

# TANKEROperator

MAY 2009

[www.tankeroperator.com](http://www.tankeroperator.com)



## Features:

- Don't take short cuts
- Don't forget your accounting
- Casualty numbers fall
- Tanker academy opens
- A lot of bilge talk
- ECDIS to become mandatory

# Cylinder liner protection vital

**Monitoring engine liner wear is becoming more critical due to slow steaming, the drive to lower fuel consumption decreases in fuel oil sulphur levels and cylinder oil formulation changes.**

Until recently, there was no feedback on real time engine liner wear. The only method of inspection was opening up a cylinder in port, or sending liquids back to a shore-based laboratory for analysis. In both cases, this is a costly and time consuming exercise, which could result in wear damage not being noticed for some time.

To help alleviate this problem, Kittiwake has introduced LinerSCAN to provide early warning against potential critical engine damage, while providing the information needed to save on lubeoil costs.

The system has been tested on various types of MAN and Wartsila 2-stroke engines, including those fitted to fast containerships and slow bulk carriers to test engines with different strokes. MAN has been testing the system with Kittiwake and a log was kept to analyse every function of the engine.

By using this real time method, the lubeoil feed rate can be changed if wear is detected. Before when a liner is inspected in port, long intervals build up between the inspection of the scavenge space openings, which renders the detection of scuffing difficult.

As well as being time consuming, this operation creates unnecessary wear when opening and closing a liner. ‘Never touch a running system’ is an old engineering saying that Kittiwake claimed was as true today as ever.

## Late reaction

Measuring the temperature of the liner wall can lead to a late reaction to an existing problem, which may also be difficult to see. Kittiwake said that this exercise was “not sensitive enough.”

The measuring of scraped down oil samples necessitates the sending of the samples to a laboratory where there is an inevitable time

delay in their analysis.

On board measuring systems include Kittiwake’s ANALEX Alert, Maersk Fluid’s SeaMate, FAMM’s DOTFAST and MSA from ExxonMobil. Kittiwake claimed that the other systems only offer a small window and do not display the whole picture.

By measuring the scrape down samples online with the ANALEX system several advantages are claimed, including –

- Fast accurate results in ppm can be gained.
- An easy to use system.
- Grease can be measured.
- Large internal data storage space available.
- No need for calibration.
- Low cost.

Kittiwake said that LinerSCAN’s real time monitoring capability gives an engineer the opportunity to safely optimise the cylinder oil feed rate, is claimed to be able to detect the first signs of scuffing, informed running-in



LinerScan has been tested on various MAN Diesel and Wärtsilä 2-stroke engines.

processes before any other system on the market, spot early damage caused by the ingress of CAT fines and identify unusual wear from abnormal conditions.

**Cost savings**

Another claim is that the system saves money in that there can be reduced oil consumption, reduced maintenance and the prevention of cylinder liner problems.

It is claimed to be user friendly with everything displayed on a colour-coded screen, which can be read at a glance. The software also allows the continual monitoring of critical cylinder information using a graphical user interface. For example, engine running hours real time sensor data can be shown as a graphic with a trend tool built in. Sensor settings can be remotely changed, such as the measurement interval. The software also allows input for major maintenance to avoid false alarms from bedding in processes and to log parameters, such as fuel sulphur level and scavenge space pressure.

DNV Petroleum Services (DNVPS) tested the effect of fuel oil quality from 2005 to 2008. It was found that the aluminium and silicon content had risen to 23.5 ppm on

average from 19 ppm. At the same time it was found that the level of sulphur had dropped, but the level of abrasives had increased – low sulphur = high iron content.

A fuel change condition was tested by DNVPS and an increase in iron readings was noted. The vessel’s engine ran for 200 hours and afterwards drip samples were taken to DNV’s laboratory for testing. All the liners on the 10-cylinder engine showed severe wear.

The No 4 cylinder proved to be the most damaged, probably caused by the piston rungs being bedded in, DNV said. Hard ceramic catalyst fines had been forced into the metal surface causing scuffing.

As for possible cost savings, Kittiwake gave an example of a VLCC fitted with a 6S90/MC type engine. The total amount of cylinder lubricants used during the vessel’s lifetime would cost around \$8 mill. This equates to about 1 tonne per day at just over \$2,000 per tonne, which adds up to almost \$500,000 per annum on cylinder oil alone.

Using sensors as part of a feed rate optimisation programme and being able to reduce fuel consumption by 10% would result in nearly \$50,000 being saved per year, which would roughly equate to the payback time on

the equipment. Saving a liner would mean a \$15,000 reduction, not including installation, shipping and offhire, but has not been included in the figures as it would not bring an additional advantage, Kittiwake said.

The company then explained the difference from using LinerSCAN, ANALEX Alert and a traditional laboratory test. Taking the case of running in sampling every two hours, the same samples were measured using LinerScan and ANALEX Alert, plus in the laboratory.

There was good correlation shown between LinerSCAN and ANALEX Alert, claimed Kittiwake as both tests showed more iron content than the traditional laboratory tests. According to the company, ICP missed large particles, XRF proved to be closer, but the particles needed to be ‘well mixed’ to be seen and the tests were obviously only as good as the skill of the laboratory technician.

Kittiwake said that online testing gave much more information than the laboratory test. “Things can go wrong when examining a sample”, the company said.

LinerSCAN can be either retrofitted on vessels in service or fitted on board newbuildings. It is claimed to easy to fit with piping kept to a minimum to avoid blockages. **TO**

## TORM opts for bearing wear monitoring system

**Last March, Kongsberg Maritime started to deliver new engine monitoring systems to TORM’s 11 Chinese newbuildings.**

The bearing wear monitoring systems (BWMS) were ordered in February 2009 and will be integrated into the K-Chief 500 automation solution already selected by TORM for all 11 newbuilding tankers.

BWMS has been designed to monitor wear in bearings of large 2-stroke diesel engines. It will provide an early warning if any of the three crank-train bearings - crosshead, crank and main bearings - experience unexpected wear problems during ship operations. This will enable the crew to carry out preventative engine maintenance in order to save downtime and ultimately, costs.

The system is available as a stand-alone solution, or it can be fully integrated with the K-Chief 500 and AutoChief C20 automation systems. In the case of the TORM newbuilds, the systems will use the bearing wear monitoring mimic in the K-Chief 500 to monitor the wear and trending measurements and a two level alarm will also be handled by



**BWMS is designed to monitor bearing wear in 2-stroke engines.**

the K-Chief 500 automation system.

The new TORM vessels will be powered by MAN 6S50ME-B Mk8 type engines while the BWMS will be installed by engine builder DMD in China. The open infrastructure of the Kongsberg BWMS provides the opportunity to add additional engine monitoring systems, such as bearing temperature and cylinder liner temperature, the company said.

"The new BWMS is an accepted solution for both newbuild and retrofit projects. This

contract is a particular milestone for Kongsberg Maritime since it represents the first large series of deliveries of the system for the newbuild market," said Arnt Johan Sivertsen, sales manager, Kongsberg Maritime.

"In addition to providing a reliable technical solution, the customer will also benefit from our worldwide service and a strong local presence in China, where the vessels are being built," he added. **TO**