FINAL Approach

BY ADAM KNAACK, PE, PHD

A historical airport is being transformed into a remarkable new public space with a majestic steel tower as its centerpiece, just in time for Independence Day.

THE CINCINNATI-BLUE ASH AIRPORT never quite took off.

Originally opened as the Grisard Airport in 1921, it was one of the first public airports in the country and was considered to be the prime location for the development of what is now the Cincinnati/Northern Kentucky International Airport. However, after failed attempts at developing the land into a large commercial hub, the airport remained a location for municipal flights and aviation enthusiasts until its close in 2012.

But the area, owned by Blue Ash, a small suburb 15 miles north of downtown Cincinnati, has new life as Summit Park. The 130-acre park has recently been developed into an all-inclusive space that can host thousands on its Great Lawn as a major concert venue, 5K races for local nonprofit organizations and the community's annual Taste of Blue Ash gathering. Scheduled to open next month, it includes traditional park amenities, a community center, retail space, designated space for a performance stage and an observation tower.

At 162 ft, the tower is one of the tallest structures in the northern Cincinnati suburbs and a landmark structure for visitors. Acting as a backdrop for the performance stage at

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The tower, assembled through the observation level.

A rendering of the completed tower overlooking the park.

the west end of the Great Lawn, it includes two observation platforms. The lower platform, at 27 ft above grade, provides those visitors who prefer to be a little closer to the ground the opportunity to view all that the park has to offer. The upper platform, at 126 ft above grade, rewards more daring visitors with stunning panoramic views of the Cincinnati landscape.

Bracing Combo

The tower is composed of a combination of hollow structural section (HSS) moment frames and braced frames. In the strong axis of the tower, two-story steel X-bracing provides the lateral stability for the tower. In the weak axis, a combination of X-bracing and vertical and horizontal moment frames provides the lateral stability. The tower is flanked on either side with single-story community buildings that are symmetric about the structure and approximately mirror the community building at the other end of the site. These buildings are generally comprised of steel bar joist roof framing supported on steel columns and perimeter CMU bearing walls.

To provide visitors with access to a stairwell and a glass-enclosed elevator at the base of the tower, the lateral system in the weak direction does not extend down to the foundation level. Instead, lateral shear forces are transferred through tube struts into braced frames in the adjacent community buildings. The tower columns resist the overturning forces, but the transfer of shear forces into the community buildings allowed the tower anchor rods to be designed only for uplift and shear forces from the strong direction of the tower and not the larger shear forces resulting from wind or seismic against the broad faces of the tower. To help mitigate tower deflections and control fatigue, the tower anchor rods were all pretensioned using a hydraulic jack. The tower's superstructure is supported on a drilled pier foundation system extending down to the rock bed, approximately 50 ft belowground.

Form and Function, on Display

Early in the design process, it was clear that the structural steel would play a significant role in the tower's look. The architectural cladding includes perforated metal panels enclosing two sides of the precast concrete stairwell and a fully glass-enclosed elevator shaft. Whether visitors choose to climb the nine stories of stairs or ride the elevator to the observation level, they will notice the steel's role in both the form and function of the tower. As such, the look of the steel and connections remained a primary concern through the design process. Architecturally exposed structural steel (AESS) was specified to achieve the desired look and reduce standard construction tolerances required for the fit of the exterior cladding elements. A zinc-rich primer satisfying the slip-re-


MSA

A rendering of the tower lit up at night.

Roof trusses being assembed on-site.


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The roof "crown" is designed to mimic an airplane's wings.

A view of the retail space facing the tower from the other end of the park.


Schaefer

sistance characteristics of a Class B coating was shop applied to all steel members and topped with two coats of aliphatic acrylic polyurethane. As this specific paint did not satisfy the requirements of a Class B coating, care was taken so that it was not applied to faying surfaces of the braced frames, considering that these connections were specified as slip critical. All weld locations and brace connections are being touched up in the field.

Considering the complexity and high visibility of the connections, the final design was a collaborative effort between the architect, structural engineer and steel fabricator to optimize appearance, minimize costs and simplify erection. Bolted connections were used where possible to minimize field welding and to aid in the multi-phase erection of the tower. Fabricator George Steel assembled the tower framing modules in the shop to help meet construction tolerances as well as to reduce the amount of field painting and welding required to provide the appropriate look and feel of the tower. These frames were typically 14 ft wide (the short dimension of the tower) and at most, approximately 46 ft tall. Given the size of the frames, transportation required coordination with local municipalities along the route, as well as an Ohio State Highway Patrol escort. Capping off the top of the tower is the custom roof "crown" supported on HSS trusses fabricated to match its slopes, as it mimics an airplane taking off.

The tower and community buildings are set to be completed in time for Blue Ash's annual Independence Day celebration, to be hosted at the new Summit Park. "Red, White and Blue Ash" will be the first prominent event at which the city will showcase this signature piece. ■

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