

NOW POSSIBLE TO MONITOR THRUSTERS ON PASSENGER SHIPS

The ferry company Scandlines, the azimuth thruster manufacturer Rolls Royce and Roving Dynamics have together found a long sought after solution for online condition monitoring of thrusters.

"Our main objective is to discover developing thruster problems at an early stage to reduce maintenance costs," says Chief Superintendent Lars Jordt from Scandlines, who operates 24 ferries between Denmark, Germany, Sweden and the Baltic countries. "Fault predictions from the OPENpredictor™ system will help us plan maintenance in due time for the least inconvenient period. We want to eliminate the risk of having to take a ferry out of operation for unscheduled repair during rush periods like the start and end of the holiday season. With online monitoring we also hope to extend the thrusters' lifetime and the inspection intervals, set by the classification societies, from every five years to condition based maintenance".

Thrusters - manoeuvrability & maintenance

Over the last 20 years thrusters have become a preferred



propulsion system for passenger ferries and cruise liners, offering superior vessel manoeuvrability and acceleration capabilities compared to conventional propeller systems. However, maintenance costs are considerably higher, mainly due to high costs of mounting and demounting the thrusters for repair. And although a ferry can continue sailing if one of its four thrusters fails, Scandlines has occasionally had problems with damaged or worn out thruster bearings, which has docked some of their 8 thruster driven ferries for 2-5 days for unscheduled repair.

"For the last 6-8 years we have tried various monitoring solutions in order to detect bearing wear before it causes damage to the very expensive gearing wheels," Lars Jordt explains. "But these off-line methods, which include vibration monitoring on the outside of the thrusters, did not give us

sufficient and precise enough measurements. They warned out not to be real at closer inspection, and failed to identify the actual problems."

Off-line vs. online monitoring

Unlike the off-line methods, where measurements had to be sent to an external company for expert analysis, OPENpredictor™ provides precise online measurements, which take the vessel's operational condition into account, and automatic fault diagnosis (AutoDiagnosis™). If faults are developing, the crew onboard Scandlines' ferries will immediately get an early warning message with precise identification of the fault and prediction of lead time to inspection.

However, online monitoring of thrusters, rotating 360° around their axis numerous times, poses two major challenges, namely finding ways to

- supply power for vibration sensors mounted inside the thruster
- transfer sensor signals from the rotating thruster

OPENpredictor™ is to be installed on M/F Prinsesse Benedikte, operating between Roedby, Denmark, and Puttgarten in Germany

Rolls Royce azimuth thrusters mounted on a Scandlines ferry

part, operating submerged into gear oil, to the vessel, without having to constantly untangle the sensor cables.

Thanks to a close cooperation between Scandlines, Rolls Royce and Roving Dynamics a solution where signals are transmitted through cables using so called slip rings has now been found. The first online thruster monitoring system will be installed at the Roedby-Puttgarden ferry M/F Prinsesse Benedikte, when she goes to dry dock in March 2007 for her regular biannual overhaul. Depending on the result of this first pilot project, Scandlines intends to install the system on other ferries.



"We are pleased that we now finally seem to have found an online monitoring solution", says Lars Jordt from Scandlines. "We hope that it will help increase the reliability of our ferry operations, and bring maintenance costs of the advantageous thruster technology down to a level comparable to that of conventional propeller systems."