

# NEW ENGLAND CONSTRUCTION



**Marr Companies Offloads New Gantry  
Cranes for Boston Harbor Terminal**



Marr, Local 7 Ironworkers, and Chinese ship crew collaborate in the installation of temporary railroad tracks to offload gantry cranes. (Notice temporary rails in foreground).

As the ship closes the gap with land, the special pipe braces that held the gantry cranes motionless can be seen.



# GIANT NEW CRANES RAISE MASSPORT STATUS

Marr Companies Offloads Gantry Cranes Shipped From Shanghai to  
New Berth Created as Part of \$350M Boston Harbor Dredging *By Paul Fournier*

**T**hree gantry cranes up to 200 feet tall were recently shipped upright on a three month trip from Shanghai to Boston Harbor, where they were destined for Massport's Conley Container Terminal.

The ship carrying the 22-foot-wide ship-to-shore (STS) cranes arrived at the Port of Boston on June 22, 2021, and headed for the terminal's brand new, 50-foot-deep Berth 10. Awaiting the specially rigged ship were crews provided by South Boston-based Daniel Marr & Son Company, who carefully offloaded the three gantry cranes that had been manufactured for Massport by Shanghai Zhenhua Heavy Industries Co., Ltd. (ZPMC). The cranes had been held in an upright position for the entire journey by special sea-fastening safeguards.

In addition to moving these giant cranes from the delivery vessel, Marr will be assisting during commissioning of the cranes, a procedure that includes a number of tests, a series of inspections, and training personnel before regular crane operations can begin.

## Sea-Fastening Safeguards Special Cargo

The cranes are classed as "Full Gantry" cranes since they are cranes built atop a gantry, a structure used to straddle an object or workspace. They can range from enormous machines such as those built for Massport, to small shop cranes used to lift automobile engines out of vehicles. Massport will employ the gantry cranes to service the ever larger container ships ("Big Ships") being manufactured to carry thousands more containers than traditional container vessels. Two of the new ZPMC cranes delivered to Massport are 200 feet tall, and have a lifting height of 160 feet, while the third, positioned closer to the flight path of Massport's Logan International Airport, is shorter, with a standing height of 145 feet and a lifting height of 100 feet.

"The most interesting challenge of this job was getting the cranes off the ship," said Richard "Rich" Burns, President of Daniel Marr & Son Company. The

ship was modified to carry the gantry cranes with special sea-fastening rigging that included large steel pipe braces positioned at a 45 degree angle to the horizontal cargo beam. The bottom end of the braces were welded to the ship deck and the top end welded to the horizontal cargo beam of each crane. Furthermore, there were heavy steel cables connecting the top of each crane to the deck. This sea fastening system thoroughly braces the cranes and helps control yaw in rough seas.

## Temporary Tracks Help Offload Cranes

Burns said there was excellent cooperation between Marr, their Local 7 Ironworkers, Local 4 operating engineers, and the manufacturer's ship's crews, as they all collaborated in cutting loose the sea fastening system from the cranes.

"They (ZPMC) are familiar with us. We have the equipment and the ironworker crews. We supplied the labor

and equipment for offloading the three cranes. And we will still be working with them throughout the commissioning process. The key field personnel on the project have been Ironworker General Foreman Jenner Helstrom, and Field Operations Manager John Seward for Daniel Marr & Son."

Burns described the procedure that was developed to safely move a 20-story megaton gantry crane off the ship:

They attached a railroad-like steel bogie – a modular framework of four steel railroad wheels and axles – to each leg of a crane. Meanwhile landside crews assembled a temporary railroad of big steel girders and rails. Then they waited for the tide – the Port of Boston has a mean tidal range of 9.5 feet. When the crane bogie wheels on the ship lined up with the temporary railroad tracks on the berth pavement, they used winches and counterweights to pull the gantry crane off the ship and onto the temporary berth tracks.

## Digging Deep Allows Bigger Ships

The three gantry cranes are located on a new Berth 10, which is 1,250 feet long and was dredged 50 feet to allow the new cranes to service larger container ships. In addition to the Berth 10 work, maintenance dredging has been underway for the past few years under the Boston Harbor Deep Draft Navigational Improvement Project (Boston Harbor Dredging Project). This is a cooperative effort of the U.S. Army Corps of Engineers (USACE), the Commonwealth of Massachusetts, and Massport. The federal Water Resources Reform and Development Act (WRRDA 2014) authorized the harbor dredging, estimated to cost \$350 million, with Massport and the Commonwealth of Massachusetts paying the \$130 million local share and the federal government paying the remainder.

The first phase of the project, which involved the dredging of the inner harbor, was completed in December 2017. Phase II was completed in November 2020, deepening the harbor to -47 feet and expanding the length of the turning basin to 1,725 feet. And the deepening of the main ship channels began in July 2018 to better accommodate present-day container vessels, as well as even bigger capacity ships.

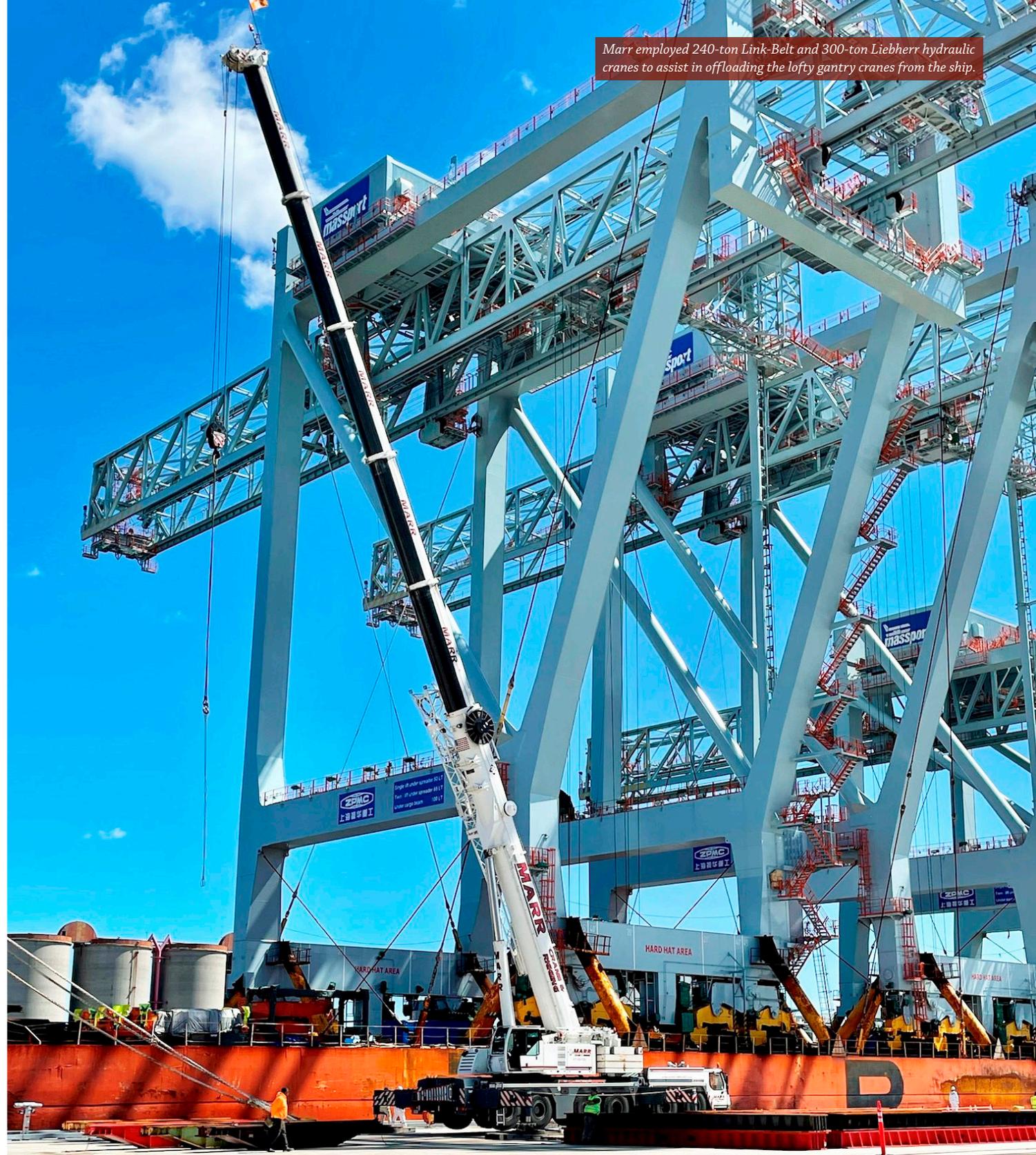
Massport's latest gantry cranes are capable of servicing container ships holding 12,000- to 14,000 TEUs (twenty-foot equivalent container units). For comparison, the existing Conley Terminal usually handles ships carrying 5,000 TEUs, and can service up to 10,000 TEUs in special circumstances.

TEU containers used in the U.S. typically measure about 8 feet tall by a little less than 8 feet wide, with lengths of 20 feet and 40 feet. The new gantry cranes can reach across a row of 22 containers on a ship to pluck a single container and place it on a waiting landside chassis. A chassis is a wheeled metal frame that is hauled over roads by a semi-tractor.

## Reefers, RTGs, STSs, Freight Road and More

In addition to the new STSs and Berth 10, other improvements have been underway at Conley Terminal. These include expanded reefer (refrigerated containers) storage, and new in-and-out gate facilities. Massport also operates a fleet of 16 rubber-tire-gantry cranes (RTGs). Moreover, a \$75 million Freight Haul Road was installed in Fall 2017, improving the trucking community's access to the interstate highways. All told, Massport has spent about \$850 million over the past several years to attain Big Ship Ready status for Conley Container Terminal. While the three gantry cranes were delivered to the terminal in late June 2021, Marr crews are still at work helping with the extensive commissioning procedure and some miscellaneous work. They are expected to be on the job for several more months, albeit with a smaller crew, according to Burns.

Marr employed 240-ton Link-Belt and 300-ton Liebherr hydraulic cranes to assist in offloading the lofty gantry cranes from the ship.



## MARR COMPANIES HELPS BOSTON BECOME BIG SHIP READY

Since offloading three gantry cranes from a Shanghai vessel last June, Daniel Marr & Son Company (DM&S), has been preparing them for regular duty servicing massive container ships at Boston's Conley Terminal. DM&S is one of four Marr Companies that have played major roles in shaping Boston's land- and waterscape for many years. Established in 1898, this company provides steel and precast concrete erection services to fabricators and general contractors. Marr Scaffolding Company rents, sells and services construction products and equipment, while Marr Crane & Rigging provides cranes, construction elevators and rigging. Isaac Blair & Co., Inc., established in 1820 and purchased by Daniel Marr & Son in 1969, provides specialty construction shoring and rigging services.

Fifth generation Daniel "Dan" Marr is the Chief Executive Officer (CEO) of the Marr Companies. He is responsible for directing the day-to-day operations of the company, and formulating plans and policies to achieve company objectives. He joined Marr in 1973.

Dredging contractors deepen Boston Harbor to allow larger container ships access to new Berth 10. Dredging is overseen by U.S. Army Corps of Engineers.

