



Propulsion solutions for multipurpose offshore vessels

'NDURANCE' AND 'NDEAVOR': DIESEL-ELECTRIC PROPULSION FOR NEW BOSKALIS N-CLASS VESSELS

Who Royal Boskalis Westminster N.V.
What 12 and 16-cylinder diesel gensets based on MTU Series 4000 for ship propulsion and on-board power
Where Papendrecht, the Netherlands

Royal Boskalis Westminster is a world-leading expert in the field of dredging and maritime services. The company owns a versatile, modern fleet that consists of over 1,000 vessels and equipment. Two of its latest additions are the multipurpose vessels (MPVs) 'Ndurance' and 'Ndeavor' which are powered by generator sets from Rolls-Royce. Whether these ships are tasked as dredgers, cable-layers or floating accommodation vessels, their Series 4000 gensets ensure reliable propulsion whatever challenging offshore environments they encounter.



A Rolls-Royce
solution

Papendrecht, the Netherlands – One of the cornerstones on which Royal Boskalis Westminster N.V. bases its success is continuous investment in its existing fleet. In order to acquire attractive projects, the company operates the best and most efficient vessels available. And the offshore market is playing an increasingly significant role in its activities. That is why Boskalis has incorporated two MPVs in its fleet alongside special-purpose ships such as trailing suction hopper dredgers, cutter suction dredgers, anchor handling tugs, floating sheerlegs, semi-submersible heavy marine transport vessels and hopper barges. In 2010, planning began for a new N-Class cable-layer. The aim of the project was to create a diesel-electric workboat with a wide operations base. The vessel was to be equally capable of laying cables or rocks on the seabed and was also to perform support functions for divers and for rescue and recovery work in offshore construction scenarios. Three years later, the two new N-Class vessels 'Ndurance' and its sister ship 'Ndeavor' went into service.

To cover as wide a spectrum as possible, the ships needed powerful engines with a long service life. Boskalis began to consider Rolls-Royce solutions as an option at an early stage. "We knew that Rolls-Royce's clean engines were ahead of other products when it came to emissions reduction," said Bram De Feyter, Manager New Building at Boskalis. The decisive moment came during a visit by the Dutch team to the engine facility in Friedrichshafen at the beginning of 2011. "Most of all, we were impressed by the high quality – both of the finished engines and of the production process itself."

"Reliability is the be-all and end-all"

For propulsion on its N-Class vessels, Boskalis chose gensets based on high-speed diesel engines from Rolls-Royce's MTU Series 4000 'Ironmen' for workboats. These units are specifically geared towards commercial marine applications such as offshore supply vessels for wind farms or oil and gas platforms and they follow a standardized, well-proven design – important aspects when it comes to minimizing the operators' risk of personal injury and property damage as well as preventing downtimes and standstill costs. Combined with preventive maintenance performed according to schedule, equipment downtimes can be kept to a minimum.

Traditionally, Series 4000 engines operate in scenarios demanding propulsion solutions with particularly long service life, high availability and low operating costs. With maintenance intervals up to 33,000 hours, Series 4000 engines are among the most robust on the market. And that is a decisive factor because for De Feyter, "Reliability is the be-all and end-all."



Propulsion for *Ndeavor* and *Ndurance*. Each of the two multipurpose vessels is powered by four MTU 'Ironmen' gensets. Pictured: MTU 'Ironmen' Genset Type 12V 4000 33S. (Picture: Rolls-Royce)

1 *Ndeavor*

The newest multipurpose N-Class vessel in the Boskalis fleet, went into service in the beginning of 2014. The ship is powered by two 12-cylinder and two 16-cylinder MTU diesel gensets. (Picture: Boskalis)

2 *Ndurance*

During her first assignment as a cable-layer between the islands of Java and Bali, 'Ndurance' carried a 5,000-ton cable drum. The 1,500 kilowatts needed to move the 26-meter-diameter drum were supplied by MTU gensets. (Picture: Boskalis)



The availability of a worldwide service network was also vital in the selection of MTU gensets for the task. “The vessels in our fleet are in service right around the world and we need to know that if the worst comes to the worst, we can rely on getting support as fast as possible – no matter where the ship in question is located,” said De Feyter, explaining the decision. The costs arising from an unscheduled break in operations can rocket into thousands of Euros in no time. “Rolls-Royce’s response is immediate and professional. We have every confidence.”

Optimum dynamic positioning

At the beginning of 2013, Rolls-Royce supplied a total of eight gensets to the Chinese plant manufacturer that built the two N-Class vessels. Each of the gensets consisted of a 12 or 16-cylinder engine, a generator resiliently mounted on the same base raft and an electronic control system. The ‘Ndeavor’ and the ‘Ndurance’ were each fitted with four gensets: two Ironmen Type 12V 4000 M33S units and two Ironmen Type 16V 4000 M33S engines which are capable of delivering 7,000 kilowatts (kW) of electric power in simultaneous operation – enough to power the total of four bow and stern thrusters. In conjunction with the computer-controlled Class 2 positioning system (dynamic positioning, DP 2), these deliver the thrust needed to ensure that the vessels stays on course even in heavy seas. To prepare them for DP Class 3, ‘Ndeavor’ and ‘Ndurance’ already have two separate engine rooms where the gensets are located. If the gensets in one of the engine rooms are damaged by fire or flooding, there is still enough power available to hold the vessel in position – a crucial factor for N-Class ships which have to operate continuously at a constant speed and with extreme precision.

Enough power whatever the job

The MTU gensets power the propellers as well as the vessels’ deck-mounted equipment. Just moving the giant 26-meter-diameter sea-cable drum onboard the ‘Ndurance’ alone takes 1,500 kW. For their first assignments, ‘Ndurance’ and ‘Ndeavor’ have been fitted with different modules and units to perform specific tasks. ‘Ndeavor’ has been equipped with modules for dredging and rock installation for an offshore transport and installation project in the Philippines and Ndurance is being deployed as a cable-laying vessel. At the end of a project, this equipment can be stored and replaced with other special-purpose units suitable for subsequent assignments. The vessels’ decks are constructed to a common basic design and can be variably configured depending on the job in hand. The gensets themselves are designed to ensure there is always enough electric power available on board – whether the task involves laying cables, installing gas-compression platforms, securing FPSO vessels or other offshore assignments.

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Bram De Feyter
Manager New Building at Boskalis

Multipurpose vessel *Ndurance*.

