

Port construction at Naples

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Ground and site conditions at the Port of Naples create a challenging construction combination for Trevi in its work to build a new container terminal while the port remains an active passenger and good destination

Port of Naples is one of Italy's largest seaports with capacity to handle 25M tonnes of cargo and 500,000TEU (20ft equivalents) each year as well as almost 9M passengers each year. Despite the size of the operation, demand is expected to increase further and work is already underway on extending the container terminal facilities.

The extension of the Eastern Dock will add a further 200m of quay to the existing 11.5km of docks at the facility owned by the Port Authority of Naples. But before the new dock cranes can offload the first cargoes, foundation contractor Trevi needs to complete work on constructing the cofferdam for the new docks.



The extension will add a further 200m of quay at the Port of Naples

This is not a simple task thanks to the geology and the need to keep the rest of the port operational throughout the work.

The existing terminal has around 7ha of open water with two 250m long piers, each 70m wide, which are separated by a 70m length of quay wall. Water depth across the terminal varies from 7m to 15m from average sea level. The new quay will be 285m long and 100m wide and will have an average water depth of 18m, which will allow the port to accept some of the world's largest container ships.

The new quay is being created by constructing a cofferdam structure that will then be backfilled using sediments dredged from within the port itself, so the structure must be completely waterproof.

The Port of Naples lies between two volcanic areas – Mount Vesuvius and the Phlegraean Fields – which gives an indication of the challenging ground conditions at the site. The geological sequence is covered by backfill used in the construction of the dock which overlies sandy-silty soils and lithoid tufa (tufa) over more sandy soils.

Construction of the cofferdam structure calls for Trevi to install sheet piles, bored piles and a diaphragm cut off wall into the tufa layer which extends 20-25m below average sea level.

The main structure is being formed using a double wall of sheets piles with sealed joints that are being driven into the tufa layer and will delimit the seaward extent of the construction. Bored piles will be constructed once the cofferdam has been completed and backfilled and these will be used to support the dock cranes.

Trevi's work on the dock itself has been combined with construction of a settlement tank which will form part of the cooling circuit for the Tirreno Power Plant, which is also being built in the container terminal. For this element of the work, the company is using a combination of diaphragm walls to reduce permeability to 10⁻⁹m/s around the tank construction area, and jet-grouting to consolidate the seabed around the tank's intake and discharge area.

Trevi is also undertaking mini-piling and grouting work to one of the existing piers and dredging to remove contaminated sediments from within the construction area.

Construction is expected to be completed later this year, clearing the way for the dock infrastructure to be installed so that the Port of Naples can offer improved facilities for its container customers.