# MERCEDES-BENZ STADIUM

ATLANTA, GEORGIA, USA

**With a maximum seating capacity of 83,000, the two million square foot Mercedes-Benz Stadium in Atlanta will continue to host the Georgia Dome's teams and events. The new iconic multi-purpose stadium will be home to the NFL's Atlanta Falcons and NCAA SEC Championships and Peach Bowl, as well as the Atlanta United FC, a new Major League Soccer team.**

The multi-purpose stadium hosted premier events such as the 2018 College Football Championship Game, the 2019 Super Bowl and was scheduled for the 2020 NCAA Basket Ball Final Four (prior to the COVID19 Pandemic). The versatile state-of-the-art facility is a $1.5 billion, public-private partnership (P3), that replaced the Georgia Dome in 2017.

The new stadium incorporates many innovative and versatile design elements, including a retractable eight-piece roof petal system that opens and shuts like a camera lens. The unique roof structure, designed to mimic a falcon wing shape, and other stadium features required twelve mega-columns to support the substantial structural loads. Large diameter drilled shafts, embedded into the bedrock, support the mega-columns massive compressive, tension and lateral forces. Design assumptions were calibrated through axial and lateral testing with Loadtest technology to characterize the foundations behavior at these large loads.

Subsurface conditions include surface fill and sand underlain by partially-weathered rock and gneiss bedrock. The two dedicated test shafts were constructed by ABE Enterprises with a rock auger and core barrel under polymer slurry. A

## PROJECT INFORMATION

- Owner: Georgia World Congress Center Authority
- Client: ABE Enterprises
- Engineer: Langan Engineering
- Completion Date: 2017
- Project Cost: $1.5 billion
- Maximum Load: 10,813 kips bi-directional

## SERVICES PROVIDED

- 2 single-level axial O-Cell® tests
- 1 lateral load test
- SONICaliper shaft profile
- MiniSID

SONICaliper™ and Mini-SID were used to inspect the excavations prior to installation of the O-Cell® assembly. The SONICaliper generated precise, 360° profiles of the shaft excavation sidewalls and excavation alignment and plumbness are germane to interpreting load distribution along the shaft during the load test. The Mini-SID provided bottom cleanliness information to assure end bearing load transfer occurred.

Test Shaft 1, excavated at 65-inch diameter and 55 feet long, had a loading assembly consisting of two single-level 26-inch diameter O-Cells located 1.5 feet above the shaft base and corresponding instrumentation. After concrete placement and curing, the O-Cells were used to load the shaft in 10 nominally equal increments, for a maximum bi-directional load of 3,711 kips applied to the shaft above and below the O-Cells.

Test Shaft 2 was also excavated at 65 inches in diameter but to a depth of 58 feet with a rock auger and core barrel. The two 26-inch diameter single-level O-Cells used were located 0.7 feet above the shaft base. The maximum sustained bi-directional load applied was 10,813 kips.

After its axial test, a lateral test was also performed on Test Shaft 1. The lateral test used a single 16-inch O-Cell loaded in ten increments to a maximum lateral load of 903 kips.

The structure used a combination of drilled piers, augercast piles, aggregate piers and spread footings for foundation supports. The load test program results allowed for site and design calibration to optimize foundation construction and allow for site variability while taking advantage of high strength of the bedrock.

*Aerial view of the stadium's retractible roof*

*O-Cell Load plate assembly*

*O-Cell assembly at tip of reinforcing cage*

*O-Cell axial shaft set up for subsequent lateral testing*

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