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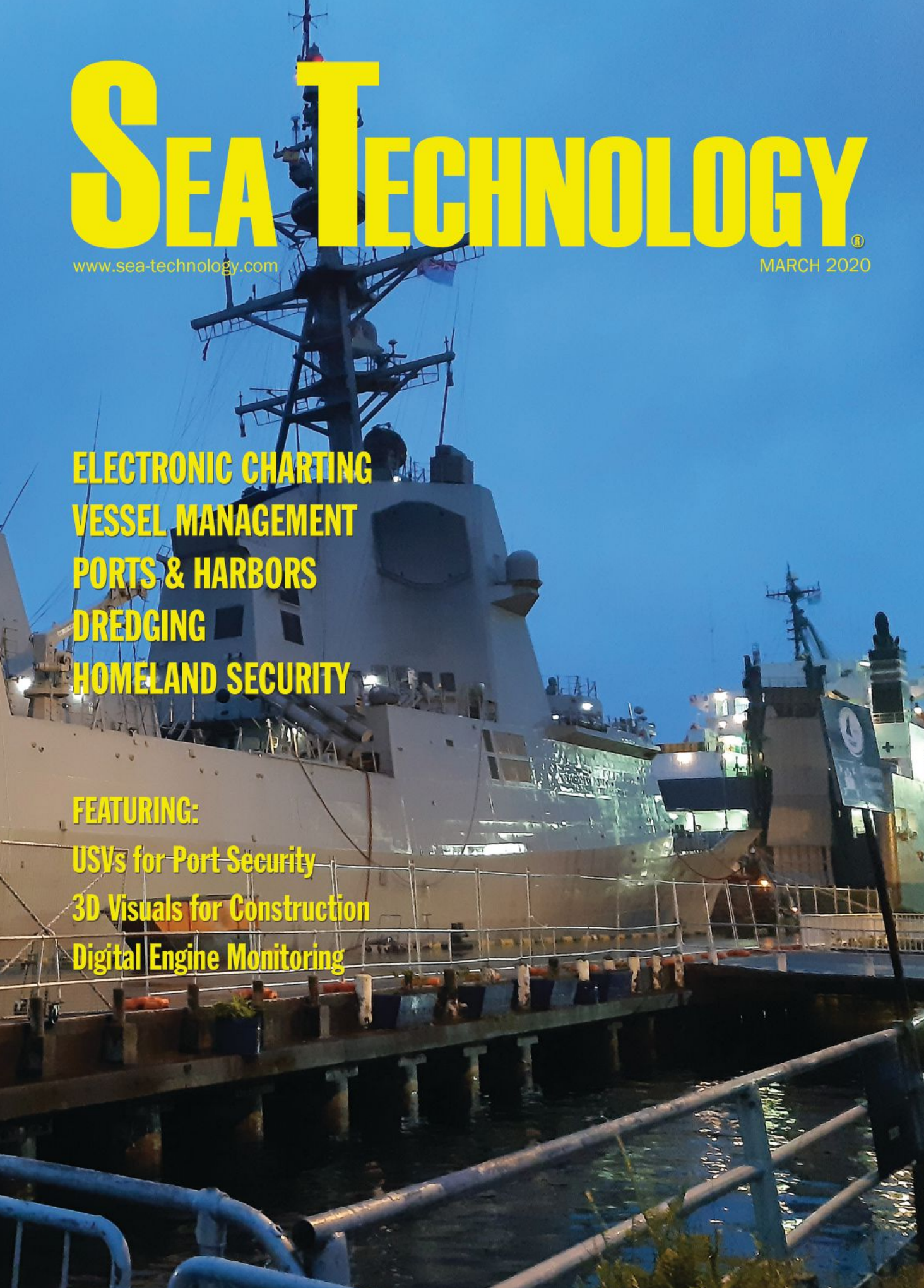

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Harbor Cable Project

Submarine Cable in Busy Boston Harbor Installed in Just 24 Months

By Jenn Said

With more than 65 years of experience installing submarine utilities, Caldwell Marine International has set the bar high by working around obstacles that would cause most contractors to walk away. The marine construction contractor has had to think outside of the box to overcome challenges while installing hundreds of submarine power and telecommunications cables worldwide. So when the U.S. Army Corps of Engineers asked the contractor to remove an existing power cable in Boston Harbor and replace it with a deeper cable on an extremely aggressive time line, Caldwell Marine was up for the challenge.

Background

Originally installed in 1990, the underwater cable provides power to a wastewater treatment plant on Deer Island, a peninsula in Boston. The cable, which runs for 3 mi. between Boston Harbor and the peninsula, was intended to be installed at least 25 ft. below the bottom of the two shipping channels it crosses. However, during its original construction, crews encountered bedrock, and, instead of 25 ft. below, they placed the cable just 12 ft. below the harbor floor in some areas.

That cable quickly became a roadblock to the Army Corps of Engineers' recent plans to dredge Boston Harbor. Dredging would allow the Port of Boston to accommodate more traffic and large container ships, but because of its shallow depth, the existing cable could sustain damage during dredging and put the crews and their equipment at risk. It would have to be removed before the dredging could start, which put immense pressure on the project's time line. The Army Corp of Engineers wanted the project complete in 24 months—a tall order.

Obstacles to Overcome

The project, which began with cable procurement in May 2018, challenged Caldwell Marine in more ways

Technology played an important role in helping Caldwell Marine replace more than 15,000 ft. of submarine cable under the main shipping channel and across the busy Boston Harbor.

Caldwell Marine's construction ERP system, Viewpoint Vista, helped keep the project on schedule by centralizing and providing complete visibility into the project's financial data, giving both on-site and out-of-state team members easy access to project data.

than one. Along the cable route was Boston blue clay, a stiff marine clay that complicated laying the new cable. Typically, submarine cable is buried using a jet plow to sink it to an appropriate depth, but this method is ineffective in clay because of its density. "Other contractors didn't want the risk of laying the cable, but we were confident we could come up with a solution," said a spokesperson for the Caldwell Marine management team.

The new cable system includes 8,700 ft. of land cable installed through duct banks and vaults in South Boston, transitioning to 15,400 ft. of submarine cable under the main shipping channel and across Boston Harbor, and, finally, back to 1,350 ft. of land cable on Deer Island, where it will be connected to the peninsula's power system.

The location alone required a tremendous amount of perseverance and coordination. The weather conditions put a strain on crews and required provisions to ensure the project stayed on schedule, even at temperatures below zero with the wind chill. "Icy conditions were a safety factor so the crew had to take time to heat the pipelines, clear snow, de-ice and salt," said the Caldwell Marine management team.

The cable route was among congested existing infrastructure in a location with almost 400 years of historic harbor structures and utilities to consider. In addition, the route begins in the busy Boston Harbor and is situated among multiple airways. Not only did the operations teams coordinate project logistics with ship traffic into the harbor, they also coordinated with the Federal Aviation Authority.

"Coordinating the work around water and air traffic required emails and phone conferences twice a day, in addition to constant radio communication," said the Caldwell Marine management team. "It was common to have as many as 40 parties on the calls, working together to sort out logistics."

Around-the-Clock Innovation, Dedication

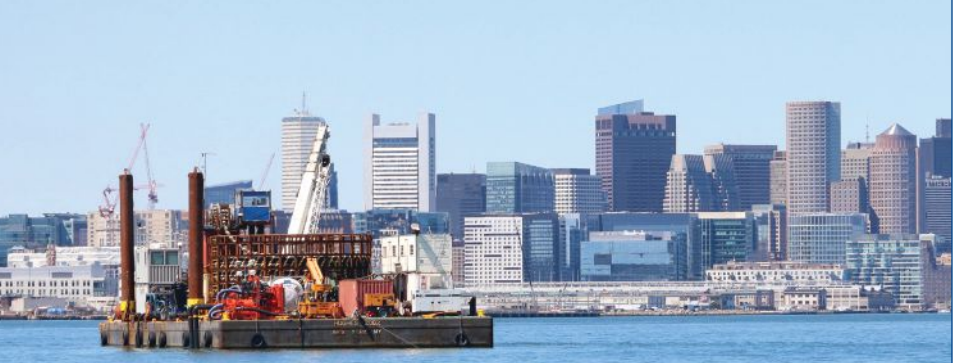
Caldwell Marine had to mobilize equipment and materials from multiple locations before drilling could start. A horizontal directional drilling conduit with a diameter large enough to accommodate the cable was shipped from Texas, and the cable itself was fabricated and shipped from Europe. "This all took place within six months," said a spokesperson for the Caldwell Marine management team.

At the same time, marine assets, such as barges, tugboats, crew boats for employee transport and cable-handling equipment were provisioned from New York and towed to Boston. Because the new cable system is essentially three cables in one and too stiff for coiling, Caldwell Marine also had to design a cable installation trough and barge setup with special rollers to support the movement of the rigid cable. The rollers mechanically turned the drum as an alternative to coiling the cable.

With the project's equipment and staff provisioned, Caldwell Marine and its sister company, ECI Drilling International, began work with a nearly 3,600-ft. horizontal foot drill operation through bedrock. At 170-ft. depth and 36-in. diameter, the bedrock drill ploughed the remaining distance to reach Deer Island. Three teams worked simultaneously, totaling 72 workers on the job site at all times. The drill crew, marine crew and fusing operation worked 24 hr. a day, seven days a week, through the holidays and winter weather to complete the job.

Success Factors

Caldwell Marine completed the cable installation on schedule in April 2019. As with every project, real-time insight into financial data was critical. Caldwell Marine's integrated construction enterprise resource planning (ERP) system, Viewpoint Vista, kept everything on schedule by centralizing and providing complete visibility into the project's financial data from start to finish.



Caldwell Marine will use the Boston Harbor project data in Viewpoint Vista to improve workflows and increase the quality and profitability of future projects.

Vista played a key role in successfully completing the project on time. "With Vista, project data were automatically synchronized, so teams in the office and in the field were working from the same source of truth and in tune with tracking costs, so nothing fell through the cracks," said a spokesperson for the Caldwell Marine management team. "They spent less time re-entering data, and managers didn't have to wait for field data to be entered before making important project decisions."

Throughout the Boston Harbor project, Vista provided Caldwell Marine's office and field teams with easy access to accounts payable, accounts receivable, general ledger, payroll and cash management data. "Our on-site crew members communicated with out-of-state offices using Vista," said the Caldwell Marine management team spokesperson. "Without it, approval process for invoices would have been delayed. Vista helped ensure timely payments to subcontractors and vendors and, most importantly, provided accurate financial information on how the project was progressing so managers could identify potential financial implications that could have derailed the project."

Like many contractors, Caldwell Marine used paper to track financial data before moving to Vista. "The efficiency gains and ease of use are the greatest benefits with Vista," said the Caldwell Marine management team. "Data are always accurate, and the team can access it from anywhere, at any time."

With the project complete, Caldwell Marine plans to use Vista to review historical cost data. "Our management team will run reports on this project and others to learn what works and what doesn't," said the Caldwell Marine management team. "This insight helps improve workflows to increase the quality and profitability of future projects." **ST**

Jenn Said is a freelance writer covering construction technology.