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Marine industry

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Overseas Shipping Group (OSG)

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Proactive Reliability Maintenance

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SKF Microlog Analyzer CMXA 51-IS

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## Condition monitoring solution saves shipping company time and money

When the Overseas Shipping Group (OSG) introduced its new generation of liquefied natural gas (LNG) carriers, a condition monitoring system was a key requirement for ensuring the smooth operation of these innovative vessels.

OSG is a diversified energy transportation group with a fleet of more than 100 International Flag and US Flag vessels. The core operating fleet comprises crude oil tankers, medium and long-range product carriers, articulated tug barges and LNG carriers.

With the job of transporting LNG around the world, the new carriers have to maintain the highest levels of operational performance, combined with meeting stringent safety standards. The four gas carrying giants that form the company's LNG fleet each have a carrying capacity of up to 216 000 cbm and use on-board re-liquefaction to reduce gas losses. At the time of construction these ships were the largest and most sophisticated LNG carriers afloat.

Mike O'Rourke, the LNG fleet manager at OSG, explains that all of the ship's equipment

– main engines, propellers and steering systems – are duplicated to ensure failsafe operation. To give an idea of the amount of rotating machinery on board, each vessel is propelled by two slow speed diesel engines: plus, each ship is equipped with an on-board re-liquefaction system to handle the boil-off gas, liquefy it and return the LNG to the cargo tanks.

On long journeys with conventional LNG carriers there can be significant gas losses so each of the new vessels has complex computerized systems – coupled with a heavy duty, high voltage electrical system, comprising a number of generators – that are required to satisfy the power demand of the re-liquefaction plant. Minimising the loss of LNG has obvious economic (more gas delivered to the customer per journey) and environmental benefits.

Monitoring the key components in rotating machinery such as pumps, motors and compressors on each vessel helps OSG reduce the cost associated with unplanned maintenance. An additional important benefit of using condition monitoring

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equipment and systems is that it has helped OSG achieve class approval from DNV, the leading certification body. Mike O'Rourke explains, "This has given us exceptions to the need to carry out certain maintenance routines, thus saving both time and money. This avoids the need to periodically strip down machinery which possibly could take the LNG carrier out of service for a significant period and add to the cost of operation."

Early detection of a potential bearing failure can ensure that maintenance schedules are optimised; it can reduce the need for maintenance in general and cut associated costly maintenance work. O'Rourke continued, "Condition monitoring is a valuable prediction tool. By catching events early, we can replace a bearing at a cost of around £250 rather than spending between £2,500 and £15,000 on a new electric motor."

The condition monitoring system consists of three elements: sensors, portable data collectors and a software package for analysis and reporting. For each vessel in the OSG fleet, regular monitoring of 225 on-board machines is carried out, with a total of 3 020 readings being taken over all the units.

The scheduling of data collection from different equipment is decided together with the fleet manager by rating the equipment

in a criticality matrix: so, typically, 1-3 month periods are selected. For some highly critical equipment, data is collected on a weekly basis. The sensor readings are divided into several distinct types:

- Velocity (mm/sec) which detects problems such as unbalance and misalignment
- Acceleration (g) which detects problems such as gearbox and lubrication issues and,
- Enveloped acceleration (gE) SKF technology for detecting bearing condition and damage

To gather this data, engineers use a SKF Microlog Analyzer CMXA 51-IS, an intrinsically safe, rugged and portable hand-held instrument specifically developed and certified for use in hazardous environments. The instrument, accelerometers and cables are all IS certified for use in Zone 0, Zone 1 and Zone 2 areas.

The measurements are analysed to determine the trend related to the vibration levels, for example, and this information builds up a picture of how well the equipment is performing and provides an indication of possible future failure.

Early detection of potential problems gives more time to plan and organise maintenance: early degradation in components can be detected months before it becomes critical. In this way engineers can

keep an eye on when action is required and also optimise the operational life of a component. Regular reports from SKF, who have considerable experience in developing maritime condition-based maintenance programmes, keep OSG updated on machinery status so that remedial actions can be planned during regular maintenance interventions.

#### SKF Microlog Analyzer CMXA 51-IS



#### Customer benefits

- Intrinsically safe portable data collector/FFT analyzer
- ATEX and IECEx certified
- Rugged and portable hand-held instrument
- Collects of vibration, process, and dynamic data
- Integrates with SKF @ptitude Monitoring Suite software

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