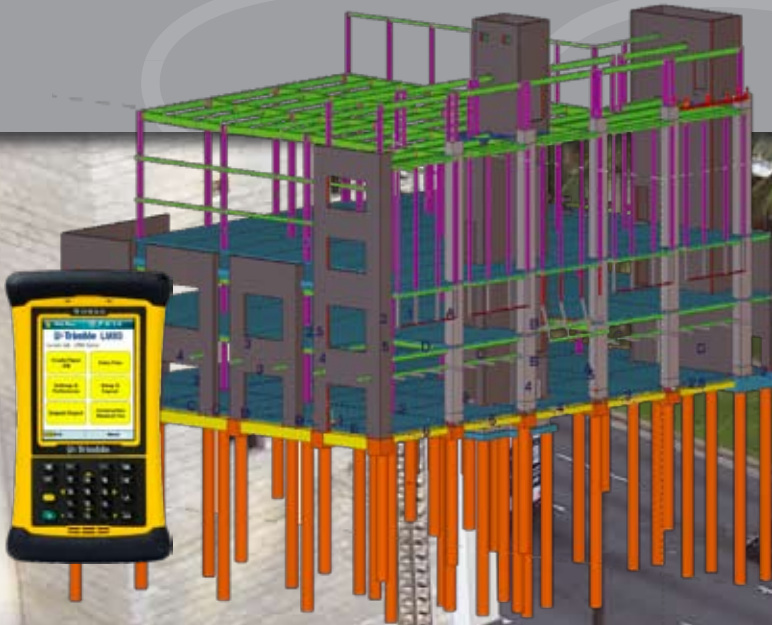




TEKLA® Structures



TEKLA STRUCTURES IN PRACTICE:
**SWINERTON PUSHES
BIM TO THE FIELD**



TEKLA Structures

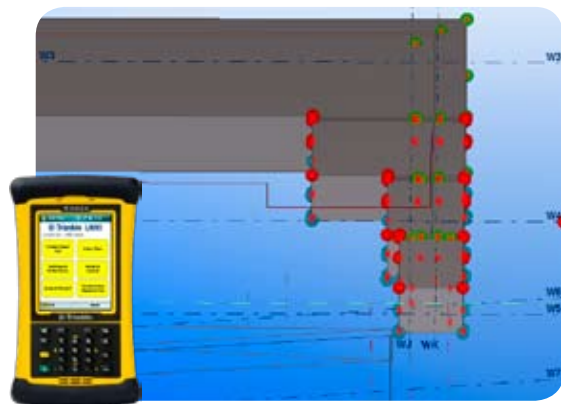


SWINERTON PUSHING BIM TO THE FIELD: CONNECTING BUILDING INFORMATION MODELS TO ROBOTIC TOTAL STATIONS

At first glance, a college campus in Grass Valley, CA and a shopping mall in Honolulu, HI seem to have little in common. Yet, according to detailers and field crews from Swinerton, a top commercial construction company, these two seemingly dissimilar projects have a unique and potentially far-reaching connection. They are among the first to seamlessly connect Building Information Modeling (BIM) to robotic total stations for field layout.

As part of its Virtual Design & Construction Initiative (VD&C), Swinerton has become a national leader in the application of Building Information Modeling (BIM) and 3D object-based modeling, estimating, simulation and scheduling practices. The firm has applied VD&C technologies on 162 projects totaling more than 49.9 million square feet and a combined construction value of over \$11 billion. VD&C has been used extensively for coordination during the planning and design stages of a project, gaining particular value from collaboration with MEP subcontractors during these early phases to resolve clashes and constructability concerns. The firm's strategic goal is to take advantage of full VD&C technologies and principles to manage a project from concept through operations.

Dan Gonzales, Corporate Manager of VD&C at Swinerton, says, "We've adopted BIM technology and techniques extensively in the planning and design phase. Now, we're working to realize the same value in the estimating, construction management and operational aspects to minimize duplication of effort and increase efficiency and accuracy between the office and the jobsite."



Key in this transition is the move to Tekla Structures BIM software and Tekla Structures for Construction Management solution which includes an interoperable link between BIM and the latest in field layout technology, specifically Trimble Robotic Total Stations and LM80 Handheld Software.

Gonzales says, "It's a seemingly simple connection between the office and field that has the potential to save an extraordinary amount of time, and allow us to transition the BIM model from a design tool into a true downstream construction and facility management solution."

BIM TRANSITIONS TO THE FIELD

The Waikiki Shopping Plaza Expansion project in Honolulu, HI includes a brand new 4 story addition that ties into the existing Waikiki Shopping Plaza, which must remain operable through the length of construction. Within the tight space, construction crews must add a 60-ft high, three-story steel building with curtain wall and exterior stone cladding and metal wall panels.

Swinerton Builders, the General Contractor for the project, will self-perform all concrete and provide layout and control for all major activities. The firm and its subcontractors created and coordinated the structural model using Tekla Structures. From that model, Swinerton created lift drawings and coordinated the exterior façade.

The engineering team then used the connection between the Tekla Structures Layout Manager and Trimble's LM80 Handheld Software. First they established the necessary layout points in the model. Then the coordinate information for these points was automatically uploaded to the Trimble Total Station for use by the project field crew.

Doug Paasch, Project Engineer with Swinerton Builders, explains, "With this connection, we are able to deliver precise well coordinated information

"Normal layout is a two man process. With the BIM-surveying tool link we have the ability to cut our layout costs by one-third on average, and in some cases in half."

*- Doug Paasch , Project Engineer,
Swinerton Builders*

to the field. Prior to the integration between Tekla Structures and the Trimble LM80 software, much of our time was spent in the office developing adequate dimension schemes with back checks."

With the Tekla Structures/LM80 Handheld Software integration, direct time and money savings result from Swinerton's ability to have one person use the LM80 machine to layout with precision.

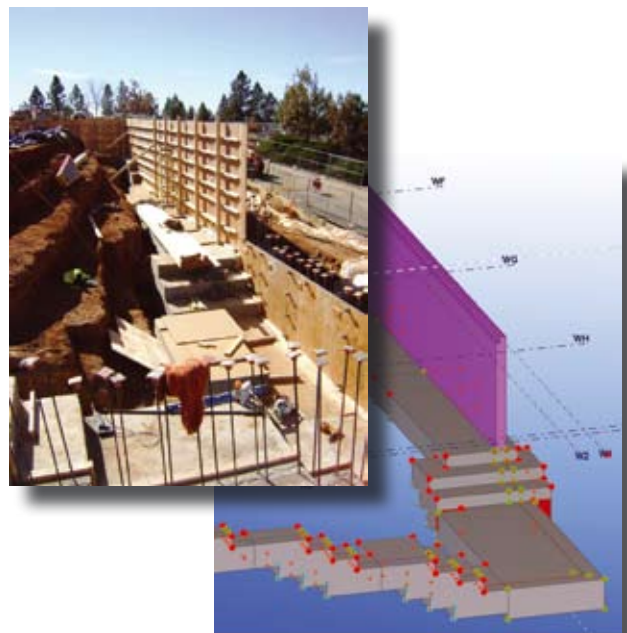
Paasch notes that there is a hard to quantify indirect cost savings that comes from the integrated process. "Information provided to the field is already coordinated as the project team in essence just built the project in a 3D realm," says Paasch. "The output from the 3D model is information to build the project again, this time in the field. Therefore, when the project is built in the field more energy can be directed towards safety, quality and production – not the head scratching endeavor of trying to determine constructability."

AN INTEROPERABLE EDGE



Swinerton detailers and field crews gained similar advantage from the Tekla Structures/LM80 Handheld Software connection on a college campus renovation project in Grass Valley, CA, located about 60 miles north of Sacramento.

HMH Concrete Services (a Swinerton company) looked to demonstrate the power and potential of a new link between BIM and the Trimble Total Station on a college campus upgrade/renovation



TEKLA STRUCTURES – INTELLIGENT 3D MODELING

project in Grass Valley. The project required some site work, the addition of ADA ramps and stairs and building foundation construction.

The HMH Concrete Services team prepared the column bolt templates for the foundation within the Tekla Structures 3D model. Bolt locations and slab edge positions were automatically sent from the model to the Trimble Total Station. Then the HMH Concrete Services carpenter took the BIM-loaded Trimble Nomad (handheld computer) into the field, connected it to the Trimble Total Station, where he could quickly and easily pinpoint the necessary locations for the site contractor.

Jeremy Melton, Superintendent and Detailer with Sacramento-based HMH Concrete Services, a subsidiary of Swinerton, explains, "Better yet, once the foundation or other site work is complete, we can quickly re-survey the site to gather the actual bolt locations and

other data from the field and transfer it back to the original 3D model to create as-built drawings, map out the floor wall locations, and other items and create drawings."

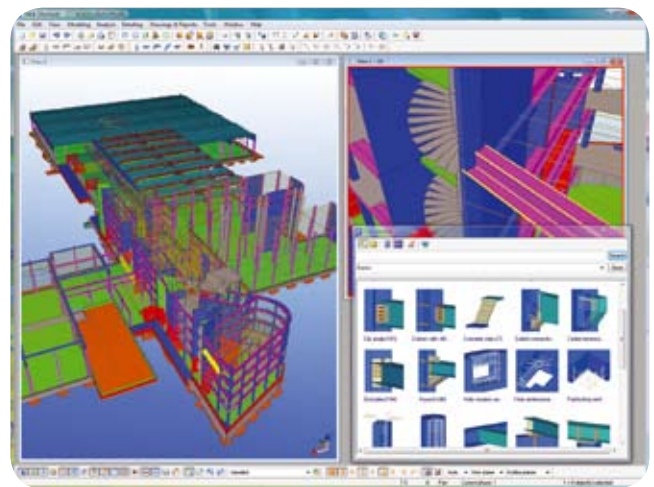
Swinerton is continuing to work with Tekla development teams to expand the functionality and capabilities of the Tekla Structures/LM80 Handheld Software link.

Gonzales concludes, "The Tekla Structures/LM80 link is a testament to the value of our strategic relationships with technology developers such as Tekla. Through these partnerships, we're able to leverage technology to improve the design and construction process, and then translate those improvements to the job site where we can bring true value to the client with more efficient and cost-effective project delivery."

ABOUT TEKLA

➤ 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 more than 80% of net sales. Founded in 1966, Tekla is one of the longest operating software companies in Finland.

Tekla Structures for Construction Management is a Building Information Modeling (BIM)-based project management solution that supports contractors, sub-contractors, project and construction management professionals by helping them to centralize, visualize and manage project information. Tekla Structures for Construction Management can process large amounts of BIM and non-BIM information regardless of the source. The solution uniquely enables streamlined communication and decision-making throughout all phases of the construction process from design, detailing, construction to project handover.



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