

PROJECT SHEET

COAST GUARD BASE, EXPANSION OF THE MAIN NAVIGATION CHANNEL AND TURNING BASIN
DREDGING EXTREMELY HARD ROCK IN EXCESS OF 100 MPA

INTRODUCTION

A new fully functional maritime base comprising marine and landside facilities is being developed for the Qatari Coast Guard at Simaisma on the Qatari Eastern coast. The marine base will contribute to the protection of the coastal area and to improving the emergency response time of the Coast Guard.

For maritime access to the Coast Guard Base, a navigation channel of approximately 28 km was dredged. The dredged material was placed in six artificial island footprints (100 ha) parallel to the channel, and two access channels were dredged to connect two of the islands to the navigation channel.

PROJECT DESCRIPTION

The new Coast Guard Base is located on the shallow Qatari coastline where extremely hard rock in excess of 100 MPa is present below the seabed.

The 28 km navigation channel and the two access channels of a total length of 2.5 km were dredged with two heavy-duty Cutter Suction Dredgers (CSD) Taurus II and Phoenix, the shallow draft Trailer Suction Hopper Dredger (TSHD) Coastway, and the backhoe dredger Colbart.

A total volume of 6 million m³ was dredged and deposited in six artificial islands. Some 2 million m³ required rehandling largely because of the size of the project area, the design volume requirements for the disposal areas and the

FEATURES

Client	Urbacon Trading and Contracting LLC
Location	Simaisma, Qatar
Period	2013 - 2015
Contractor	Boskalis Westminster Middle East Ltd



A

- A** Backhoe dredger Colbart dredging an access channel
- B** High capacity discharge booster pump CSD Taurus
- C** CSD Taurus dredging the main navigation channel

distance between the areas. The rehandled material was initially placed in the disposal area, which was within pumping distance of the CSD. Subsequently, the material was excavated by dry earthmoving equipment, transported on flat-top barges and offloaded at the designed disposal area for the volume distribution.



B



C



INNOVATION

As the local authorities do not permit marine blasting, this project called for specific innovations to be able to deploy the heavy-duty CSD. A special cutter head was designed and constructed with extra wear-resistant pick points to dredge the extremely hard rock in excess of 100 MPa. A cutter head was also developed and constructed for medium hard rock.

The purpose-built cutter heads were connected to the vessel's automated control system to monitor all forces exerted and for onboard monitoring of the cutting process. Close monitoring was required to ensure maximum use of the available capacity without exceeding limits. This new automated system supported the operator in optimizing the cutting process, and determining the optimum cutter head for the soil conditions and thus minimizing wear and tear on the cutting head.

Prior to execution of the dredging works, a seismic refraction survey was performed to accurately assess the seabed of sand, cap rock and extremely hard Simsim limestone. The survey results were used to optimize allocation and utilization of the dredgers deployed on the project.

CHALLENGES

During the dredging process, a total of 250,000 pick points were used. On time supply of new pick points was a critical factor and the complex import and export logistics were successfully accomplished



by the project logistics team, the corporate office and suppliers. The large number of pick points were transported in 225 containers from foundries in Europe, and the worn pick points were returned to the foundries for recycling as part of the Boskalis sustainable cradle-to-cradle program.

DREDGING AND DISPOSAL

The stationary CSD's started operating from 12.5 km offshore gradually working towards the shallow shore. These dredgers commenced operation in January 2014 and the work was completed in July 2015.

The TSHD operated between 12.5 and 28 km from the shore because this section consisted predominantly of sediment materials. The dredger transported and deposited the dredged materials in a group of four islands.

The navigation channel and the two access channels were dredged to a depth of 8.8 m CD and a bottom width of 86 m.

The total of 2 million m³ rehandled material was moved by dry earthmoving equipment, and transported from Island 1 and 2 to Island 3 in the group of four islands.

MONITORING AND SURVEY

A large team of in-house hydrographical and topographical surveyors was deployed to monitor the dredging and disposal process over an area of nearly 50 km². Since dredging the extremely hard rock resulted in considerable wear and tear on the cutter heads, the dredging depth was closely monitored to achieve the design profile.

Extensive monitoring demonstrated full compliance with the environmental requirements. Water quality was monitored periodically at several locations in the direct vicinity of the dredgers and continuously at two fixed stations. The key parameters monitored included turbidity, water temperature and salinity, and the results were presented to the Client.

CONCLUSION

The works were completed at the end of 2015 and under the NINA safety program, a total of 2.5 million LTI free man-hours were achieved.

- D** Maintenance of a cutter head
- E** Disposal of dredged material and creation of an island
- F** Loading of material for re-handling and transport over greater distance

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