

Alberici worked closely with the U.S. Army Corps of Engineers (USACE) and engineering firm Arcadis on the Seabrook Gate Complex project using USACE's Early Contractor Involvement procurement method. Alberici implemented innovative ideas during both the design and construction phases of the project.

Innovation During Design: Rock Closure Dike and Cofferdam Solution

The original design by Arcadis and USACE called for a double combi-wall cofferdam -- essentially two rows of sheet piles with pipe pile framing filled with sand and rock around all four sides of the project area. During early design stage collaboration meetings, Alberici proposed a cofferdam consisting of circular cells in lieu of the combi-wall system. However, tidal flows in the Inner Harbor Navigational Canal, which separates the Gulf of Mexico from Lake Pontchartrain, created extreme water velocities in the area, as evidenced by a 90-foot-deep scour hole within the footprint of the new gate complex. These velocities would make it impossible to place sheet piles across the canal for the cofferdam. Alberici, a marine construction specialist, conceived of a plan to install a rock dike across the width of the canal in order to reduce water flow velocities in the canal. USACE and Arcadis approved the innovative construction method, and Alberici installed the stone control structure -- a temporary rock dike - dramatically reducing water velocity. Alberici specified the sand selection and placement methods, with underwater vibro-compaction, to fill the large scour hole.

Alberici's proposed cofferdam solution led to direct cost and schedule benefits. The original plan utilizing double combi-walls would have required all gate foundation piles (30 inch diameter and 90 feet long) to be driven "in the wet" from barges and would have required a tremie seal slab. The Alberici proposed cofferdam solution, in conjunction with a design/build dewatering system, eliminated the need for the tremie slab and this recommendation resulted in a savings (deletion) of 25,000 cubic yards of concrete. An additional benefit to the project associated with the deleted tremie slab included a 25% reduction in the quantity of foundation piles for the sector and vertical lift gates. In total, the circular cell cofferdam innovative solution implemented at Seabrook and associated dewatering system resulted in:

- \$9.8 million savings or 7% total cost reduction for the project.
- A schedule reduction of three months from the project's critical path.
- Improved safety and quality resulting from gate foundation piling installed in-the-dry opposite in-the-wet from barges (zero injuries and zero non-conformance reports)
- Circular cell cofferdam at the North side, near Lake Pontchartrain, was designed to serve as temporary protection to achieve the USACE intermediate milestone requirement of Hundred Year Level Attained for flood protection by June 2011. This would not have been achieved otherwise due to the late notice to proceed granted on the project.

Innovation During Construction: Laser Scanning

Traditionally, a contractor would assure the tight dimensional control required for installing large steel gates like these by dry-fitting the fabricated parts within the embedded steel frames to assure clearances and fit, and then removing them prior to making secondary pours. Alberici's innovative approach utilized laser scanning of the gates during fabrication in St. Louis to ensure they conformed to the design dimensions and modeled them in 3D. Then, the embedded steel rails were scanned in New Orleans to verify fit and clearances prior to making the secondary pours as the gates were still in fabrication 600 miles from the project site. By laser scanning the gates and making sure the geometry in the 3D model was correct in advance of shipping the gates, we were able to make the secondary pours in advance of gate deliveries. When the fully assembled gates arrived by barge in New Orleans, they were hoisted from the barge into final position. Use of laser scanning saved many weeks in the project schedule, and proved to be a very successful and innovative approach for the project team at Seabrook Gate Complex.

Seabrook Gate Complex Innovations



Alberici installed a temporary rock dike to sharply reduce tidal flow through the canal. The image below shows the rapid flow of the current before completion of the dike. The dike enabled use of a cofferdam. The dike was later removed for use as permanent scour protection, as shown in image below, at left.



Above, Alberici's Mitch Collins uses a Leica scanner that takes measurements by emitting 4,000 laser light beams per second, as shown in an ENR news story. This enabled Alberici to ensure the steel gates met tolerances prior to installation. Above is an image of the completed project. A scan of two sector gate leaves is at right.

