Urban Oasis

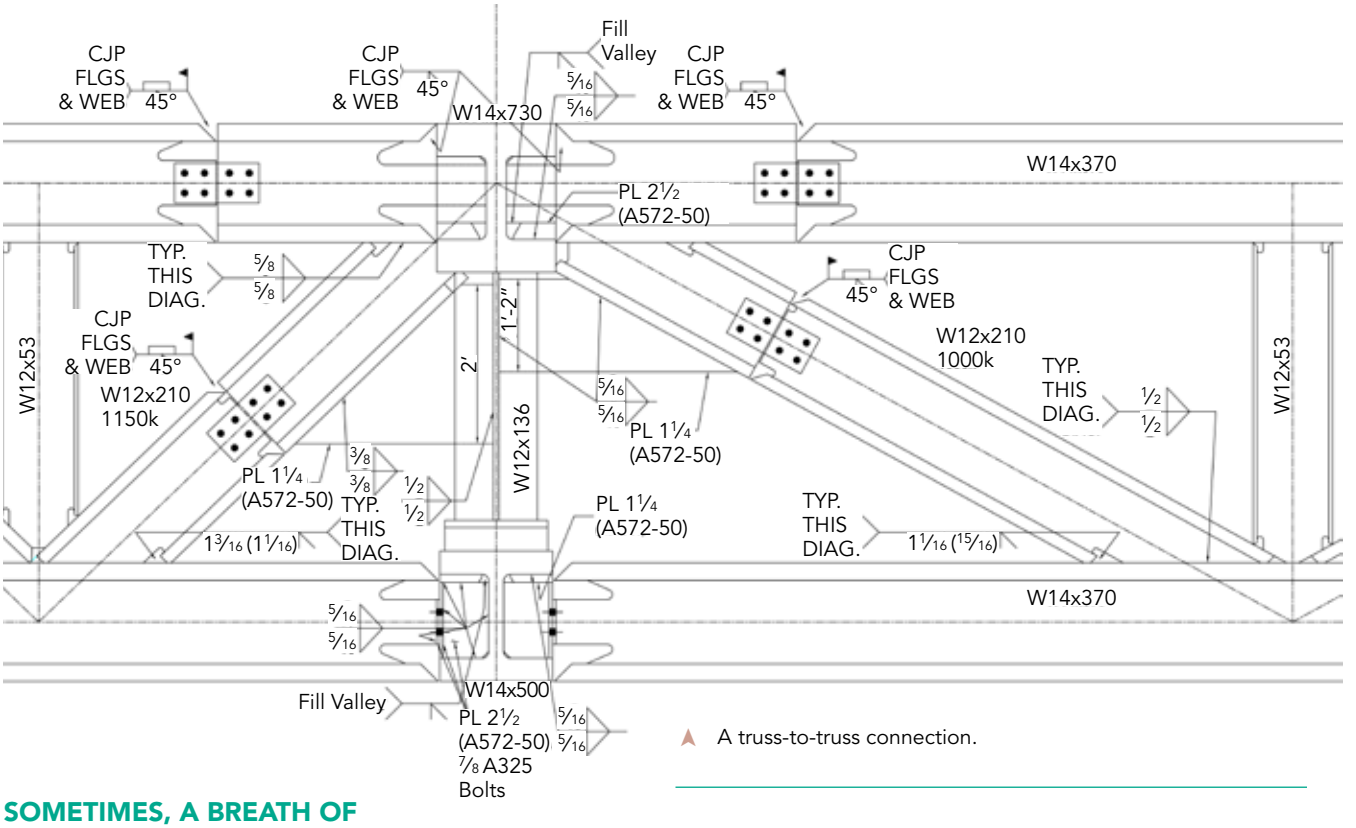
BY JONATHAN HAMANN AND RICHARD MOON, AIA

Long-span trusses frame the entry to a new ambulatory center in South Boston.

All images: Cives Steel Co.

Jonathan Hamann (**jhamann@cives.com**) is a senior project manager with Cives Steel Company's New England Division and **Richard Moon** (**rmoon@tka-architects.com**) is an associate principal with Tsoi/Kobus and Associates, Inc.

- The building's design creates visual adjacencies and connections to the outdoors and uses light as an orienting device throughout.
- Terracotta panels provide a contemporary counterpoint to the traditional brick façades found across the historic South Boston campus.



▲ A truss-to-truss connection.

SOMETIMES, A BREATH OF FRESH AIR is the best medicine.

The Carl J. and Ruth Shapiro Ambulatory Care Center, which functions as an academic medical center, replaces a 1920s-era maternity building where caregivers advocated the benefits of fresh air for patient well-being. The new building takes up the mantra of the original, with an emphasis on nature. The design places a 21st-century emphasis on that concept by creating visual adjacencies and connections to the outdoors and using light as an orienting device throughout the building. A bamboo garden in the lobby echoes outdoor plantings, and a palette of soothing materials and colors, including terrazzo flooring, sandblasted glass and anigre wood veneer sets the tone for a calm experience. The interior palette integrates exterior materials, bringing the outdoors inside to evoke the natural environment as a vehicle for healing and distraction, creating a restful "urban oasis."

On the exterior skin, unitized terracotta panels were clipped into place, and offset baguettes (architectural sunshades made from terracotta and reinforced with steel stand-off clips) on the Albany Street (south) façade help to address solar heat gain and glare, introducing a contemporary counterpoint to the traditional brick façades found across the historic South Boston campus. The scale and proportion of the ambulatory care center respectfully complement the existing neighborhood forms. The facility's overall aesthetic and use of terracotta systems to engage the street edge and create a memorable identity for the new institution would not have been possible without the supporting steel framework (2,220 tons of structural steel were used in all).

Highly Visible

The latest in a series of strategic development and planning initiatives, the nine-story facility represents the first phase in a long-term effort by Boston Medical Center to transform the image of its southern campus edge. The building sets the stage for future improvements and establishes a new standard for sustainable design among Boston healthcare facilities, and is even a registered pilot project with the *Green Guide for Health Care*.

A fast-paced schedule (the steel schedule was 17 months from contract award to completion of erection), strict budget and very limited lay-down area (approximately 2,000 sq. ft) on a highly

▼ The building uses more than 2,200 tons of structural steel.

▲ The facility's overall aesthetic and use of terracotta systems to engage the street edge and create a memorable identity would not have been possible without the supporting steel framework.

▼ A view of one of the interior walkways, with ample daylight.

visible, dense urban site necessitated seamless coordination between all project team members to successfully meet deadlines. In addition, the large drive-through area for vehicular access and patient drop-off required that trusses span 73 ft. Further, the overall depth of the trusses was limited to 7 ft, presenting another challenge in safely meeting this span requirement.

The steel trusses spanning the drive-through area, which is on the west side of the building, consisted of wide-flange chord members ranging in size from W14×120 to W14×730, with internal members of W12×53 through W12×210 and W14×90 through W14×455. In order to keep site costs low, the fabricator, Cives Steel, decided to preassemble as many of the trusses as possible in-house. After reviewing the truss loads and geometry, it became clear that gusset plates and bolted connections would not be feasible; there simply was not enough room between the chords. This meant that each internal member would need to be shop-welded directly to the chord.

Based on the loading calculations provided by the structural engineer, complete joint penetration (CJP) welds were required for the majority of the internal-to-chord member welded joints. However, due to the very shallow angle between the two members, access to the back side of the weld joint was restricted. This prevented backgouging of the weld or proper installation of backing material and necessitated the use of partial joint penetration (PJP) welds for many of the joints, which could be installed from the obtuse side of the joint. The smaller effective throat of the PJP weld did not prove to be sufficient to transmit the loads required. Cives reviewed the situation with the structural engineer, McNamara/Salvia, Inc., and determined that the best solution was to upsize the internal members as necessary to use the correct size PJP weld to properly transmit the load.

While the drive-aisle trusses spanned east-west, several smaller trusses spanned north-south and cantilevered up to 16 ft on the highly trafficked Albany Street side (main public entrance) of the building. The challenge then became a matter of connecting these smaller trusses to the long-span trusses as efficiently as possible. Where a chord member and diagonal member of the short truss both intersected with the chord member of a long truss, short sections of the diagonal and chord were shop-welded to the long truss. A shear tab connection was provided to align the stub section with the diagonal or chord in the short truss during erection. After the short truss was plumbed and leveled, the flanges and web at the splice were field welded with a CJP weld.

Due to the weight, the long-span trusses could not be erected as one piece. Therefore, a splice was added at a third point, creating a 49-ft section and a 24-ft section. During erection, temporary shoring columns were used to erect the 49-ft section first. Installation of the 24-ft section then completed the long-span trusses. The short trusses between the long-span trusses were erected next, followed by the cantilever trusses. This fabrication methodology saved time and ultimately additional expense, in the absence of crucial lay-down space on such a dense, highly active urban site.

Minimized Impact

Working closely with the city agencies, owner, construction manager and architect was crucial to the success of the project. Securing the permitting and necessary temporary street closures for the steel erection was organized, and community members were given timely notice of any disruptions to Albany Street and adjacent access. Close communication between the structural design and construction team also ensured that many of the above-referenced challenges such as required truss span were mitigated early on to manage potential impact on cost and schedule. The structural integrity of the steel framing and flexibility of in-shop fabrication, in the absence of adequate lay-down space, benefitted the project aesthetics and ultimately, the patient population. MSC

Owner
Boston Medical Center

Architect
Tsoi/Kobus and Associates, Inc., Cambridge, Mass.

Structural Engineer
McNamara/Salvia, Inc., Boston

General Contractor
Suffolk Construction Company, Boston

Steel Fabricator
Cives Steel Company – New England Division, Augusta, Maine (AISC Member/AISC Certified Fabricator)

▲ The large drive-through area for vehicular access and patient drop-off required trusses to span 73 ft.

▼ The nine-story facility represents the first phase in a long-term effort by Boston Medical Center to transform the image of its southern campus edge.