

"SIMON STEVIN"

The world's largest FALL PIPE & ROCK DUMPING Vessel



LA NAVAL Shipyard

CONSTRUCCIONES NAVALES DEL NORTE

**24,350kw Diesel-Electric
Propulsion**

**19,500m³ Capacity
of Rock Storage**

**Dynamic Positioning
System DP-2**





The world's largest fall pipe & rock dumping vessel built by La Naval Shipyard

La Naval Shipyard - Construcciones Navales Del Norte delivered in February 2010 the world's largest fall pipe & rock dumping vessel "Simon Stevin" to the Belgian shipowner Jan De Nul. In addition, La Naval Shipyard is currently involved in the construction of a second ship, the B340 similar to the Simon Stevin but with important changes that improves its final performance.

This type of vessel, known as a fall pipe & rock dumping ship, is designed to cover channels, cable systems and gas pipelines at a maximum depth of 2,000 metres. Subsequent to delivery, the ship was sent to Australia for its first two projects. The first is to cover a stretch of underwater piping belonging to the Pluto gas pipeline at a depth of 80 metres. The second project is the construction of another gas pipeline in the region. En route to Australia, the Simon Stevin will make a stopover so that its two hoppers can be fully loaded with stones and rocks.

With a load capacity of 33,500 tonnes, the Simon Stevin has the largest tonnage of any fall pipe & rock dumping vessel in the world. This makes it 25% larger than the Nordness, its nearest competitor with a capacity of 25,960 tonnes.

Following the delivery of this fall pipe & rock dumping vessel, La Naval shipyard delivered in June of 2010 the dredger Leiv Eiriksson, twin ship of the Cristóbal Colón and in February 2011 the B335 Charles Darwin, the third of the dredgers ordered by Jan De Nul. The B335 has a hopper capacity of 30,500 m³ and operates in shallow waters. The ship has an overall length of 183.20 metres, a beam of 40 metres and a draft of 11 metres.

The delivery of the fall pipe & rock dumping vessel Simon Stevin in optimal operating conditions, subsequent to rigorous testing at sea and testing of the fall pipe system, confirmed the capacity of La Naval Shipyard to build complex ships of high added value featuring the latest technology. The building of the Simon Stevin, with a load capacity of 33,500 tonnes, along with the Willem De Vlamingh, which has a unloading capacity of up to 6,000 tonnes of stones, and the conversion of the 4,600-tonne La Boudeuse into a fall pipe vessel, strengthens Jan De Nul's position for entry into the market niche for deep-sea work with rocks.

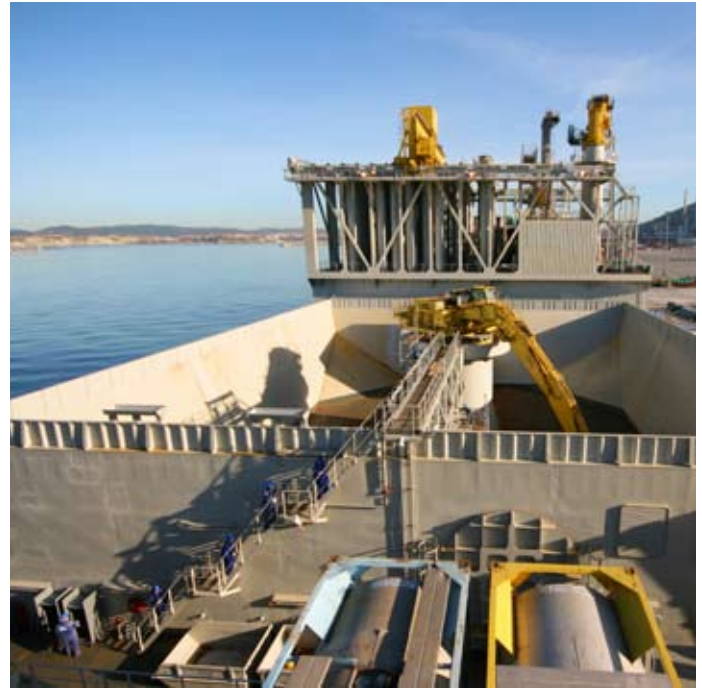


General Information

The Simon Stevin is designed and equipped for the following main functions:

- Capacity for the loading and transportation of rocks and stones in two hoppers arranged on the deck
- Capacity for the discharge of rocks and stones by means of two excavating cranes and two conveyer belts. These are subsequently unloaded through a fall pipe system which is deployed through a moonpool of 10 x 10 m² located at the midships
- Capacity to maintain a constant angle of heel during loading and discharge by means of an automatic ballast system. This system comprises two tanks on each side of the vessel which are filled and emptied by means of two electrically driven pumps
- At the midships, just between the two hoppers, a single module system is installed for the mounting, deployment, support, retrieval and dismantling of the fall pipe and the riser pipe.

The concept design and basic design of this vessel, along with the design of the fall pipe system and associated handling, was carried out by the Dutch engineering company Vuyk Engineering Rotterdam BV.



Fall Pipe System

The vessel is fitted with an innovative module for the fall pipe system. This 2,000-tonne module is of a magnitude comparable to that of an eight-storey residential building with 70 apartments per storey. The fall pipe system is installed within this module or structure, located at the midships of the vessel. The system comprises segments of piping of 12 metres in length, with segment weight ranging from 6 to 12 tonnes.



Mounting Process

A gantry crane is installed for the handling and mounting of the entire fall pipe system. This crane has the capacity to handle up to 180 segments of piping and subsequently position it on the operational platform of the system. The gantry crane takes approximately 140 seconds to transport each section of piping from its respective storage rack to the operational platform. A total of six hours is required to deploy the entire pipe system to achieve the maximum depth of 2,000 metres.



Assembly Process

Two traction winch systems designed are installed on the Simon Stevin for the vertical assembly of the discharge pipe system, with the following features:

- Traction winch of 6,400 x 4,200 x 3,000 mm and a weight of 90 t
- Storage winch of 6,800 x 4,750 x 5,020 mm and a weight of 130 t (including cable)
- Hydraulic pre-tensioning system
- Electrical operation system with a power rating of 1,440 kW.

Functioning

As mentioned at the beginning of this report, the Simon Stevin is designed to carry out the discharge and deposit of rocks and stones on the seabed to cover channels, cable systems and gas pipelines at a maximum depth of 2,000 metres. The system can handle rocks with a diameter of up to 400 mm. This very special type of vessel functions in the following manner. The rocks are carried in two on-deck hoppers with a load capacity of 33,500 tonnes. Two identical hydraulic excavators are installed on a pedestal within the two hoppers. Each excavator has the capacity to discharge a maximum of 1,000 tonnes of rock per hour into a feeder compartment

located on each of the hoppers. Two conveyer belts go from each of these feeder compartments to carry the rocks to another feeder compartment located in the fall pipe system. These conveyer belts can also discharge over the sides of the vessel. The discharge rate of rocks onto the seabed is 2,000 tonnes per hour. The discharge piping has a diameter of 1,000 mm. An ultra-compact ROV (Remote Operated Vehicle) is installed at the final stage of the fall pipe system in order to correct the position of the entire set of piping so that the deposit of rocks is carried out with the highest possible precision. This ROV is an ATOM model with a power output of 600 kW.



Other Deck Equipment

Two pedestal-mounted slewing cranes, one located at the midships and the other aft. These cranes carry out diverse functions (deployment and retrieval of a second ROV of 100 kW for investigation and other purposes, and the handling of cargo on deck). Both cranes have a hoisting capacity of 35 tonnes at a reach of 24 metres. A crane used for storage purposes is located forward at the midships of the vessel and is used for supply and service through hatches that lead directly to the ship's engine rooms. This crane can hoist 2.5 tonnes at a reach of 12 metres.

The ship is supplied with a set of anchor handling fairleads and the associated guide rollers to direct the cable of 76 mm in diameter to the winches. Another equipment, is a platform for the takeoff and landing of helicopters. This platform is located forward above the castle deck.



Propulsion and Auxiliaries

The fall pipe & rock dumping vessel Simon Stevin is equipped with an advanced diesel-electric propulsion system. This system is a substantial improvement on diesel propulsion, particularly in terms of reduced pollution and enhanced manoeuvrability. The main electrical generation plant for the propulsion system and the auxiliary hull and engine plants are made up of five main generator sets comprising the following equipment:

- Five MAN Diesel, model 32/40, nine-cylinder engines. Each of these engines has a power rating of 4,500 kW (480 kW per cylinder) and a nominal speed of 750 rpm
- Five main generators, each with a power rating of 5,625 kVA.
- 6.6-kV main switchboard.
- Two 2,000 kVA transformers for power distribution.
- Four 4,100 kVA transformers for the ship's rudder propellers.
- Four INGEDRIVE MV frequency converters for the ship's rudder propellers, each with a power rating of 3,350 kW.
- Four INDAR asynchronous electric motors for the ship's rudder propellers, each with a power rating of 3,350 kW.
- Four 2,500 kVA transformers for the ship's thrusters.
- Four INGEDRIVE MV frequency converters for the ship's thrusters, each with a power output of 2,000 kW.
- Four INDAR asynchronous electric motors for the ship's thrusters, each with a power output of 2,000 kW.

The Simon Stevin propulsion plant is made up of two main azimuth propellers. These are fixed-pitch, model SRP 3030 FP propellers. Each has a power output of 3,350 kW. Other equipment is two retractable azimuth thrusters to facilitate the manoeuvrability of the Simon Stevin. These fixedpitch bow thrusters each have a diameter of 2,500 mm and a power output of 2,000 kW. The vessel is also supplied of two thrusters with dismountable tunnels. These fixed-pitch thrusters each have a diameter of 3,000 mm and a power output of 2,000 kW. In addition, the Simon Stevin is equipped with an emergency genset, with a power output of 345 kW at 1,800 rpm. This in turn drives a Leroy Somer 450-kVA, 60 Hz alternator. And finally, an auxiliary genset, with a power output of 1,539 kWe at 1.800 rpm.

Dynamic Positioning

The Simon Stevin is fitted with a class II Dynamic Positioning (DP) system (Dynapos AM/AT R compliant), which includes the following elements:

- Two control stations on the navigation console
- Control station on the Fall Pipe system console
- Control station on each lateral bridge console
- Two VRS sensors
- Two UPS.

Electronic and Navigation Equipment

The navigation and communication system includes the following equipment and systems:

- Magnetic Compass
- Three Gyrocompasses
- Rudder Angle Indicator System
- Two Depthfinders
- Doppler Speed Log
- Two Radars
- Two Satellite Navigation Systems (DGPS)
- Automatic Identification System (AIS)
- Ship Security Alert System
- Electronic Chart Display and Information System (ECDIS)
- Voyage Data Recorder System black box (VDR)
- Two Wind Sensors
- Telecommunications System (GMDSS).

Accommodation

The Simon Stevin boasts accommodation facilities to house a maximum of 70 people in the most comfortable conditions. The accommodation zone is located on the ship's Superstructure at the bow and above the Main Deck. Such accommodation is distributed along seven decks, five of them (Castle Deck and B, C and D Decks) are devoted to the crew in individual cabins, the most, and double cabins. The Main Deck is the special deck of the vessel. In this deck we can find a large dining room of 97 square meters and a spectacular bar equipped with a retroillumination system through a centralised DMX at a side of the circular bar.

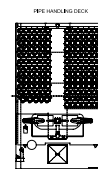
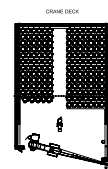
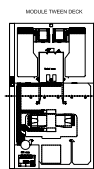
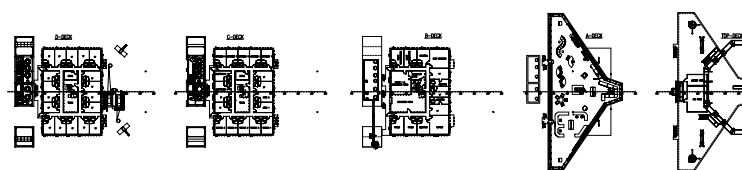
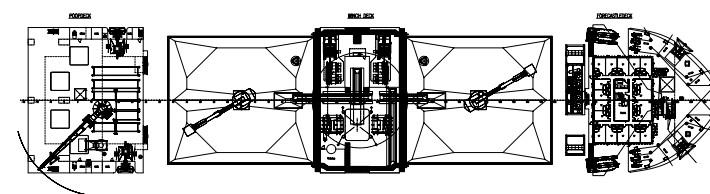
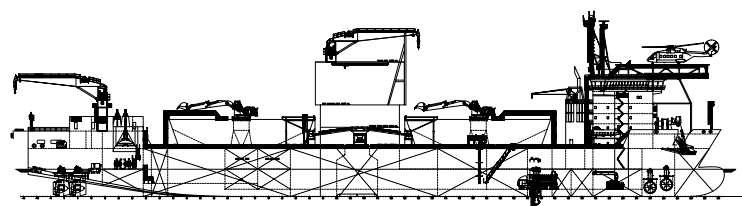
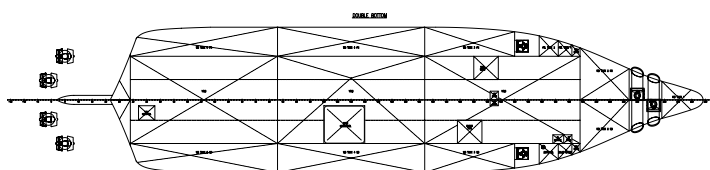
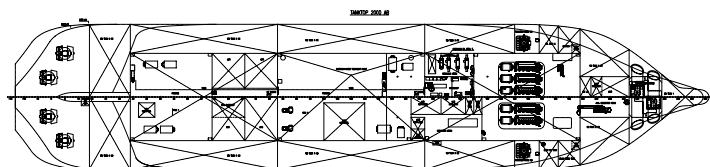
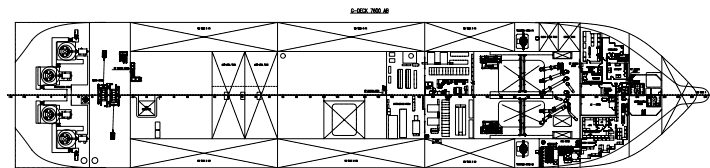
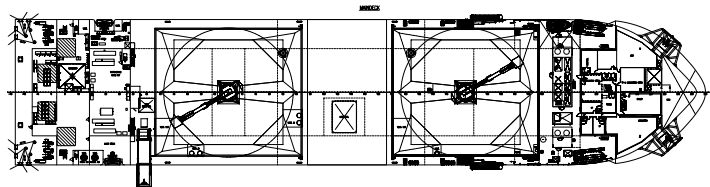


MAIN PARTICULARS

Length Overall	191.50 m
Length b.p.	175.00 m
Breadth moulded	40.00 m
Depth moulded	13.20 m
Draught loaded	8.50 m
Design Draught	7.50 m
Dead Weight	37,500 t
Rock Storage Capacity	19,500 m ³
Maximum Dumping Depth	2,000 m
Maximum Dumping Capacity	2,000 t/h
Fall Pipe Diameter	1,000 mm ø
Rock Size	400 mm ø
Propulsion Power	24,350 kW
Speed	15.5 knots
Crew	70 persons
Bureau Veritas	HULL, MACH, SPECIAL SERVICE FALL PIPE VESSEL/ EXCAVATOR SUPPORT VESSEL UNRESTRICTED NAVIGATION AUT-UMS, CLEANSHIP 7+ DYNAPOS – AM/AT – R CLASS 2

CAPACITIES

H.O.	2,500 m ³
D.O.	400 m ³
FW	400 m ³
Ballast	26,000 m ³
Anti-roll Tanks	2 x 1,180 m ³



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