

# PROJECT SHEET

**PORT OF WALVIS BAY, NAMIBIA**  
DREDGING AN ENTRANCE CHANNEL IN AN ECOLOGICALLY HIGHLY SENSITIVE AREA

## INTRODUCTION

The port of Walvis Bay is a naturally sheltered deepwater harbor on the west coast of Africa. The port is part of a transit route linking Southern Africa, Europe and the Americas and it is Namibia's largest commercial port, handling around 5 million tons of cargo each year. The container terminal can accommodate a throughput of about 250,000 containers per year.

## WORK METHOD

The contract for the dredging works was awarded to Boskalis International in mid-2010. The works included capital dredging in the entrance channel, allowing larger vessels to enter the port. Deepening of the channel was required to a design depth varying from 14.0 -CD to 14.4m -CD. All the dredged material had to be taken to a designated offshore spoil site located at a sailing distance of approximately 13km.

The material dredged in the outer channel was very soft and can be typically described as ooze, or pelagic sediment composed of planktonic debris. In other areas very compact sandy material was found, especially in deeper parts of the profile. The ooze material contained large amounts of H<sub>2</sub>S and methane, and this was the major challenge on the project. A total of 1.8 million m<sup>3</sup> of material was dredged during the four-month execution period. All the dredging works were executed with a Trailing Suction Hopper Dredger. The first TSHD deployed on site was the Argonaut, which was followed by the Cornelis Zanen halfway through the project. These vessels were perfectly adapted for dredging in the given conditions, especially in the relatively narrow main channel.

## FEATURES

Client	Namibian Ports Authority
Location	Namibia
Period	November 2010 - May 2011
Contractor	Boskalis International B.V.



A local plough barge with a 6.5t plough and a 10t bollard pull tug were hired through to the end of the project for the purposes of handing over the site in accordance with the contract specifications.

- A** To ensure problem-free dredging, the TSHD Argonaut was modified by installing equipment including a degassing system and accommodation filter units
- B** TSHD Cornelis Zanen joined halfway through the project



**PORT OF WALVIS BAY, NAMIBIA**

DREDGING AN ENTRANCE CHANNEL IN AN ECOLOGICALLY HIGHLY SENSITIVE AREA

**ENVIRONMENTAL CONDITIONS**

The Walvis Bay area is an ecologically highly sensitive area located alongside a protected lagoon (the "Ramsar site"). During the dredging, the most important factor was the risk of contaminated suspended solids spreading towards the inlet of the lagoon. The north-west of the bay, where major oyster farms are located, was another sensitive area. Several control measures were taken, such as restricted overflow, to minimize the environmental impact of the dredging on the sensitive areas. The environmental monitoring was executed by Geo Pollution Technologies, a subcontractor based in Windhoek. The entire project was completed without any incidents with suspended solids caused by the dredging.



**C** TSHD Cornelis Zanen dredging near the quay wall on the site

**HYDROGEN SULFIDE**

Throughout the dredging area, H<sub>2</sub>S was present, sometimes in extremely unpredictable high concentrations. Both vessels therefore required modifications to dredge without problems, and they were fitted out with a degassing system and accommodation filter units. A measurement system was installed to monitor the flow of gas on board. In the most extreme situation, high gas concentrations of more than 7500ppm were measured. However, the extensive preparations showed that H<sub>2</sub>S gas can be controlled satisfactorily. With the precautionary measures in place, it was possible to keep the level to 0ppm in the accommodation at all times and there were no major technical delays due to the gas during the dredging.

NO	ID	LOCATION	READING	SENSOR	OK
1	50CF	hopper	180.5	H <sub>2</sub> S	<input checked="" type="checkbox"/>
2	508D	booster	0.0	H <sub>2</sub> S	<input checked="" type="checkbox"/>
3	505B	draghead	12.3	H <sub>2</sub> S	<input checked="" type="checkbox"/>
4	5119	inlet ac	0.0	H <sub>2</sub> S	<input checked="" type="checkbox"/>
5	50CB	inl er	0.0	H <sub>2</sub> S	<input checked="" type="checkbox"/>
6	509E	er	0.0	H <sub>2</sub> S	<input checked="" type="checkbox"/>

12-29 06:42

1 ALM-50CF | FAULTS: 1 | ALARMS: 0

← RESET → CHECK

**D/E** H<sub>2</sub>S readings

NO	ID	LOCATION	READING	SENSOR	OK
1	50CB	inl er	3.2	H <sub>2</sub> S	<input checked="" type="checkbox"/>
2	508D	booster	0.0	H <sub>2</sub> S	<input checked="" type="checkbox"/>
3	505B	draghead	17.2	H <sub>2</sub> S	<input checked="" type="checkbox"/>
4	5119	inlet ac	0.0	H <sub>2</sub> S	<input checked="" type="checkbox"/>
5	50CF	hopper	24.2	H <sub>2</sub> S	<input checked="" type="checkbox"/>
6	509E	er	0.0	H <sub>2</sub> S	<input checked="" type="checkbox"/>

12-29 06:43

1 ALM-50CF | FAULTS: 1 | ALARMS: 1

← RESET → CHECK