities projects are a major source of construction in the United States, and Barton Malow has delivered a wide variety of them. To achieve the high-set goals of their clients, Barton Malow provides facilities that support growth, progress and innovation within health care. They do this by offering services that encompass the entire building process, while maintaining their roots in constructing strong, quality buildings. What significantly helps in promoting their clients' progress is using software that does the same for construction, such as the Tekla Structures 3D building information modeling (BIM) solution. As a result of Tekla Structures' open platform as well as its unique collaboration possibilities – design coordination and communication of all project participants in a shared, real-time 3D environment – it is possible to effectively minimize construction costs, while sufficiently controlling risk. Tekla's modeling interface can be used to supplement 3D objects, which are not structural in nature, to better develop 3D design and construction coordination. Tekla's solution also enables efficient conflict resolution, which is equally important for the success of a construction project. The ability to both create construction specific model objects, as well as, combine other disciplines' 3-dimensional information enables maximum usage of project planning and coordination resources.

PROGRESSIVE PATIENT CARE IN A TOWER OF BRICK AND GLASS

> The five-story patient care tower at Lynchburg General Hospital was designed to meet the growing demand for services, to be patient and family-oriented, yet still accommodate the advanced equipment and technology needed to care for today's patients. The 140,000 square-foot tower of brick and glass includes 108 patient rooms and other facilities, such as treatment units and one floor of shell space for future expansion. The tower rooms will be wired for a future move to a digital, computerized environment, such as electronic patient records, and be designed to include the latest in patient monitoring equipment. The addition is built across the front of the hospital's existing main entrance. Construction of the state-of-the-art facility is scheduled to be completed in 2007. In addition to the patient care area, the project includes renovation of 65,000 square feet of space at Lynchburg General Hospital, with an emphasis on improved patient care support areas. The cost of the patient care tower is estimated at approximately \$64 million.

More information at:
www.centrahealth.com/about/construction.aspx

SAVINGS THROUGH PHASING AND 3D MODELING COORDINATION

> Compared to other projects at Barton Malow, the Lynchburg General Hospital expansion is unique due to the phased release of bidding and construction, explains **Ronald B. Sinopoli**, Project Manager at Barton Malow. As the construction manager, Barton Malow released three project engagement letters (PELs), which subsequently determined the phasing of the project. These included Site Utilities Package, Structural Package, and Architectural/MEP Package, which rolled together set the GMP for the project.

Tekla Structures 3D model and coordination was utilized in all of these phases, which significantly facilitated the overall construction management process and resulted in substantial tangible savings. According to the Barton Malow project team, known savings from MEP contractor not re-detailing the structure in 3D environment amount to \$20,000. In addition to the tangible costs savings realized on this project, a wealth of errors and costs were avoided in adopting the collaborative way of working. It is quite difficult to quantify savings from costs and errors that are prevented due to a more effective workflow between the project disciplines. After acquiring Tekla Structures license and maintenance for the company, all of the implementation was done at no added cost to the project. For Barton Malow, it was extremely important that no upfront costs were put in the project to counteract the savings.

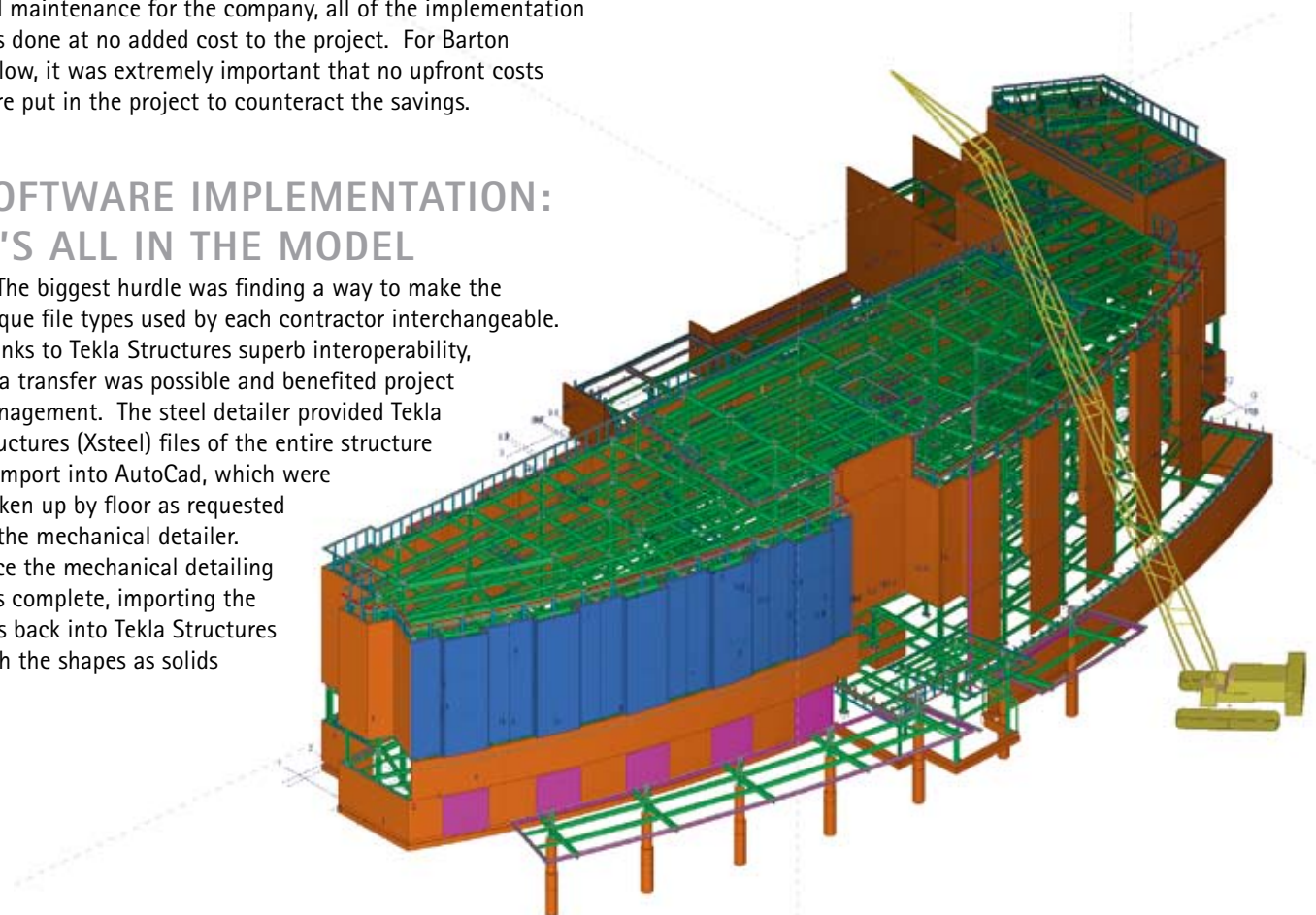
SOFTWARE IMPLEMENTATION: IT'S ALL IN THE MODEL

> The biggest hurdle was finding a way to make the unique file types used by each contractor interchangeable. Thanks to Tekla Structures superb interoperability, data transfer was possible and benefited project management. The steel detailer provided Tekla Structures (Xsteel) files of the entire structure to import into AutoCad, which were broken up by floor as requested by the mechanical detailer. Once the mechanical detailing was complete, importing the files back into Tekla Structures with the shapes as solids



(duct, flex, pipe equipment etc.) was, according to Sinopoli, a huge leap: it allowed for easy viewing and clash checks, which in his opinion was highly beneficial. "An entire floor of mechanical detailing can get extremely busy and wire frames just don't cut it," he notes.

The whole implementation was based on the phasing of the job. Says Sinopoli: "With the entire structure already detailed, we wanted, at the very least, to provide a 3D file of the entire steel frame to the MEP detailers so they would not have to re-draw the structure all over again."



➤ *"TEKLA STRUCTURES IS THE MOST OPEN FORMAT IN REGARDS TO IMPLEMENTATION OF OTHER FILE TYPES TO IMPORT AND EXPORT."*



This would allow additional time for conflict resolution, interaction with the Centra Health (project owner) staff during the detailing phase; or, in the best case, allow shop fabrication to be completed ahead of schedule and installation to begin sooner than anticipated. What turned out as a bonus was the ability to import the MEP wire frame back into Tekla Structures with solid shapes. "No matter how hard you try, issues will come up that need to be resolved after the MEP coordination process is complete," Sinopoli remarks. "We had a model representing shop fabrication and as-built steel, concrete, and MEP systems, so when problems were discovered – either thru a visual clash check or during the installation phase – the ability to take a snapshot and send it to the architect was invaluable. It allowed him to immediately understand the issue and give timely feedback for the desired resolution, and it even allowed us to easily add a proposed schematic solution, coordinated with other interacting trade work, without having to wait on somebody else to develop it."

According to Sinopoli, the next step of implementation will be to bring the cladding systems into the process and determine a protocol for the situation where all of the major systems (steel, concrete, cladding, and MEP) are being detailed at the same time. In this instance, the phasing of the detailing will be critical, and it will be essential to keep the model up-to-date and posted to ensure that all parties are working with the latest model. Barton Malow is currently implementing this kind of process on a hospital project in Detroit.

SMOOTH COOPERATION FOR A BETTER FUTURE IN CONSTRUCTION

➤ For **Stacy Scopano**, Business and Product Development Manager for North America at Tekla Inc, Barton Malow represents an ideal organization to spearhead innovation in design and construction. "The diversity of Barton Malow's portfolio of projects, in regards to project size and types, allows their organization to constantly refine the way in which they deliver projects," he says. "Their drive to constantly streamline this delivery process allows Tekla a great opportunity to facilitate it with technology."

Concludes Sinopoli of Barton Malow: "Cooperation with Tekla was absolutely excellent. Tekla acted like a consultant, not a software vendor. Without the implementation support provided by Tekla, the 3D coordination of the structure and MEP systems would never have been accomplished." He is also very positive about the expanded usage of Tekla's software in the future: "Tekla Structures provides a viable solution for 3D modeling concrete. It is the most open format in regards to implementation of other file types to import and export. I see that within the next 3–5 years Tekla Structures will have one of the most practical and powerful solutions to coordinate construction through building information modeling."

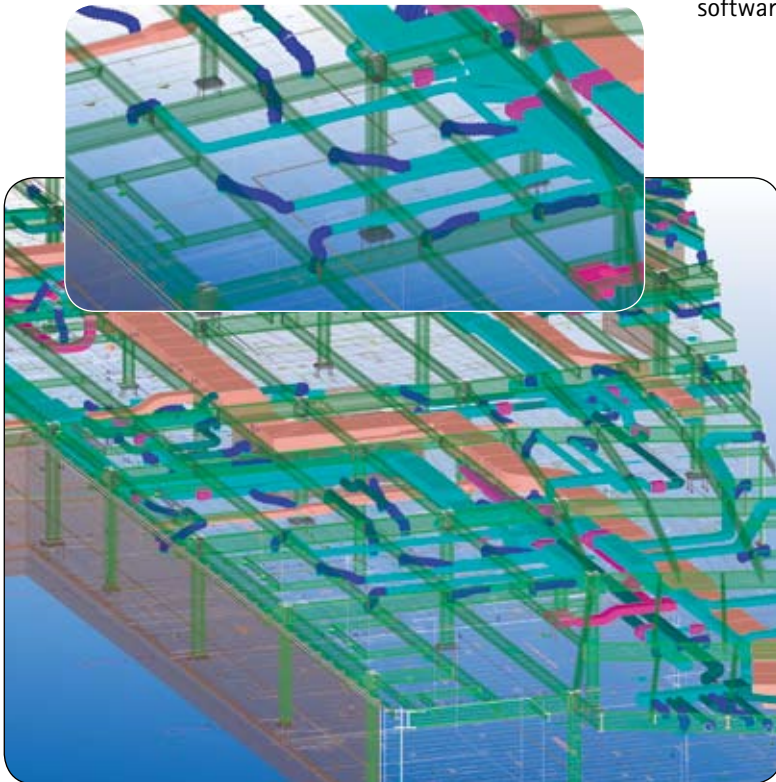
TEKLA STRUCTURES – INTELLIGENT 3D MODELING

TEKLA CORPORATION IN BRIEF

> Tekla is a leading international software company whose innovative software solutions make customers' core businesses more effective. Tekla's software products and related services are used mostly in building and construction, but also in energy sales and distribution, defense, and by municipalities. Tekla Group has 11 offices internationally and over 30 global partner organizations. Headquartered in Espoo, Finland, Tekla employs over 300 persons worldwide. International operations account for 75% of net sales. Tekla was founded in 1966 and celebrates its 40th year in business in 2006.

TEKLA STRUCTURES

> Tekla Structures software is the building information modeling (BIM) solution that can take any building project all the way from sales and conceptual design to detailing, manufacture, construction and beyond. Its innovative tools and openness to related software provide new possibilities to create an intelligent model of any size or complexity and coordinate different materials with ease and precision. Tekla 3D models contain all the information required for the different phases of a building project. Tekla Structures encompasses specialized configurations for structural engineers, steel detailers and fabricators, precast concrete detailers and manufacturers, as well as contractors. The software has thousands of users in more than 80 countries.



CONTACT INFORMATION

Tekla Corporation Headquarters:
Metsänpojankuja 1, P.O. Box 1
FI-02131 Espoo, FINLAND

Tel. +358 30 661 10
Fax +358 30 661 1500

Check your local Tekla contact from:

www.tekla.com