

PHILLIP AND PATRICIA FROST MUSEUM OF SCIENCE

MIAMI, FLORIDA



PROJECT OVERVIEW

Viewed from above, the Phillip and Patricia Frost Museum of Science Aquarium resembles the organic shape of a water droplet. The four-level structure contains the Gulf Stream Aquarium vessel, a 100-foot wide 500,000-gallon cone-shaped aquarium. The façade is a one-of-a-kind doubly curving stucco and tile fully vented cavity structure with graceful lines reminiscent of the bow of a seafaring vessel. The tiled skin of this building has a constantly changing curvature with a linear pattern superimposed onto it and a 3/16" tolerance. The three-inch round tiles are flat, convex or concave. Aesthetic and robust, the façade was required to demonstrate compliance with Miami-Dade NOA. The team developed a process that enabled them to take the two-dimensional details, deploy them three dimensionally and create a feedback loop to gain exposure on the project all the way around.

PROJECT HIGHLIGHTS:

- The 3/16" linear pattern tolerance required investigation of the finished surface in real time using parametric modeling to elucidate impacts of connections to the concrete superstructure
- Each framing adjustment required an iteration of the linear parallelogram surface around the entire building to ensure the pattern connected precisely
- Through this process, the team identified clashes, possible engineering problems, highlighted them and redesigned to maintain the 3/16" linear pattern tolerance
- Structurally, the façade assembly hangs like a curtain from the aquarium's fourth-floor slab.
- Studs stand off from the slab at grade where metal clips stay their location
- The finished tile surface rearward assembly is backed by metal sheathing lapped uniquely to direct errant water in the system rear to a vented cavity formed by a lattice of curved hat-channel
- The entire façade system is engineered to withstand standards, category 5 hurricane forces, and high impact projectiles
- Frost Science is an example of a high-risk project with complex geometry and extremely tight tolerances, where through collaboration the team delivered on the design intent
- McClure is the cold-formed steel specialty engineer of record



2017 ENR BEST CULTURAL/
WORSHIP AWARD WINNER