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MARITIME

SAFEARC

Safe Arctic Marine Operation

The maritime industry is moving north. This represents new challenges for both manufacturers and regulatory bodies. As new technology and new uses of current technology enter the market, DNV GL is adapting class rules and advisory services to meet new market demands.

Background

SafeArc was established as an research and development, joint industry project (JIP) between Rolls Royce Marine Propulsion and DNV GL, with significant funding from the Norwegian Research Council. The project objectives were first to learn and investigate operations aspects, demands and challenges of ice-going ships, and second to study the forces of ice on podded propulsion through full-scale measurements. The main purpose of these measurements was to calibrate the DNV GL class rules and assess the IMO Polar Code requirements for ship hull and machinery design, as well as to investigate efficient operational patterns and efficient propulsion system design.

DNV GL contribution

The measurement program was initiated following the delivery of the South African research and supply vessel S.A. Agulhas II. The objectives were to study hull, propulsion machinery, noise, ice properties and ship maneuvering during operation in Ant-

arctica. The permanently installed monitoring system has been logging data for the last two operational seasons in Antarctica.

The project had a duration of three years, lasting from 2011 to 2014. It involved a variety of partners and gathered operational data from vessels operating in ice-covered waters in the Arctic, the Antarctic and the Baltic.



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Project results

During the winter of 2013, SafeArc instrumented the Swedish icebreaker KBV Triton. Parameters such as torque, rpm, structural strength, ice conditions and consumption were recorded in addition to other operational parameters. The data were analyzed to determine peak load distributions on the propulsion system. Energy efficient operation and ice-management strategies were also assessed.

During the winter of 2014, SafeArc instrumented the cargo vessel Pajuttaat, owned by Royal Arctic Line. The vessel operates in the northern part of West Greenland, which represents an extremely harsh environment. Essential propulsion parameters were logged and assessed, as well as the vessel's operational pattern.

The project has also focused on the environmental footprint generated by a vessel during operation in ice. Underwater noise measurements were taken during ice trials in the Gulf of Bothnia. During the field trip to Greenland, a semi-automatic underwater noise listening station was established together with the Greenland Institute of Natural Resources. The station is situated in the vicinity of Qeqertarsuaq in Disko Bay. From an underwater noise perspective, the area is especially interesting because marine traffic in the area is expected to increase and at

the same time it is one of the key breeding grounds for whales and other marine mammals.

The project has earned significant public attention from the media. The findings have been summarized in technical reports, in addition to being presented at major industry conferences.

More complex operations in polar waters will require new technology and methods. Current ice class rules and associated knowledge requires continuous attention and improvement to meet these needs. With SafeArc and other research projects, DNV GL helps industry bring cutting-edge technology to the market.

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