

CONSOL Energy Center

Pittsburgh, Pennsylvania

Owner

Sports & Exhibition Authority of
Pittsburgh and Allegheny County

Team

NHL Pittsburgh Penguins

Architect

Populous (formerly HOK Sport Venue
Event)

Construction Managers

PJ Dick / Hunt Construction
(Joint Venture)

Completion Date

August 2010

Construction Cost

\$321 million

Total Area

720,000 sf

Seating Capacity

Hockey – 18,087
Basketball – 19,000
Concert – 19,750

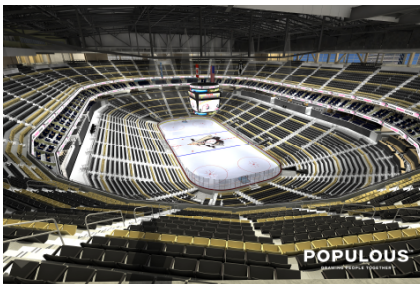
Number of Suites

66

Awards

Outstanding Overall Project Award,
Structural Engineers Association of
Kansas and Missouri (SEAKM), 2010
Awards Program

Greater than \$100 Million New Building
Award, (SEAKM) Structural Engineers
Association of Kansas and Missouri,
2010 Awards Program



Courtesy of POPULOUS

Thornton Tomasetti provided structural design services for the 720,000-square-foot, state-of-the-art ice hockey arena for the city of Pittsburgh and the 2009 Stanley Cup Champions, the NHL Pittsburgh Penguins. The \$321 million facility utilized an accelerated fast-track project delivery approach and has received LEED Gold certification. With its capacity to host hockey, basketball, concerts and an assortment of other events, the arena serves as the anchor of the urban redevelopment district since its opening in August of 2010.

The 100-foot-tall atrium space, with a dramatic spine wall along the west façade, provides a spectacular view into the concourse and suite levels of the building. Not only is there an elevation change across the site, the building is cut into and is founded upon bedrock at the north end of the site and drilled piers extending through almost 30 feet of “unconsolidated fill” at the south end. Rammed aggregate piers are required for slab support for much of the building footprint including the ice sheet. In addition, controlled low strength materials were utilized as backfill behind a 28-foot-tall by 500-foot-long basement wall, reducing vertical and lateral earth pressures and settlement, creating retail space along the entire south end of the arena.

The interior view of the roof is quite remarkable since all catwalk and rigging girds have been placed at the top chord of the two tied arch trusses, leaving the plunging tension tie prominently exposed. This element enhances the interior view, while significantly simplifying the structural steel construction.

Thornton Tomasetti also provided specialty engineering services for the contractor to ensure the construction schedule and budget were met, and to prevent delay due to the complex foundation wall system. This service included the design of detailed bracing plans, as well as direct work with the contractor to revise backfill schedules to correlate with the state of completion of the primary structure.