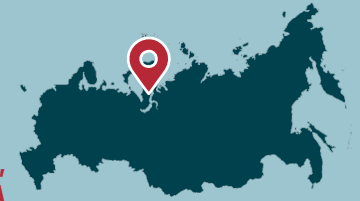


MACCAFERRI

Designers: LENMORNIIPROEKT JSC
Owner: YAMAL LNG OJSC
Main contractor: MRTS SEA PORTS LLC
Products: 7,000 RENOMAC PLUS FOR 118,350 m²
Date of construction: 2018

TYUMEN REGION,
RUSSIA



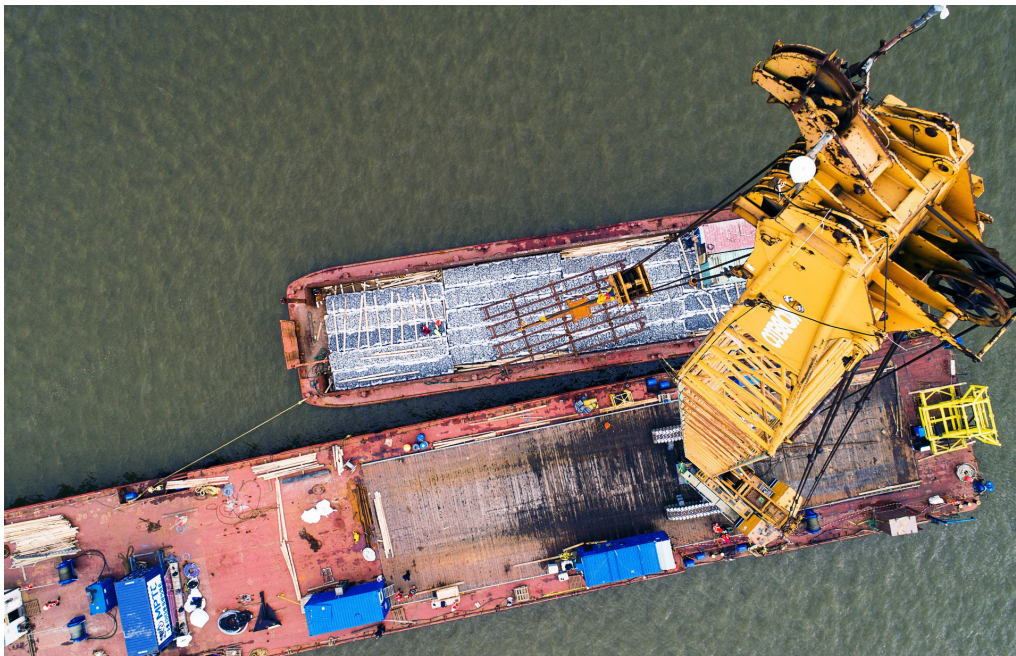
Jetty bottom reinforcement for scour protection in the Arctic zone

The port of Sabetta is an Arctic port on the western coast of the Gulf of Ob, in Tyumen Region, and has become an absolute leader of the Northern Sea Route in terms of cargo turnover growth. Construction of the port began in 2012, as part of Yamal LNG project, which is the largest infrastructure project in the world today being implemented in Arctic.

Three large hydraulic structures were built within the framework of sea port construction near Sabetta settlement: an approach channel, a sea channel and a harbor basin. The works were performed in harsh geological, climatic and hydrological conditions inside the Arctic Circle.

There were absolutely no transport infrastructure at the coast, and the navigation season is very short, about 70 days (August to October).

A problem was found during the navigation season: wave flows from vessel engines were scouring foundations of process jetty support walls. This problem was aggravated by soft soils at the bottom of the approach channel. Experts working on the project together with engineers of Maccaferri decided to reinforce the space under the jetties with RenoMac Plus.



JETTY BOTTOM REINFORCEMENT SABETTA PORT, TYUMEN REGION, RUSSIA



Many difficulties were found in the project implementation and RenoMac Plus was the perfect solution to overcome them. The main problem was the geographical remoteness of the construction site: the absence of developed infrastructure made impossible to fill the mattresses with rock material directly on site in Yamal. The solution was found in using a prefilled mattress: RenoMac Plus was filled in an assembly area and then transported at the work site ready to be installed.

The installation process was complicated by a significant depth of the approach channel. Contractors' specialists decided to install RenoMac Plus using a submersible lifting complex Tetris with GPS navigation and an automatically detaching lift spreader. This system enabled installation of four filled mattresses with the total area of 63 m² during one submersion to the depth of 15 m. RenoMac Plus mattresses were installed to their design positions with high accuracy. The total area of seabed reinforcement near the process jetties was 118,350 m².