Trimble MEP
CASE STUDY

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Model-to-Field Connection Helps Contractor Cut Installation Time in Half

For almost 100 years, Cache Valley Electric (CVE) has provided high-quality electrical services for a wide range of industrial, enterprise, transportation, government and special projects in Utah and throughout the West. The family-owned company has adopted and adapted a number of technological advancements over the past century that have helped drive efficiency, improve quality and safety, and expand services.

Yet, with all that history, the company's latest technology implementation at one of its most visible projects is likely one for the record-books.

CVE, as a subcontractor to Okland Construction, is completing the coordination and installation of electrical systems for a $100 million, four-story, 280,000-sq-ft building in Lehi, Utah. The contractually-specified BIM execution plan outlines requirements for level of detail and building systems. The requirement is intended to facilitate coordination activities between various components such as mechanical, electrical and plumbing during the design phase.

Jordon Gillman, building information modeler for CVE, says, "We've been working in 3D and BIM for a number of years. BIM-driven design phase activities have definitely helped to minimize installation issues in the field. However, we hadn't found a way to translate the design information between the office and the field with accuracy and speed –until now. Thanks to advancements in field layout technology, our improved BIM-to-field connections have facilitated communication and drastically reduced our installation time."

In fact, by implementing the Trimble® Point Creator tool, CVE teams are able to cut their field installation times in half.

Streamlined BIM

CVE's BIM-driven integrated work practices begin well in advance of project go-ahead. The estimator leverages the conceptual model of a structure to develop an estimate using Accubid Estimating software. Once the estimate is complete, cadLive, Accubid's takeoff tool, detects and quantifies all materials. Once the bid is accepted, the conceptual model is passed along to the design team as a starting point to develop a more detailed model.

CVE used Autodesk Revit on the Lehi project to model electrical systems such as lights, conduit runs, cable tray, electrical equipment,underground systems, and more. The structure is unique in that there isno traditional ceiling to hold the approximately 1,200 cable-dropped lighting fixtures. Pendants that hold the light fixtures are installed on structural elements of the building, making the task of locating points in the structure particularly challenging.

For an office building such as the one in Lehi, CVE would typically export the background data from Revit to an AutoCAD DWG file, locate the points in AutoCAD and then export into the field unit. In the past,this process could take

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days because of potential scaling issues that required rework on the design file in AutoCAD. After the data was loaded into the field unit, a three-person field crew clean the work area, mark a grid line on the floor, note each pendant location, then use a plumb-bob to shoot the points onto the ceiling.

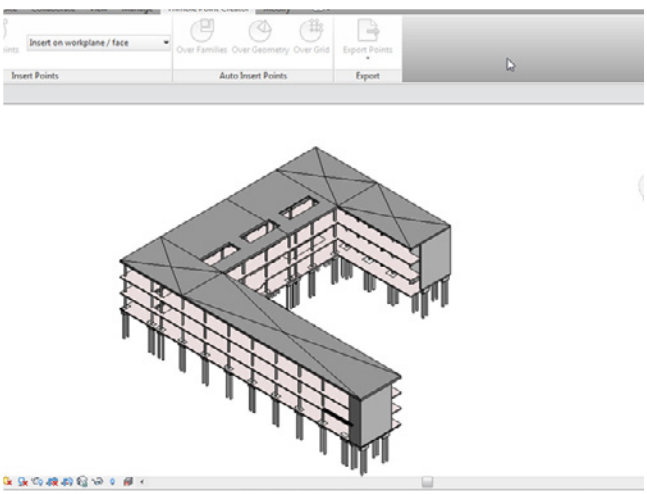
Gillman remarked, "Translating virtual design data to the field has not been easy in the past. We've spent a lot of time locating pendant light hanger positions, verifying accuracy to the model and then coordinating with the design team as questions arise. A team of two or three would need several weeks to locate and install light fixtures in alarge commercial building. We needed a better way."

Seamless field to office communication

To streamline the model-to-field connection, CVE implemented the Trimble® Point Creator (TPC) tool. TPC enables users to create 2D and 3Dpoints directly within familiar CAD and BIM platforms, such as Autodesk Revit, and then share with field layout software/controllers for a more streamlined process. TPC places user-defined point on Revit object families or CAD block objects. Once field points are created in the model, TPC generates a job file that is properly scaled and aligned for work in the field without adjustments that are ordinarily associated with model-to-field operations.

Using the TPC-enabled process, the BIM technicians layout and coordinate the electrical systems and locates the pendant light positions in Revit and sends the 3D Revit file directly to the Trimble Total Station and Nomad field device. Using a scissor lift and the Trimble field devices, one field person can move from position to position, locating pendant points directly on the structural elements then shoots the anchors in, thus eliminating the need to lay points out on the floor and transpose them back up to the ceiling. In addition, the new process only takes about two hours to set up and export to TPC.

Gillman says, "We're faster and more accurate because it eliminates two steps from our old manual method. First, we don't have to export from Revit to a DWG then place points manually in a CAD program. This eliminates the risk of scaling issues. Second, we no longer need to manually lay points out on the floor and shoot positions to the structural



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elements above thus shortening our layout time and increasing our installation efficiency."

In addition to the added efficiencies during the initial process,another advantage is the ability to mark deviations found in the field. Field teams can upload the data to the 3D model directly and clarify information with the design team quickly and easily.

On the Lehi project, the CVE field person shot 6,000 points to locate1,200 lights with two to three pendants per light over the course of about 3 weeks – a task that would normally require three people and take5-6 weeks for full light installation.

John Krstyen, a project manager with CVE, says, "The Trimble tool made it possible to pinpoint and install anchors for each pendant location in one step, eliminating the need to mark and come back laterto install anchor. The process removes any chance of lay out errors from the standard field measuring. It also provides us the ability to install our work earlier in the construction process, which on fast track projects is an added bonus. This tool will definitely be used next time earlier in the construction process for other systems such as cable tray, and conduit locations."

CVE is already using the model-to-field connection on other projects. On one large data center project, field personnel are usingit to locate conduit turnouts, cable tray locations, wall penetrations,underground conduit and much more.

About Cache Valley Electric

First established in 1915, Cache Valley Electric is a leading family-owned electrical contractor with headquarters in Logan, Utah. The firm provides high-quality electrical services for a wide range industrial, enterprise, transportation, government and special projects as well as technology services like teledata, networking, and wireless communications throughout the country. Engineering News Record Mountain States magazine recently recognized Cache Valley Electric as the 2011Specialty Contractor of the Year for its longevity, consistent service and steady leadership through the recent recession.

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