# $50 Million Chicago Construction Project Adopts Next-Gen Workflow

## Pepper Construction uses laser-based applications to automate, simplify, and transform building processes


Columbia College's new student center abuts an elevated train track, presenting challenges for the construction team. Photo © Ballogg Photography.

### Situation

Much is made of the global construction industry's lack of productivity and technological innovation. In the U.S. for example, agriculture achieved real productivity growth of 1,510 percent between the years 1947 and 2010, while manufacturing surged by 760 percent over the same period. U.S. construction was stagnant.

The good news is, a new wave of technically adept builders like Chicago-based Pepper Construction are busy rewriting that narrative.

A great illustration is the new student center for Columbia College Chicago.

Scheduled to open in 2019, the project is an ambitious undertaking for the private urban college. The structure represents the second ground up building in the school's 127-year history. Previously, Columbia College acquired existing buildings to form its downtown campus. The $50 million project, which began construction in February 2018, was designed by Gensler and constructed by Pepper. The five-story student center spans 114,000 square feet and is supported by a cast in place, post-tension concrete structure.

### Challenge

Traditional construction practice largely relies on methods and techniques developed years ago in a pre-digital, analog world.

In recent years progress has been made in adapting advanced precision technologies, such as lasers and function-specific construction software, to a variety of tasks across pre-construction through construction. Implementation, however, is seldom as comprehensive as it could be due to staffing limitations or the existing workflow.

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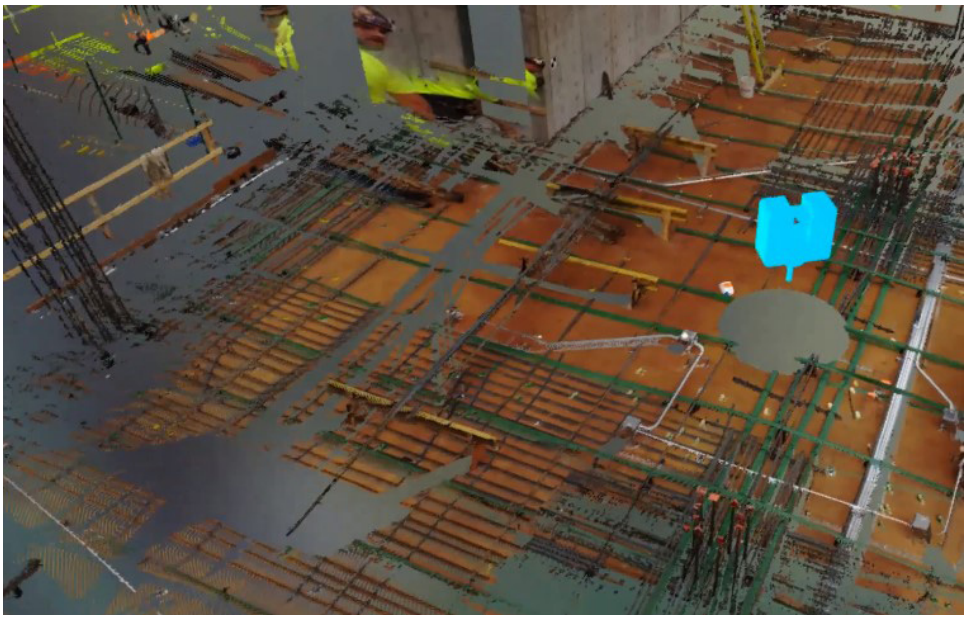
The Columbia College student center project presented some interesting challenges that helped support amending the workflow to better accommodate laser-scanning applications. For example, the project butts up to an elevated train track. "It was critical during our planning process to capture the exact location of the tracks. One of the first things we did was laser scan them. We then modeled that information and used it in all subsequent project planning," explains Jen Suerth, Vice President of Pepper Construction Technical Services. Suerth leads the company's virtual construction, BIM, and technical aspects of other areas such MEP and structural.

Documenting the train track's as-built condition was just the beginning of Pepper's technology stake to laser precision, speed and software automation.

For example, to provide Chicago Transit Authority (CTA) with periodic project updates, Pepper Construction opted to furnish the CTA with 4D visual representations that are updated when schedules change. "We not only took the laser scan data and converted it into 3D models, but we also tied that back to our project schedule. As the project evolves, we use that 4D visual plan model to communicate with the CTA and city at key milestones," notes Suerth.

Pepper is constructing the building in two phases—phase one is the west-half which aligns parallel to the CTA track. Phase two is the eastern half on the Wabash Avenue side. This phased approach requires the project team to also split reinforcing into two phases. "We're solving this issue by coordinating our post tensioning and rebar shop drawings with MEP trades and any other issues that may arise," says Anthony Tiberi, Pepper Construction Project Engineer in the firm's self-perform group.

Pepper Construction is also self-performing the project's concrete work. "We utilize laser scanning as part of our concrete quality program. For every concrete pour, we scan three times. This captures the information inside the slab that's covered up, evaluates floor flatness and confirms we're in compliance with the design. The data we capture from laser scanning the pour helps us communicate our work quality to the client," Suerth says.



The Pepper team conducts a pre-pour scan to document the conditions for any future coring or embed issues.

Eveart Foster, Pepper Construction Technical Services Engineer, explains the software side of a pour scan: "Our field tech begins by using our FARO® Laser Scanner to scan the pour. He'll send me the pre-pour scans which basically allow me to see in 3D the post-tension cables, conduits, rebar, all the slab openings.

"We take this point cloud and register it in FARO SCENE, then create a ReCap™ file which can be used in Revit™, AutoCAD®, any Autodesk® product. We then document where the post-tension cables were placed for future coring or for any embed issue in relation to the cable," Foster says.

## Solution

The Pepper Construction technical services team have transformed the Columbia College project into an object lesson on how laser-based applications can successfully simplify many verification tasks with unmatched levels of project confidence. Emerging industry-standard software applications like Builder, Inspector, and Surveyor from RITHM are compelling growing numbers to adjust workflows to better simplify, automate, and visualize projects.

Pepper Construction understands the long-term value and immediate payback. "By utilizing laser scanning and avoiding rework, on average we save up to $200,000 or more on a single project. That easily pays for multiple scanners on a single project. This has drastically improved our deliverability to clients. What's more, we deliver a much higher quality product," reports Suerth.

Foster points out the long-term potential for construction in general. "We haven't really seen the full value of where this could lead," he asserts. "Laser scanning is still undervalued. Owners should insist on laser scanning for every project. I've been fortunate to have worked with software engineers and FARO to reimagine this portion of the construction processes. We're finally nearing a time when we can truly create what we dream. That's exciting."

**For More Information**

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