

PROJECT SHEET

CENTREPOINT OF INDONESIA
 DESIGN, ENGINEERING AND CONSTRUCTION
 OF CENTREPOINT OF INDONESIA

BOSKALIS

Royal Boskalis Westminster is a leading global services provider operating in the dredging, maritime infrastructure and maritime services sectors. The company provides creative and innovative all-round solutions to infrastructural challenges in the maritime, coastal and delta regions of the world. With core activities such as coastal defense, riverbank protection and land reclamation Boskalis is able to provide adaptive and mitigating solutions to combat the effects of climate change, such as extreme weather conditions and rising sea levels, as well as delivering solutions for the increasing need for space in coastal and delta regions across the world. With a versatile fleet of more than 700 vessels and floating equipment and 10,000 employees, including associates, Boskalis is creating new horizons around the world.

PROJECT DESCRIPTION

The Centrepoint of Indonesia is being developed by KSO Ciputra Yasmin in Makassar, South Sulawesi. The project involves land reclamation of an area of approximately 150 hectares for residential and commercial purposes.

The design and construct contract was awarded to Boskalis in 2016 and after an engineering phase, construction commenced in 2017. The project was completed by the end of 2018. Boskalis' scope of work included design and engineering of five islands, sea defense structures, including geotechnical slope stability analyses, rock revetments and channels between the islands. During the construction phase, Boskalis was responsible for dredging and reclamation of some 10 million cubic meters of sea sand, supply and installation of close to 200,000 tonnes of rock and all associated quality assurance and control activities. Geotechnical and environmental monitoring works were part of the scope as well.

In addition, Cofra, a Boskalis company, undertook supply and installation of prefabricated vertical drains and various forms of compaction.

IN-HOUSE ENGINEERING

Since the contract was awarded on a design and construct basis, the preliminary design prepared by the client had to be converted into a final design. Hydronic, the engineering department of the Boskalis Group, provided project support, including preparation of the construction design.

FEATURES

Client	KSO Ciputra Yasmin
Location	Makassar, South Sulawesi, Indonesia
Period	2017 - 2018
Contractor	PT. Boskalis International Indonesia



DREDGING AND RECLAMATION WORKS

The dredging and reclamation campaign started in August 2017 and was completed in December 2017. Boskalis deployed the trailing suction hopper dredgers Fairway and Gateway to undertake the dredging and transportation of some 10 million cubic meters of sand from the marine borrow areas to the project site. The sand discharged by the TSHD's was pumped via floating and land based pipelines to the reclamation area.

The reclamation was constructed under challenging soft soil conditions, requiring the sand fill to be built up in stages. A purpose-built spreader pontoon was deployed to undertake this task. Where sufficient water depth was available the spreader pontoon was used to spray the sand in horizontal layers of predefined thickness. At areas too shallow for the spreader pontoon to operate, the TSHD's discharged through shore pipelines. Land based equipment was used to distribute and level the sand.

As soon as sufficient height above the water level was established, prefabricated vertical drains were installed, followed by the TSHD's continuing to discharge sand until the required levels were reached. The final level was achieved by re-handling sand from the slopes and future channels.





ROCK REVETMENT WORKS

For the construction of the rock revetments close to 200,000 tonnes of graded rock and 250,000 m² of geotextile were used. The rock was procured from local quarries and transported by trucks over distances of up to 55 kilometers.

For the installation of the revetment in the channels a special long reach excavator was used, capable of reaching the profiles from both sides.

After rock placement, surveys were carried out to ensure that the revetment was placed within the required specifications and tolerances.

SOIL IMPROVEMENT

Soil improvement works were carried out by Boskalis' subsidiary Cofra.

To expedite the settlement of the soft sub-soil, a total of 7,000,000 m¹ of prefabricated vertical drains were supplied and installed up to depths of 25 meters below the surface.

In an area prone to earthquakes, liquefaction of the reclaimed land poses a threat to the stability of buildings and infrastructure. For this reason, 425,000 m² of reclamation area had to be compacted using a combination of Cofra Vibro Compaction for the deepest layers, Cofra Dynamic Compaction for the intermediate layer and Cofra Roller Compaction for the top layer. This project was the first project in Indonesia to use dynamic compaction.

ENVIRONMENTAL MONITORING

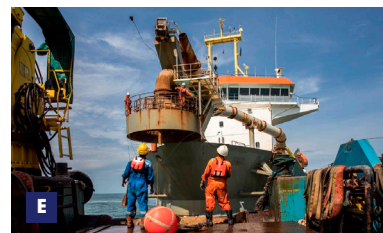
Through a project specific Environmental Management and Monitoring Program, Boskalis was able to control and mitigate the environmental risks. This program included understanding and controlling the transportation and deposition of fine sediments and water quality parameters.



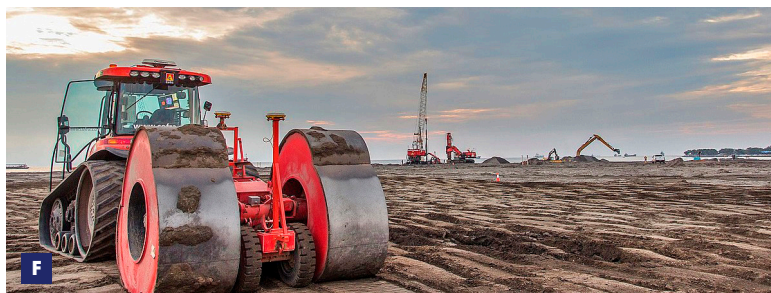
Great effort was made to prevent and anticipate on potential exceedance of environmental limits. Predefined triggers were put in place in order to respond before any impact occurred. Lessons learned during one stage of the project were used to test environmental compliance of subsequent dredging and reclamation scenarios and to adjust these scenarios where required. This also included management of interfaces with third party operations.

NO INJURIES, NO ACCIDENTS

The complexities of working in a dynamic environment with various nationalities, differing cultures and the strong influence of local stakeholders provided significant initial challenges to create the desired safety culture on the project.



With commitment to its NINA (No injuries, no accidents) safety program, Boskalis successfully achieved over one million manhours without a single lost time injury. As a testament to our safety culture, Boskalis proudly received Ciputra's Award of Excellence during the project's grand launching event.



- C** Geo textile installation for rock revetment
- D** Aerial view of Centrepoint of Indonesia
- E** Connecting floating pipeline to Gateway
- F** Cofra Roller, Vibro and Dynamic Compaction in one picture