



PHOTOS COURTESY OF CHRISTOPHER LARK

Ruby + Associates:

Analyzing the roof truss and construction loads for a large infill in Detroit's urban core



Originally built in 2003, One Campus Martius is an iconic one million-square-foot office and retail building in the heart of Detroit. Largely occupied by Quicken Loans, the W-shaped landmark was originally built in anticipation of future expansion. The building's actual expansion in 2019 took the form of a 310,000-square-foot infill addition, filling in floors four to fifteen.

The project team includes Rossetti as the architectural firm, Desai/Nasr as structural engineer of record, and Walbridge as construction manager. As the structural steel contractor, Midwest Steel commissioned Ruby + Associates to provide erection engineering and construction load analysis for their structural steel erection scope of work.

In the end, the crew topped out the placement of 2,000 tons of structural steel, carefully crafting it into the original building's existing geometry adjacent to Campus Martius, a heavily populated and busy downtown intersection and park.

The addition's floor framing and columns are formed of typical wide flange steel member types – W14 columns and floor framing consisting of W16 to W24 beams – but the structural solutions at the addition's roofline are anything but ordinary.

"Because the section was set to the truss' undeflected theoretical elevation, simply loosening slip-critical bolts in a predetermined slot allowed Midwest Steel to remove the post easily by loosening bolts. The gap created by the post's slip/slot design allowed for truss deflection," said Ruby's Project Manager Jeff Gasparott, PE. "Ruby provided the analysis to pick and set the 112' roof truss in two pieces to stay within the erecting crane's capabilities. To do so, Ruby designed a custom shoring post that allowed Midwest to erect the truss to the correct elevation but then remove the post at completion of erection without the use of hydraulic jacks.

"Ruby also provided temporary cable

bracing of the first roof truss segment, attaching to previously erected steel to stabilize the truss section," Gasparott said.

For the steel designer and erector, connecting back to existing steel is always a challenge. For this particular undertaking, fabrication and installation challenges included limited site accessibility. As a solution, Midwest Steel had to stage steel bundles on the previously erected floor. Ruby analyzed the floor framing for bundle weights and provided acceptable staging locations and required cribbing for each floor. Ruby designed a temporary support system for the 5,000 lb. scissor lifts off the metal decked "working floor." These lifts allowed Local 25 Ironworkers to erect and connect the next tier of steel above.



Top Left: Ironworkers stabilizing the first section of truss prior to crane release.

Bottom Left: Ironworkers gather prior to steel erection surrounded by staged steel bundles on top of metal deck.

Above: Ironworkers setting first section of truss atop shoring post.

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