



Seawall Stretch

Replacing a crumbling stretch of seawall along the Atlantic coast in Massachusetts required creative placement of equipment.

In Marshfield, Massachusetts, the strong waves of the mighty Atlantic Ocean have deteriorated a northern stretch of seawall built in the 1930s, thereby threatening the safety of beachfront homes. To reconstruct 3,300 linear feet of concrete seawall would have required an exorbitant amount of time and labor if not for the ability of Putzmeister America, Inc. truck-mounted boom pumps to set up in challenging locations and place concrete with efficiency.

Reconstruction of the seawall was divided into four contracts or sections, spread out over six years. The last and most complicated section was finished in late summer 2015. All four contracts were awarded to Northern Construction Service, LLC of Palmer, Massachusetts, who handled the entire project with a highly disciplined construction process and an aggressive concrete placing schedule.

Needing to place concrete with speed and efficiency, as well as with equipment that could set up in difficult work site conditions, Northern exclusively relied on the experience and wide range of concrete placing equipment from the fleet of Boston-based L. Guerini Group, Inc., a third-generation construction business established in 1917. Upon completion of the project, the placing company had pumped approximately 15,000 total cubic yards of concrete.

The five-section boom of the new 42Z-meter reached up and over homes while set up in confined areas.

PROJECT SPECS

Each contract comprised the demolition, followed by the construction of new 16-foot tall reinforced concrete seawall, including reinforced 14-foot wide and two-foot thick concrete footing with steel sheet pile scour protection. It also included construction of seaward and landward stairways at specified road locations.

SETUP CHALLENGES

To access concrete forms on shore, ingenious solutions had to be devised for truck-mounted boom pumps to set up on streets that were lined with homes next to one another. Even when there was an open space between homes, it was often too small for full extension of all four outriggers, specifically on the larger-sized models that were needed for their longer boom reach.

“The key to overcoming the tight spots while getting the boom reach we needed was the One-Sided Support (OSS) outrigger system on our Putzmeister boom pumps,” states Bob Magliozzi, one of four family owners at Guerini. The technology of OSS allows the operator to reduce the outrigger extension on one



From one strategic spot, the 42X-meter reached over homes, placed concrete for a wall segment, swung over a segment that was curing and pumped a segment of footing next to it.

side of the unit to create a smaller footprint for setup in confined areas. It avoids the unsafe practice of short-rigging.

The seawall was also situated in the flight path of a nearby municipal airport that had a maximum 45-foot height restriction. This meant unfolding and keeping the unit's boom at a low height to meet the requirement.

Adding to the list of obstacles in boom pump setup, the last \$2.7 million seawall contract along Foster Avenue had streets that ran parallel instead of perpendicular to the shore and many homes were unusually close to the seawall on one side, and right next to the road on the other.

Consequently, the boom pumps were forced to set up on the narrow streets, sometimes with outriggers in private driveways, and sometimes mere inches from a home's front yard. The boom would reach up and over homes to access the seawall on the other side, maneuvering the boom over peaked roofs and around chimneys.

ONE SETUP, TWO PURPOSES

Further compounding the situation was the need to set up a boom pump to accommodate the contractor's strategic construction approach. "We had to precisely calculate where to set up the boom pump to reach both a wall and footing segment in the same day, without moving the unit, and while maneuvering around obstacles on the street," said Magliozzi.

A similar leapfrog construction process was used for all three seawall sections; however, for the last 1,000 foot seawall, it was divided into 24-foot segments with a two-day curing schedule. Each day, crews would pump concrete for a wall segment, placing only about half of the concrete, as the pour rate could not be too fast in order to avoid excessive pressure on the wall forms.

The boom would then swing over a concrete segment that was curing, and next to it, place a partial amount of concrete for a 24-foot-long footing. The boom would return to the wall to finish concrete placement, then swing back to complete the footing. The boom pump had to reach an 80-foot wide span while placing 110 cubic yards each day.

"The equipment was all top notch, and Guerini did a fantastic job," said Jack Graves, project superintendent at Northern. "With a difficult concrete mix and high temps in August, there was no time to move the boom pump for fear of concrete setting up in the line. So there was no choice; Guerini had to strategically position the unit to remain in one spot all day." Each day, the pumping company needed to figure out a new tactical place for boom pump setup while overcoming the numerous obstacles.

WEATHER REPORT

"To construct a seawall, the proper equipment, manpower and knowledge is needed, and the job needs to get done as quickly as possible," remarked Graves. "We don't want to



Concrete seawall is reconstructed with use of truck-mounted concrete boom pumps to set up in awkward locations.



The 20Z-meter handles intricate concrete placement.

inconvenience the people at the beach, but we're extremely vulnerable to the weather. If strong winds blow in from the northeast, there's nothing protecting the beach."

Work on the last seawall section started in the middle of summer after the busy Fourth of July holiday and ended before September's hurricane season. Northern initially only demolished 150 feet of seawall so as not to expose too much open space in case of destructive weather. As a new section of seawall was constructed, an older section was demolished every other day.

The contractor and the concrete placing equipment worked at an aggressive pace to place concrete for both a 24-foot wall and footing segment every day. "Because of the unpredictable weather, we wanted to finish the entire job as fast as possible, so we did five pours a week," states Graves. "In total, we accomplished 42 consecutive pours, placing concrete every single weekday during the summer except three. The pumps did great; no service issues at all."

THE RIGHT TOOLS

Although Guerini dispatched almost every boom pump size from their expansive fleet, the 36Z- and 42X-meter were the models most often used because of their long booms, reaching 116' 10" and 136' 6" respectively.

"With about a month left in the project, our new 42Z-meter with Z-fold boom was delivered to our fleet, and we used it right away. The maneuverability of its five-section boom was perfect for the job, just wish we had ordered it sooner," said Magliozzi.

Even the smallest boom pump in Guerini's fleet, the 20Z-meter, had a special task on the project. With its extremely compact outrigger spread, it could fit in tight spots to pump the concrete stairways used for access from street to shore.

To better withstand the long-term effects of storm waves and the ocean's corrosive saltwater, a specially engineered mix was specified. Graves notes, "It was a harsh 5,000-psi mix with one-and-a-half inch aggregate, a much larger size aggregate than the typical three-quarter inch found in our area."

"Although the concrete was an aggressive mix with all kinds of plasticizers, our pumps with the Big Mouth S-Valve had absolutely no problem pumping it," adds Magliozzi.

Even though a significant amount of seawall was reconstructed for these four contracts, more deteriorating seawall remains to be fixed or reconstructed as communities scramble to find funds. **CP**

Specs:

General Contractor: Northern Construction Service, LLC—Palmer, Massachusetts

Concrete Supplier: P.A. Landers—Hanover, Massachusetts

Concrete Placing Contractor: L. Guerini Group, Inc.—Boston, Massachusetts

Equipment: Putzmeister 42Z-meter, 42X-meter, 36Z-meter and 20Z-meter truck-mounted concrete boom pumps