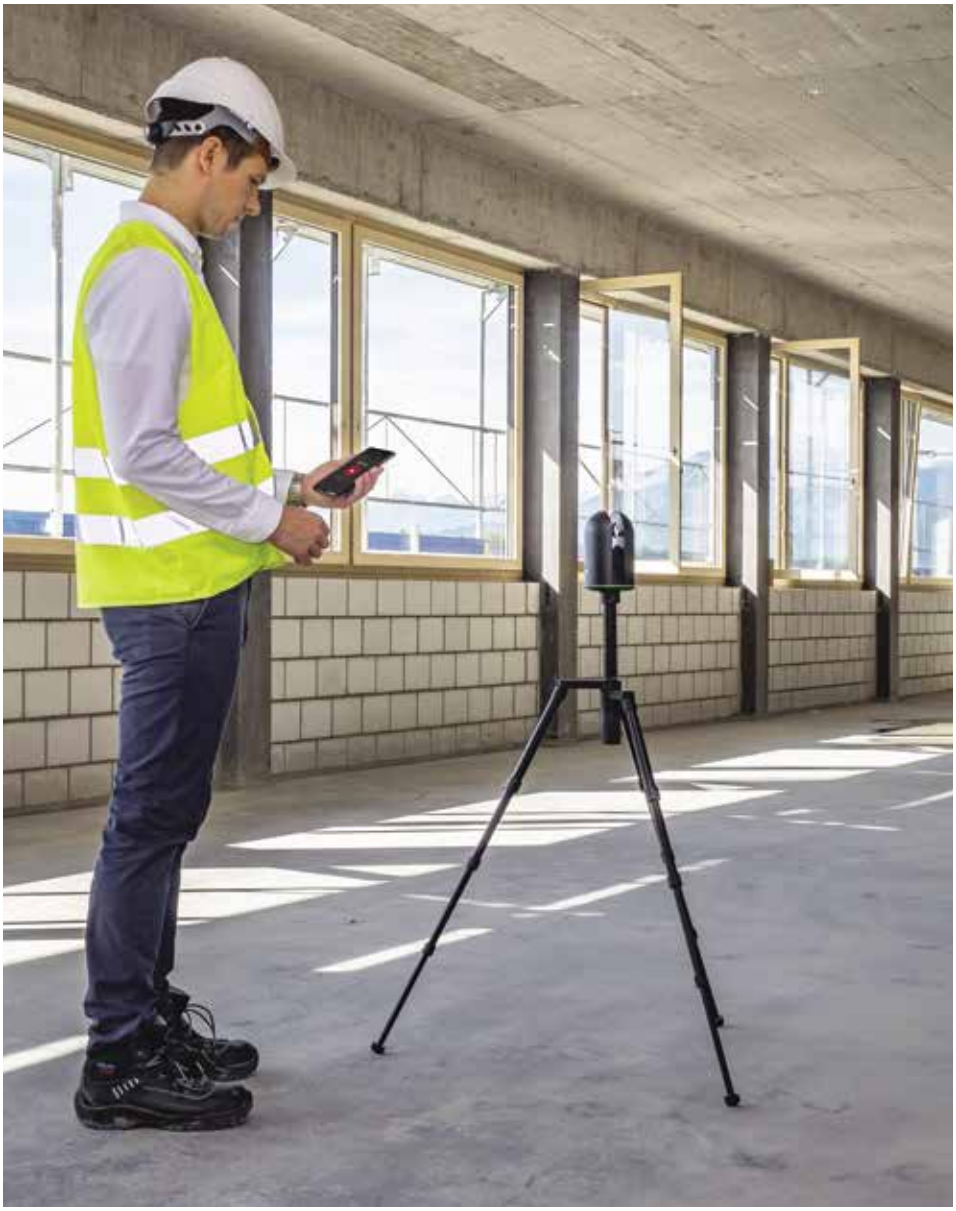
Capturing Reality:

One Firm's Laser Focused Investment in Scanning Reaps Big Rewards

As an architectural, engineering and construction services firm, Schemmer Associates prides itself on creative and collaborative relationships to design with purpose and to resolve problems. The firm is best known for its comprehensive scope of services that range from design to construction administration across many market segments in the public and private sector.



Maintaining its high standards of service has required an investment in technology—from building information modeling (BIM) in the office to survey solutions in the field. Recently, the firm incorporated 3D building scanning into its design workflow, with some enterprise-wide benefits.

The scan-to-BIM workflow was initially perceived as a faster way to assess as-built conditions and speed design processes—and it does. However, with some forethought, it's turned into much more, as the firm has found ways to put point clouds to work to strengthen existing and build new client and contractors relationships.

As-Built Advantage

The idea to add scanning to the Schemmer workflow initially came about as a potential benefit to one of its primary services—space utilization assessments where knowledge about as-built conditions is essential. In recent years, the company has been involved with more than 40 of these assessments along with concept development projects in 18 states at more than 140 site locations.

The need to collect as-built conditions quicker and more accurately caught the attention of Joshua Murphy, the BIM/CADD Manager at Schemmer. Murphy is responsible for managing the firm's hardware and software deployment. When laser scanners emerged as a way to digitally capture existing conditions versus more traditional site visit recordings and paper documentation, he was intrigued.

Murphy says, "I had seen the Leica BLK360 laser scanner while attending Autodesk University a few years ago. I

asked our U.S. CAD partners about the value of 3D scanners to support design work. Within a few days, they brought one to one of our jobsites to demonstrate the potential benefits."

U.S CAD and Schemmer Associates have partnered for more than five years with U.S. CAD providing Autodesk software, Bluebeam software, and training and consulting services in addition to reality capture and laser scanning services.

In the scan-to-BIM process, a laser scanner is used to capture an accurate 3D scan of the real-world conditions on a project. The scan data is then imported into a 3D modeling environment to create either accurate as-built models or to inform the design with the real world conditions. The Schemmer demonstration with U.S. CAD involved the scanning of a mechanical room to support a system redesign.

"As soon as we had that data from the scanner in our 3D modeling software and saw the level of detail and accuracy of the point cloud, we knew the technology could be an advantage over traditional site visit recording methods," Murphy says. "Now we just needed to demonstrate a clear ROI."

Building Buy-In

The cost of professional laser scanners gives many business owners pause—and Schemmer was no exception.

Murphy adds, "It's a big commitment and we needed to get buy-in across the enterprise—from leadership to IT to the end users. We sat down with a U.S.CAD panel of experts to really look at how the laser scanning can be used in our business and to understand best practices. They helped us storyboard 8-9 ways that we could use the scanner across our project workflows."

To build buy-in, Schemmer rented the Leica BLK360 scanner for a year as a way to evaluate benefits.

"The timing worked well as we had just won a big project that would require documenting existing conditions over a span of months. The BLK360 was the perfect tool for this effort and allowed us to develop accurate real-time and cost saving numbers," Murphy says.

He and his team also took the time to better understand data management and storage requirements. "Point cloud data can't sit on a standard project network drive—it's just too much data to store and requires significant computing power," Murphy explains. "We had to work with our IT group to spin up a separate network, backups and multi-office accessibility."

Finally, Murphy says they needed to support the end user. Traditionally, the Schemmer design team uses a PDF or DWG file to begin modeling. With scan-to-BIM, Murphy registers the point cloud and brings it into CAD, Revit or Civil3D. Now they would have to learn how to model off of a point cloud.

Turns out, the user experience was the easiest win, says Murphy. "As soon as our team started modeling, they saw the advantage. It's so much faster than any other methodology. It's so much faster to model off of a point cloud—a 100 times better than traditional methods," he adds. "Our design team loves it."

With a typical scan time, the Schemmer team scans up to two million points per second—but that number can increase if needed for greater accuracy. After a full year of evaluation, Schemmer purchased the RTC360.

An AR Edge

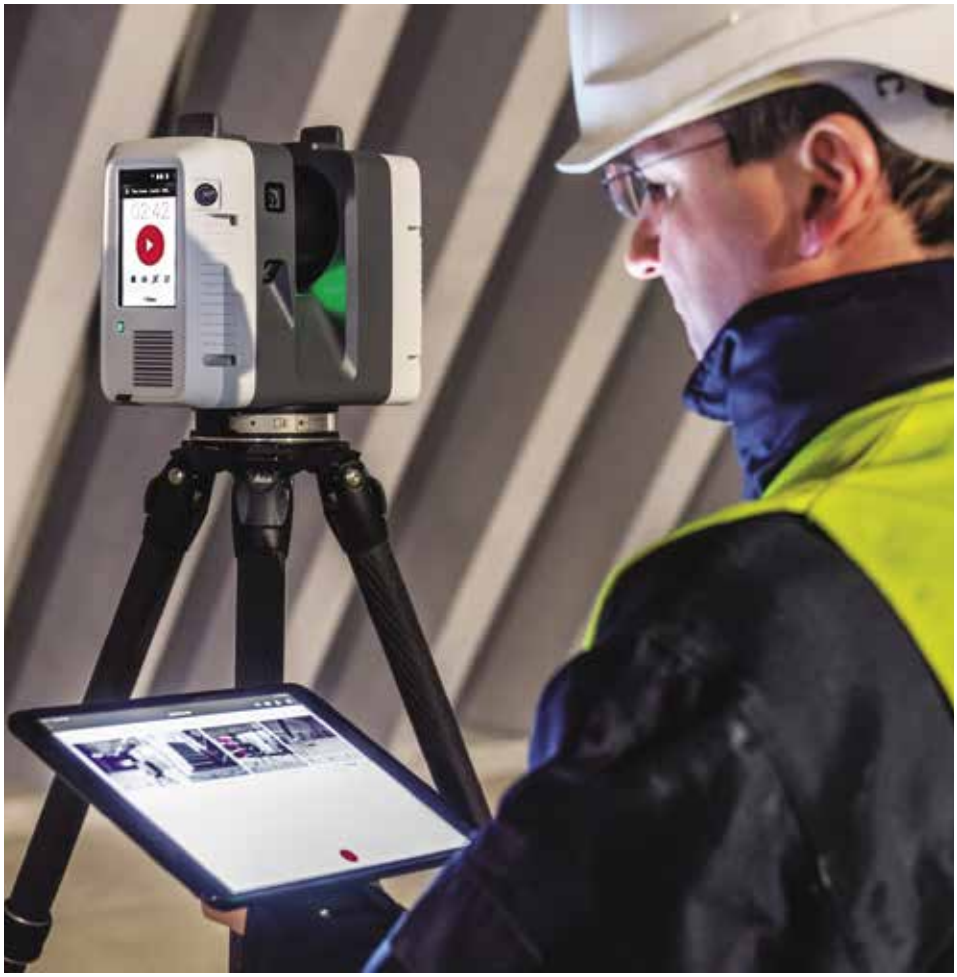
Over the last two years, the scan-to-BIM workflow has become an integral part of near every project that includes as-built conditions.

"It's part of our toolbox on renovation projects," says Murphy. "We even bought accessories such as lights and a telescoping tripod that allow us to use the scanner in hard-to-reach places such as ceilings and below the floor."

It's also been a great tool for client collaboration.

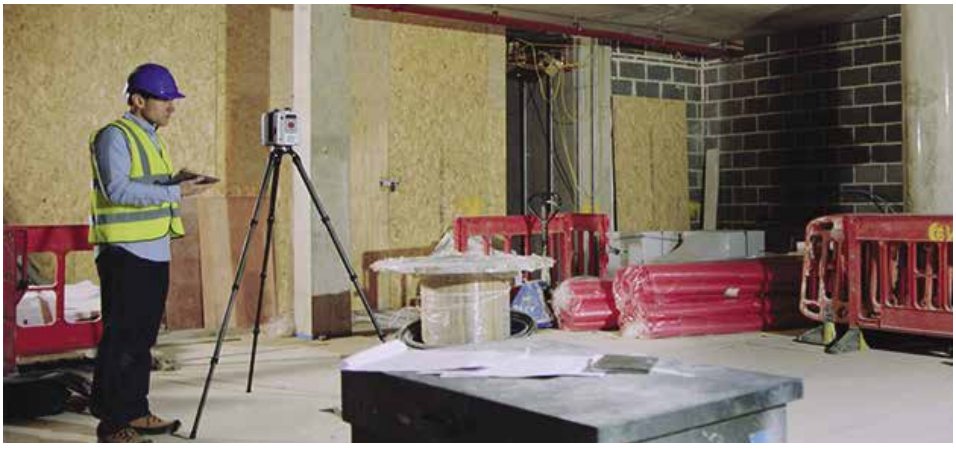
He points to a recent project where scanning was not part of the proposal, but there was a concern about whether the in-slab heating coils were to specification, specifically the length of the coils. Murphy continued, "With scanning, it's easy to take a look at the point cloud and measure the coils and related piping. In this case, the images clearly documented as-built conditions and the corrections that needed to be made."

"We do a lot of scanning at risk in advance of project bids," Murphy adds. "Often a client will come back to us even when we don't win the initial job. We're finding it's a great way to build relationships."



Visualizing scan data is particularly easy for clients. "Navigating a point cloud is as easy as using Google Maps," says Murphy. "While in a meeting, we can pop it up and everyone can walk the site or an existing building and evaluate options. With the scan-to-BIM, we have more data than we could ever have with conventional methods that would have required sending people back out to the site. We're coming to solutions for project challenges much faster."

The company is also using the scanner and the scan-to-BIM workflow to build stronger relationships with contractors who don't have a scanner but might need support during a project. The benefits of the scan-to-BIM workflow have been so clear both internally and externally that Schemmer is already looking to purchase its next scanner. Thus far, Schemmer has 16 people trained to use the scanner—but those numbers will rise over the next year.



He says, "Scanning has become such an integral part of our toolbox, that our goal is to have someone in every department able to use it. Right now, we need it so much that we often look to our U.S. CAD partners to support scanning on projects." Moving forward, he would also like to take advantage of augmented reality (AR). Murphy concludes, "I see the day very soon when we'll be able to view a model or point cloud in the field using AR goggles to verify work completed or resolve issues. For now, the scanner and the scan-to-BIM workflow has paid for itself over and over." ◆