



FEATURES

Client	Ports of Stockholm
Project	Dredging, drilling and blasting, foundation rockfilling for 1,400 metre quay line
Location	Stockholm Norvik Port, Norvikudden, Nynäshamn, Sweden
Period	September 2016 – March 2017
Contractor	Terramare Oy

SCOPE

Ports of Stockholm is building a new port for rolling goods and container traffic, Stockholm Norvik Port. Terramare has carried out the Stockholm Norvik Port project's dredging, underwater and onshore drilling and blasting as well as rockfilling of the quay line operations. Foundation rockfilling work included underwater mass transfer, rockfilling and compaction.

- A** View of Stockholm Norvik Port's worksite 2017.
(A) Backhoe dredger Nordic Giant and barge Hans,
(B) Drill platform Playmate and (C) Grab dredger Kahmari 2.

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QUANTITIES | DREDGING

Dredging, total	780,000 m ³
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QUANTITIES | DRILLING AND BLASTING

Drilling and blasting	200,000 m ³
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QUANTITIES | ROCKFILLING OF THE QUAY LINE

Rockfill & compaction	1,400 m
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MAIN PLANT

Grab dredger	Kahmari 2 (Liebherr HS 895 HD)
Backhoe dredger	Nordic Giant (Liebherr P995)
Trailing suction hopper dredger	Freeway (Gross tonnage 4,320)
Self-propelled barges	George & Hans (500 m ³ each) Wadden 1,3 & 4 (935 m ³ each) Terra 1 & Terra 2 (660 m ³ each) Erik & Fredrik (270 m ³ each)
Drill Platforms	Playmate Pora-Pekka 4
Other plant	Excavators on land



INTRODUCTION

Ports of Stockholm is building the new, large-scale Norvik container, RoRo and distribution port at Norvikudden, Nynäshamn, located around 60 km south of Stockholm. The harbour area's naturally deep fairways will enable it to serve the Baltic Sea's largest cargo

vessels. The depths on the 1,400 metre quay line to be built at the harbour will be 11 and 17 metres.

MULTI-STAGE DREDGING

Terramare carried out the Stockholm Norvik Port's preliminary dredging, which comprised a total of 780,000 m³ of various materials. In addition to non-cohesive and soft masses, mixed material from previous extensive marine rockfilling was also dredged at the site. Work at the locations, up to 40 metres deep in places, was handled by suction, backhoe and grab dredgers. The site area was isolated with a silt curtain, which prevented turbidity from spreading into the surrounding environment. The dredging masses were transported on barges to a dumping area.

UNDERWATER AND ONSHORE DRILLING AND BLASTING

As dredging proceeded, underwater and onshore drilling and blasting was launched. For the future quay line, bedrock was drilled and blasted from above and below the water surface. The drilling and blasting volumes totalled approximately 200,000 m³, of which onshore drilling and blasting amounted to 66,000 m³. All of the rock waste was used for underwater filling at the site.

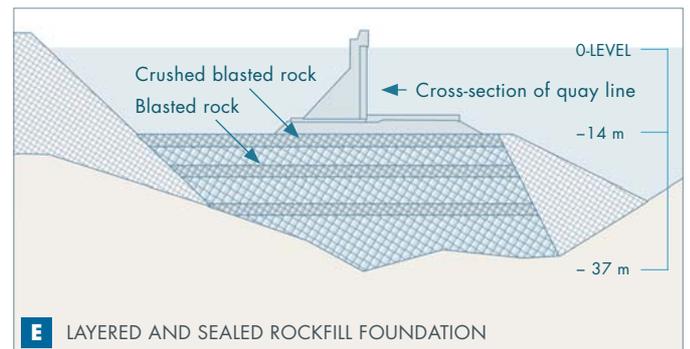
BLASTED ROCK FOR THE QUAY LINE FOUNDATION

Terramare's contract included underwater mass exchange, rockfilling and compaction, implemented as the foundation for the 1,400 metres long quay line. Rockfilling was implemented in layers on the dredged bottom, from a depth of -37 metres to a level of -14 metres. The foundation was constructed of three superimposed and compacted layers of rock waste, between and on the surface of which was laid crushed rock. Barges brought the larger rock waste and crushed rock to the location. At the same time, the grab dredger, Kahmari 2, compacted the base with a 20 tonne drop hammer.

Terramare's contract was completed on schedule in March 2017. The project employed around 60–80 people, from both Terramare and Boskalis Group.

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STOCKHOLM NORVIK PORT, SWEDEN DREDGING, DRILLING AND BLASTING, FOUNDATION ROCKFILLING FOR 1,400 METRE QUAY LINE



- B** The trailing suction hopper dredger Freeway.
- C** The rockfilling work. Cooperation of onshore and marine equipment.
- D** The drill platform Playmate.
- E** Graphic illustrating the layered rockfill.