PROVEN CONDITION MONITORING FOR RUDDER PROPELLERS

More data for customer-oriented service

The Condition Monitoring System (CMS) makes a timely detection possible, as soon as the first signs of possible damage appear. To this end the CMS gathers data from sensors, relating to bearing vibration, various temperatures and amounts of water in oil. For the S-COM monitoring system Schottel relies on tried and tested Bachmann technology.

(Source: Federal Waterways and Shipping Administration, WSV)

»A non-operational ship is a big problem for every ship owner«, says Jörg Majewski, who is responsible for modernisation and customer service at Schottel. »Any breakdown immediately results in immerse costs. Depending on the ship and application this can run to several hundred thousand euros a day. If a rescue tug like the Neuwerk is suddenly out of action, in an emergency there is no speedy aid available for a broken-down ship and its crew«, explains Jörg Majewski why the upgraded CMS 2018 is being installed as a pilot system on the Neuwerk.

Because of the competitive situation in the area of marine applications, with the latest extension of its S-COM Smart system, Schottel offers a compact and intelligently designed diagnostic system with modular extension options. Combined with a performance and maintenance management system, it can provide adapted products and flexible extensions if required.

AIC module for continuous monitoring

The sophisticated key element of the S-COM Smart is an AIC unit, one component of which was developed in collaboration with Bachmann. The AIC212 condition monitoring module and its successor modules, the AIC214 and AIC206, and the corresponding software allow the OEM, Schottel, to monitor a larger number of functions of the propulsion system than comparable control systems can. The ring buffer creates the basis for continuous calculation of specific values based on ISO standards, and for continuous monitoring of the system around the clock. This enables the continuous recording of measurement data without the risk of data lacking for uninterrupted monitoring. The AIC214 module has 12 IEPE channels for the input from twelve acceleration sensors and two counter inputs for two speed sensors. It also

The Schottel group develops and manufactures all-round steerable drive and manoeuvring systems, complete drive systems with up to 30-megawatt output and controls for ships. By spending a lot on research and development, the enterprise optimises existing products and realises innovative system solutions with the aim of increasing efficiency and reliability. To do this it works closely together with the partners in its value network.

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◀ In the engine room the sensors are more easily accessible for maintenance purposes.

offers an extended selection of adjustable sampling rates and filters. Thanks to its 24bit analogue-digital converter, the module also has an improved signal-to-noise ratio and a dynamic of over 95 decibels. Bachmann is also launching the smarter AIC206 version on to the market at the same time. This is designed for four IEPE acceleration sensors and two speed sensors, and has the functionality of the AIC214 in a cost-reduced package.

Integrated systems are ready for anything

Bachmann's condition monitoring modules offer the possibility to add plug-ins to enable additional functions. This makes the system flexible and adaptable for future requirements: »There are a lot of useful technologies coming onto the market, which support the maritime industry. Their integration into something like a propeller control system the existing communication and safety infrastructure can also be used for every additional functionality. That enables the OEM, Schottel, and the ship owner to get a holistic view of the condition of the drive system«, argues Burkhard Staudacker from Bachmann electronic.

What are the highlights of the Condition Monitoring S-COM application? »Schottel has not restricted itself to gathering vibration data. Other systems can do that too. This system takes much more data and many more algorithms into account, including bearing and lubrication oil temperatures«, says Burkhard Staudacker. The positioning of the sensors required serious attention. The sensors should be accessible from outside the oil-filled, dynamically working drive, and ideally be located in the engine room. »We determined the ideal location of the sensors by fitting specially prepared drives with spots of damage that were then once again removed and analysed after the trial.«

»Reliability, cost optimisation, good service, but also the good and long relationship with Bachmann were the factors for success for this project of the future.«

Jörg Majewski
Team Manager Service, Modernization & Conversions
at Schottel

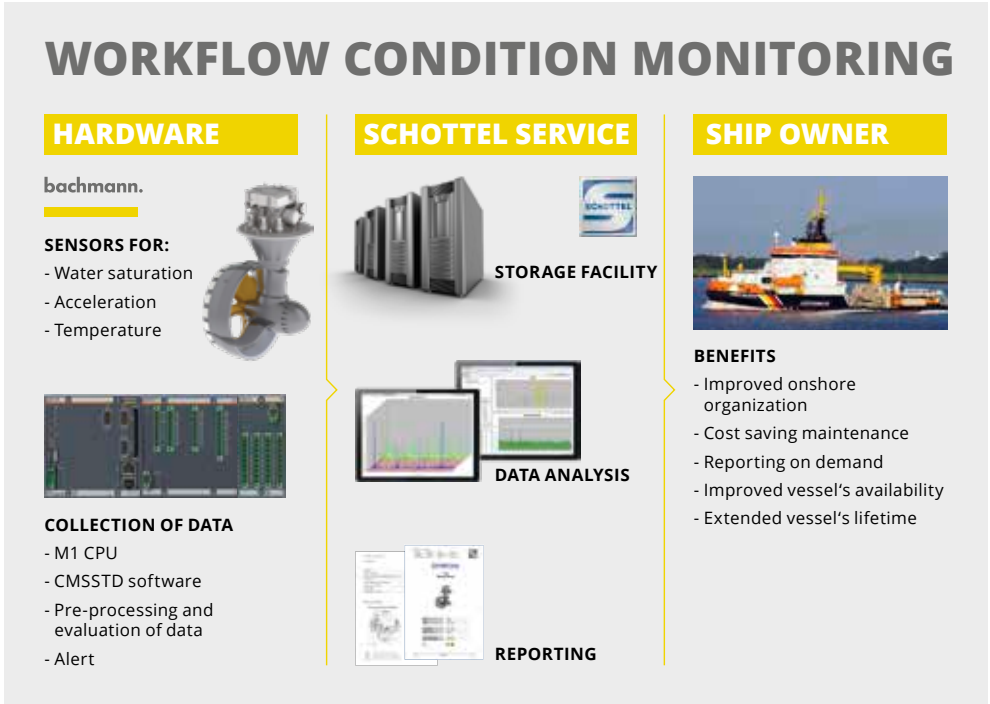
Correctly decided on the basis of data

The success of a CMS relies closely on whether it or not it can trigger a rapid and correct reaction by the user to any reported condition change. So that such a flood of data does end up burying the user, clever programming is needed to correlate the data, aggregate it into information packages, generate an understandable report and send it to an authorised person. The aim of the S-COM Smart CMS is to derive direct instructions for ship and crew – such as »Overhaul of the propeller shaft bearing recommended for the next scheduled maintenance!« This makes communication in real time absolutely essential.

»The AIC module is cheap in combination with the M1 controller and quickly calculates all the RMS values of the vibration velocity in accordance with ISO Standard 20283.4. You are then ready for online monitoring«, says Burkhard Staudacker. You can see how well ahead Bachmann already is with regard to communication for Maritime Industry 4.0 by looking at the evaluation in accordance with VDMA guidelines: it has scored 5 of a possible 5 points.
But there's always a but: The great difficulty here is the worldwide data transmission. Satellite-based systems are often the only connection, and they deliver limited amounts of data for a lot of money. »We have to eliminate this uncertainty factor. We have already had some experience with reporting and remote service in the past. Monitoring on board works in real time in a self-contained system and, as soon as there is a secure connection back in harbour, the crew can eMail the recorded data to the Schottel server for analysis and data storage«, adds Jörg Majewski, describing the process.

Future Business in service

Condition monitoring with SCHOTTEL's modular S-COM Smart, combined with an intelligent performance and maintenance management system opens up new business fields for the company's service division. It offers the customer the opportunity to avoid downtime scenarios, predictable docking times or individual maintenance contracts. With the certification Vibration Analyst ISO CAT II and III, SCHOTTEL fulfils the classification rules according to international standards and can therefore offer a certified status report of the drive systems for a requested docking extension. Jörg Majewski is convinced that "in the service field, the future will be determined by data storage with the diverse analysis possibilities and the realisation of autonomous driving assistance systems".



◀ Bachmann Hardware gathers and communicates the operating data. Schottel's Remote Monitoring Service structures and analyses the large amounts of data. The ship owner bases the measures to be taken on the meaningful reports.