

# Port

i n d u s t r y

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HARBOUR REMEDIATION PROJECT IN TRONDHEIM

# Clearing THE WAY

THE CITY COUNCIL AND PORT AUTHORITY OF TRONDHEIM, NORWAY, AWARDED THE PORT BASIN REMEDIATION PROJECT 'RENERE HAVN' TO ENVISAN – THE ENVIRONMENTAL SUBSIDIARY OF THE JAN DE NUL GROUP. WITH THIS CONTRACT, Trondheim aims to restore the port basin to its required sailing depth and halt the spread of contaminated sediments into the water. Once the remediation work is complete, a section of the harbour will be redeveloped into residential areas and marinas. The project is supported and controlled by the Norwegian environmental authorities and is one of the largest harbour clean-up projects in Norwegian history.

The Renere havn project includes environmental dredging and the disposal of 65,000m<sup>3</sup> contaminated sediments. The dredged and disposal areas will be capped with filter and erosion layers using approximately 175,000m<sup>3</sup> graded clean limestone. Around 30,000m<sup>3</sup> sediments will be used to reclaim new land in the harbour. To accomplish this, an embankment will be built to create a 5,000m<sup>2</sup> closed basin made of either rocks, geobags filled with sediments or sandy material from waste soil treatment operations. This basin will be filled with dredged sediments, sealed with a geomembrane and finally covered with a rock armour layer ensuring the contaminated sediments are encapsulated. The project is closely monitored to be in compliance with environmental permits and is subject to strict restrictions for suspended solids. Embankment and disposal works are

controlled by an inflatable silt screen which allows regular harbour traffic.

### Dredging & Capping

Envisan performs the dredging by means of the backhoe dredge pontoon DN18. The excavator on the backhoe is equipped with a specially designed environmental bucket, minimising suspended solids in the surrounding water during underwater operations. Dredged sediments are transported to the disposal areas with elevator barges and carefully placed on the seabed.

In order to fill the geobags, Envisan designed a double hopper installation, which produces 1m<sup>3</sup> geobags in a safe and productive way. Once filled, the geobags are sealed using portable sewing machines. Finally, the geobags are installed underwater in the core of the embankment





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The port basin remediation project 'Renere havn' is one of the largest harbour clean-up projects in Norwegian history.

using a long-boom excavator with a clamshell bucket welded with a rounded edge, protecting the geobags. Capping works are performed with two types of equipment depending on the grain size of the capping material to be laid out. A 300m<sup>3</sup> self-propelled hopper barge is used to spread the fine filter material in shallow areas which rainbows the material after it is mixed with sea water. The coarser erosion material is laid out with a 100m<sup>3</sup> split barge. Due to steep and uneven slopes in certain capping areas, only a thin capping layer of

10cm is allowed. Needless to say this is a challenging task given the boundary conditions.

The project kicked off in the spring of 2015 and follows tight time limits because of fish migration season as well as commercial and leisure ship movements. Despite the significant challenges the Renere havn project brings, Envisan plans to complete the project before the contractual due date of April 2016.

i. [www.jandenul.com](http://www.jandenul.com)

## Safety First

Before the main dredging was able to commence, disposal and capping needed to be done. Envisan was asked to perform a UXO (unexploded ordnance) survey. This was done in an area in front of an old U-boat bunker which was heavily bombed during the Second World War. Side scan sonar and magnetometer surveys confirmed that no harmful explosives were present – thus all works were given the green light to proceed.