



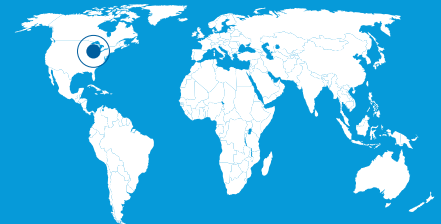
# C.D. Smith Increases Layout Efficiency and Overall Productivity with Trimble Robotic Total Stations



GENERAL CONTRACTOR GAINS 5X INCREASE IN PRODUCTIVITY USING ROBOTIC TOTAL STATION

# overview

Founded in 1936, C.D. Smith Construction, Inc., is a family-owned, self-performing general contractor focused on safely providing the highest quality commercial construction services. Utilizing an integrated approach and in-house technical expertise, C.D. Smith serves as a solutions provider throughout all phases of a project, from planning through closeout. The company offers preconstruction, virtual construction, construction management, design-build, general contracting, building commissions and systems training services. It serves a variety of industries including corporate, education, healthcare, housing, hospitality, industrial, municipal, and mixed-use development, among others.



Location  
WISCONSIN, USA

## CHALLENGE

Jamie Spartz, Director of Virtual Design & Construction, and Matt Riemer, Virtual Design & Construction Manager at C.D. Smith, are responsible for coordinating 3D models during the design phase and translating them for field layout. They also help coordinate all fabrication models until they are ready to prefabricate and ship everything to the site, creating a streamlined workflow for the installation.

Historically, C.D. Smith used a variety of two-person mechanical total stations for layout, which involved manually inputting points based on drawings, loading them onto a flash drive, and shuttling the data back and forth between the field and the office. This process was repeated each time the data was changed or updated.

According to Terry Owens, Director of Field Operations at C.D. Smith, these two-person total stations would typically be used at the beginning of the project and then removed from the site. If there was a need to do additional layout, the total stations had to be brought back to the project site.

Using the two-person stations also required that they draw out the arcs in the design and then provide core dimensions to put a plan together. They would then put all the dimensions on the plan and provide a PDF to show the designers how to stake points along the arc, which was a time-consuming process.

Spartz wanted to see how robotic total stations could be used to improve C.D. Smith's workflows. He decided to do an analysis on using a two-person total station versus Trimble® FieldLink and a Trimble Robotic Total Station (RTS).

## SOLUTION

Spartz and Riemer worked with BuildingPoint Midwest, a Trimble distribution partner, to purchase two Trimble Robotic Total Stations. After evaluating the RTS and getting positive feedback, they quickly came to the conclusion that they could lay out 5.5 times more points on the RTS than on a two-person total station in the same amount of time - a 550% increase in productivity. After completing an analysis documenting the overall savings that could be realized by utilizing an RTS, Spartz replaced all the company's two-person total stations with Trimble FieldLink and 10 Trimble Robotic Total Stations (RTS655).

Now, an RTS can be provided to a superintendent for the duration of a project. This creates real-time data and maximum transparency for all stakeholders into the points they are shooting from the field. Having the RTS onsite at all times throughout the building process eliminates the need to have a crew come out for one day for layout work and back again when another need arises. It also offers the flexibility to load any additional points needed at any time without interrupting the process.

"Because FieldLink and the RTS is so useful, superintendents like to hang onto them for the entire project and sometimes use them to go inside and layout interior points or layout additional items outside such as curbs, gutters, or entrances," said Owens. "Everyone wants an RTS on their jobsite. Last summer, even when the superintendents were busy with other aspects of the project, they weren't ready to give up the RTS because they knew how useful it was."



Training on the FieldLink system is relatively simple and includes a four-hour onsite training session that is specific to the project, so the superintendent knows how the software and technology are being implemented.

“The construction industry is very hands-on, so we wanted to do the FieldLink and RTS training on actual projects to make the best use of everyone’s time.”

**Jamie Spartz, Director of Virtual Design & Construction**

“BuildingPoint Midwest sent a technician who met with the superintendent on the jobsite and helped them lay out actual points as part of their training. They were also available to answer questions after the initial layout and would later interface with the superintendent virtually via FaceTime if needed.”

The RTS can also be used to capture points and elements that are offset from others in the drawing and can communicate back to the office if a line within a file is not showing the points accurately.

Using FieldLink provides flexibility for the user in the field to either create arc elements or to select them from the drawing in the field. The operator can then lay out to any location on the arc or can also offset points as required.

Owens described how FieldLink was particularly useful on a school building project where his team was responsible for the layout including the underground pipes in the gymnasium. The team had to tie into the roof conductors, but there was a lot of heavy equipment that had to remain inside the building so the way out of the building with cranes and trucks could be set. “Using the RTS and FieldLink, the superintendent was able to shoot where each of the roof conductors were, mark the points and then bury them with two feet of gravel so heavy equipment could be moved over the top of them. Upon completion, the heavy equipment was removed, and the plumber was able to easily find the location of the roof conductors under the gravel,” said Owens.

On another project, C.D. Smith used FieldLink for doing backchecks on concrete slab pours for a multi-story building with exterior curtain wall system tie-ins and embeds. According to Riemer, they were able to shoot the edge of the slabs up the buildings to load points and use the drawings to compare differences and provide as-built variations to the facade team for fabrication and installation.



## RESULTS

C.D. Smith can now conduct layout as well as collect as-built data much more efficiently and can share updates from the office to the field and back in real-time via the cloud.

“With the Trimble, everyone is trained on one system and we’ve gained efficiencies by having one person do the layout instead of two,” said Riemer. “Superintendents can pick their own points and know what they are associated with, shoot any point they want on the fly, and share the information with the office in real time. This is a big improvement over shipping flash drives back and forth every time an update is needed in the field.”

Using FieldLink and the RTS, C.D. Smith can now free up valuable skilled laborers for other tasks and still get their layout completed quickly and accurately, resulting in huge time and cost savings.

“The people who know this technology and have fully embraced it are excited about it. They love that they can run down a line and within minutes tack on 20 to 30 points and stake them. This would have taken half a day using the two-person total stations,” said Riemer.

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