LinerSCAN

Cylinder Liner Monitor

Parker

ENGINEERING YOUR SUCCESS.

The world's first real-time alarm system for engine liner wear. LinerSCAN marks a new era in asset protection, providing early warning against critical engine damage whilst providing the information needed to save on lube oil costs.

Parkers LinerScan system is designed to remove the uncertainty on cylinder damage resulting from low fuel quality, slow steaming, low sulphur levels, lower oil feed rates and cylinder oil formulation changes.

Why it is becoming increasingly important to monitor wear?

- Financial savings
- Optimize feed rates
- Highlight problems with low sulphur fuel
- Aid in preventative maintenance
- Increase lifetime of your cylinder liners
- Prevent engine damage and down time

System Benefits

LinerSCAN provides highly accurate feedback about the wear condition in your engine. Trials have shown that LinerSCAN highlights the first signs of damage earlier than other systems and enables safe reduction of lubricant feed rate. If the wear rate increases during normal conditions the system will generate an alarm which, when connected to the ships alarm, provides instant feedback allowing for immediate action. This allows for preventative maintenance during the ships passage to the next port, or even a route change. LinerSCAN is a fully automated system and can help save money by optimizing the lubricant feed rate, reducing your maintenance loads and by helping you prevent unnecessary engine damage.

- Provides accurate and actionable data on your engine wear levels
- Enables safe reduction of cylinder oil feed rates
- Dramatically reduce engine damage by spotting the first signs of scuffing or piston ring damage
- Highlights the issues caused by fuel problems
- Allows an informed running-in process
- Runs fully automated – with no human interference
- Provides savings immediately after installation
- Simple installation for both new and retrofit

LinerSCAN Features

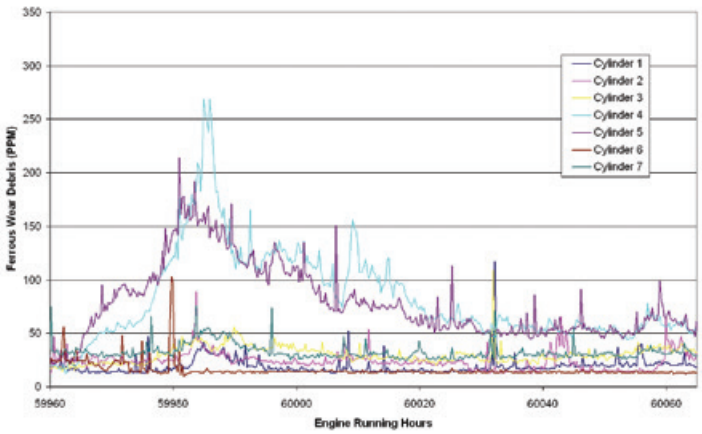
- Highly capable communications enable the system to link with ships management systems.
- Bespoke user-friendly software interface for data evaluation onboard or in the office.
- LinerSCAN takes the use of oil analysis data a stage further than is possible with laboratory or test kit results
- Reliable and robust – Once installed, the the system requires minimal intervention
- Compact units require little space per cylinder
- LinerSCAN utilises patented ANALEX technology from Parker

Measurement Principle

LinerSCAN measures the amount of iron in cylinder lubricant by a method known as magnetometry, where a sample is tested in a magnetic field. Utilising a novel shielding method, the system exploits a fundamental physical effect: namely the change of inductance due to the presence of a magnetic material.

Analysing the scavenging air space drain oil from each cylinder for iron (Fe) has been proven to give the operators an indication of relative changes of cylinder liner wear. At very early stages, the sensors reported the onset of severe wear and other engine problems such as cat fines in the fuel.

The system will also highlight periods where the engine is subjected to increased stress levels and indicate changes in iron levels caused by imbedding processes and increases in wear caused by routine inspection.



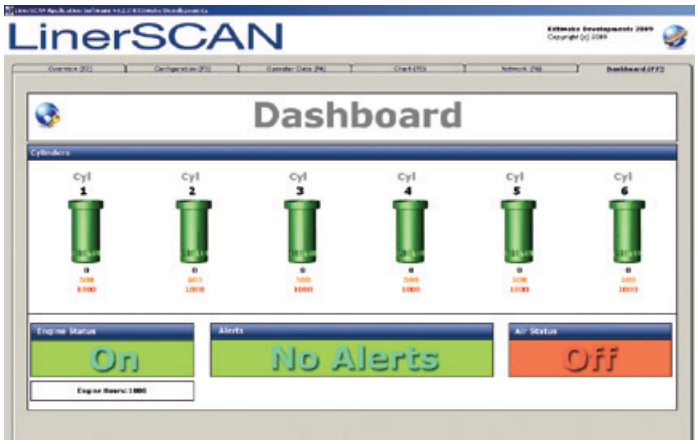
This chart shows the ability of LinerSCAN to detect and trend the amount of iron particles in the cylinder oil in real time.

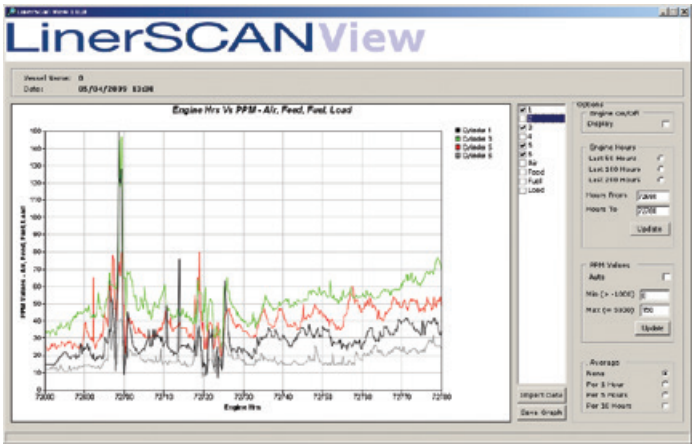
Feed rate was reduced by 10% on cylinders 4 and 5 at 59961 engine hours. Wear levels increased for a short time and were monitored before returning to normal levels.

This process was then repeated across the other 5 cylinders providing an overall 10% decrease in cylinder oil usage.

Simple Interpretation and Communications with Ships Automation System

LinerSCAN software enables you to continually monitor critical cylinder information on screen using a bespoke graphical user interface.
A 'Dashboard' highlights all critical information at a glance with colour coded liner symbols showing wear levels and current readings. Alarms are displayed on the screen for system alerts and engine / air status and are also communicated (optional) to the alarm system of your ships automation system.





An 'Overview' tab shows all readings, an event log and allows exporting of the data and log information which can be sent to the head office for further investigation if needed.

Using the 'Configuration' tab you can set individual alarms for each liner to allow for informed running in processes on individual liners.

The LinerSCAN system can be connected to your ships alarm system via a 4 - 20 mA connection or the use of trip amplifiers which communicate alarms for liner wear, blockages, and other system alarms.

An extremely informative graphing tool allows for in depth data evaluation on-board and in the office. Simple on-screen options enable the viewer to alter the scaling of running hours and ppm values for detailed and personalised interpretation.

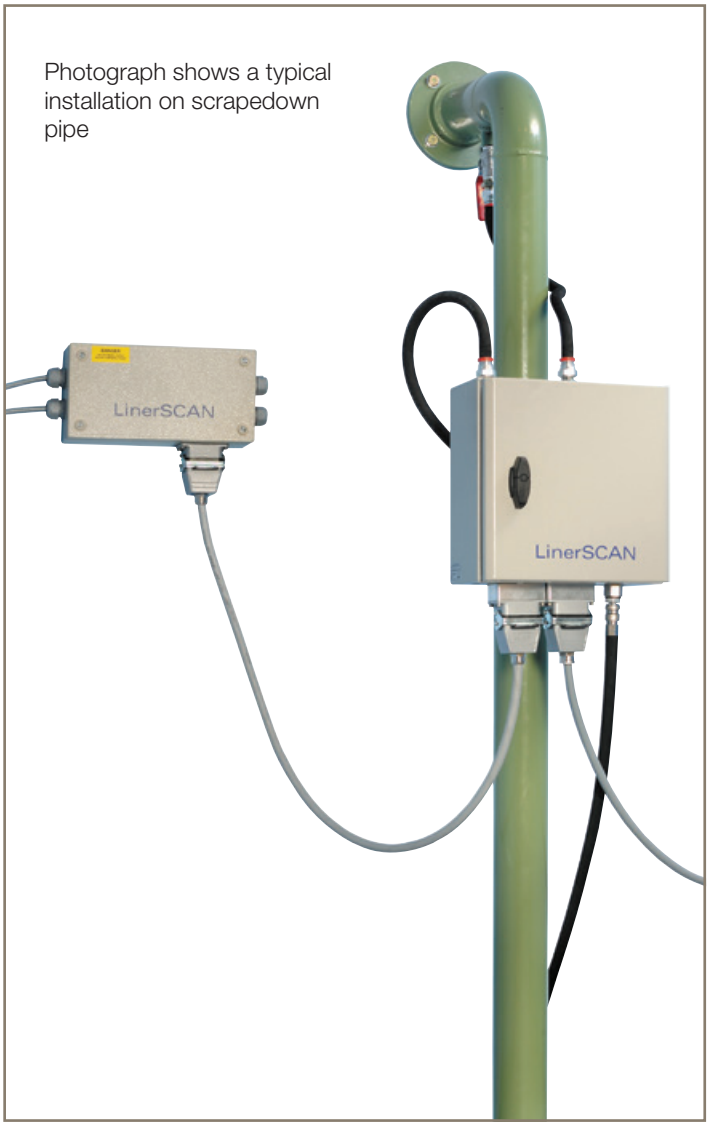
LinerSCAN software provides an informed view of single or multiple liners and (if connected to the system) plots of essential engine information such as rpm, load, sulphur or feed rate can also be included.

The data provided then enables the user to react to changes and adjust the feed rate according to the actual liner / engine needs and requirements based on real time data.

An office based version of this software, called LinerSCAN View, is available for easy evaluation of data from remote or shore based locations. Data is easily exported from onboard and then imported into the LinerSCAN View software.

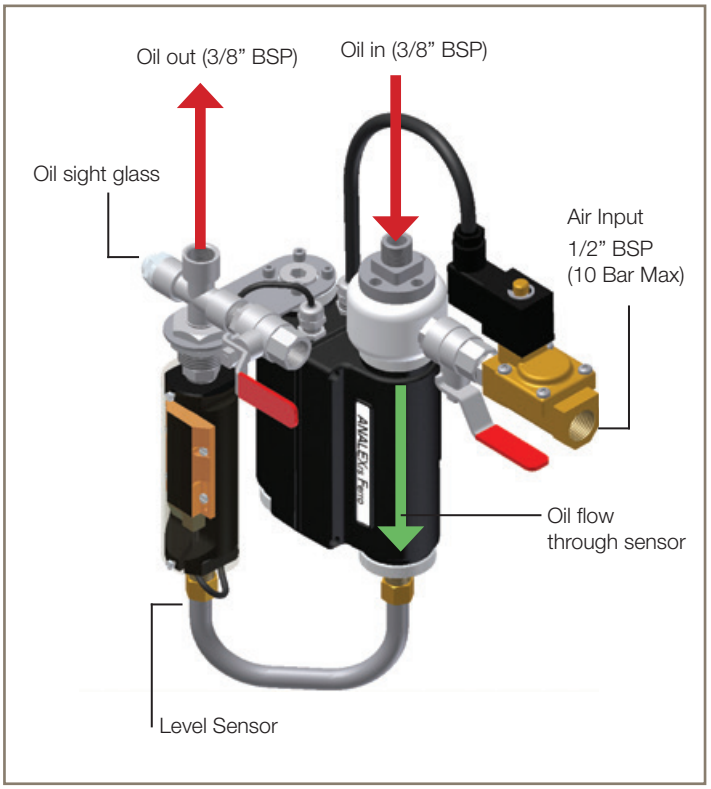
Simple Installation and Commissioning

LinerSCAN is very simple to install on new builds and as a retrofit to existing ships. Previous installations have proven that the system can be installed by the crew although Parker also provides a commissioning service using experienced engineers. Parker can also assist with data evaluation if requested.



MAN B&W Diesel Supported

"...Analysing the scavenging air space drain for iron (Fe) has been proven to give an indication of cylinder liner wear. ... Drain analysis can be used as an early indication for discovering suddenly increased wear situations. ... Parker has developed equipment ... for monitoring of cylinder condition through scavenge drain analysis. Based on successful test results, MAN B&W has no objections that the ANALEXrs Total Ferrous Sensor is used on two-stroke engines. This equipment may be used to monitor the effect of cylinder oil feed rate changes. ... It can also give an early warning if unusual high wear is occurring because of fuel problems such as catalyst fines, or other reasons and can possibly avoid engine damage..." MAN / B&W Diesel.



The following work is required prior to commissioning:

- Welding of bosses to scrape down oil pipe with valves for oil in and out.
- Mounting of the LinerSCAN boxes.
- Install pipe for compressed air along the engine.
- Run cables from Engine to ECR
- Windows PC
- Provide connection to engine control or ship alarm system

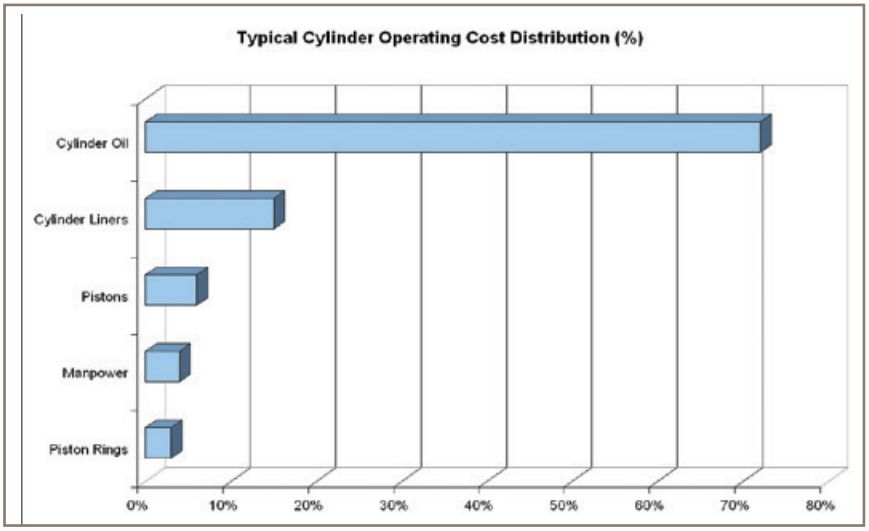
Rapid Return on investment

The use of LinerSCAN is not solely limited to the prevention of engine damage. Constant real-time monitoring gives engineers a vital tool in maintaining and optimizing cylinder oil feed rates and helps reduce many other associated costs.

The chart to the right shows that the cost of cylinder oil and the liner itself are the biggest cost factors when operating a main engine.

Existing installations have proved that significant cost savings can be achieved with return on investment achieved in less than a year in some cases.

Visit www.parker.com for further information as well as a reference list.



Ref: Dev. In Cylinder Liner Lubrication, L. Eriksen, May 2003 – K90MC Engines

Ordering Information

Product Code	Description
FGK17400PA	LinerSCAN Sensor complete (one per cylinder)
FGK17401PA	LinerSCAN Sensor & Network (one per engine)

LinerSCAN installation can be carried out by our skilled engineers. Price and details available on request.

Contact Parker for more information about your specific engine type and application.

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