

**DYNAMIC
MAINTENANCE
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OVER SCHEDULED
MAINTENANCE.**

MAKING THE MOST OF PERFECT MAINTENANCE TIMING

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WÄRTSILÄ'S NEW TECHNICAL MANAGEMENT concepts cuts costs for ship owners by online monitoring and dynamic maintenance planning.



At the CM centre, the data is received, analysed and recommendations are then submitted.

Wärtsilä has developed a condition monitoring (CM) system for its latest design Wärtsilä engines and thrusters. This provides operators with a summarized report enabling corrective actions to be taken onboard.

Wärtsilä feeds the parameters into its database where the data is evaluated by the CM centre. Together with the results of visual checks, forecasting trends are then reviewed by the CM centre. The group analyses the recommendations and makes a risk assessment. Based on this, the tasks are then agreed upon and reports for classification societies are produced.

The dynamic maintenance plan (DMP) is a flexible maintenance schedule designed to extend maintenance intervals and reduce spare parts consumption. The latest Wärtsilä designed engines and thrusters are serviced precisely when, and only when needed, thus reducing costs significantly.

Maintenance is then carried out according to the actual need based on the CBM reports, visual inspections, oil and fuel analyses, other operational information, and regular meetings with the customer.

Dynamic maintenance plans have several advantages over scheduled maintenance. They ensure up to date reporting and regular risk assessments, lower overall maintenance costs and downtime, and they allow the use of existing technology and Wärtsilä's large database. They are very cost transparent and are available in customized service-packages that fit the exact needs of the ship owner.

CUSTOMER BENEFITS

The customer benefits begin with soft advantages. An engine can have up to 350 set points and up to 90 or even 120 monitoring points. Since the engines are monitored regularly, the collected data supplies a solid

basis for reliable analysis and up to date reporting. The ship owner knows exactly in what shape his engines and their components are.

Wärtsilä feeds the parameters into its database where the data is evaluated by CBM. Together with the results of visual checks, forecasting trends are then reviewed by the CM team. The CM team then makes an analysis, prepares a risk assessment and submits recommendations for maintaining ideal running conditions. The necessary tasks are then agreed upon and reports for classification societies are produced.

Major overhaul targets of between 24,000 to 36,000 hours for engines, depending on operations and fuel, and 40,000 to 56,000 hours for thrusters once every 10 years, are realistic.

QUANTIFIABLE ADVANTAGES

The quantifiable advantages of DMP are reduced operating costs. Average savings are in the 3% range through reduced fuel/lube oil consumption, and from 5% to 15% through reduced maintenance costs. Because components are monitored constantly, dynamic maintenance localises trends in decreasing performance. Service at the appropriate time increases component life.

For example, the Wärtsilä 46 engine's overhaul target was recently increased from 16,000 to 20,000 hours, running on HFO, and with continuous monitoring the expectation is to reach a target of 24,000 hours.

Dynamic maintenance schedules also reduce the number of unplanned stops. More than 9 years of experience with the CBM tool indicates that unplanned maintenance can be reduced to a level of just 5%, as opposed to a planned schedule. Because trends are monitored and analysed, any performance decrease can be recognised, located, and rectified before a problem becomes critical.

DMP organises the availability of spare parts, logistics, and manpower economically, with approximately 20% less working hours lost through waiting for spares or tools. The improved maintenance planning with a flexible schedule provides work-cards for onboard scheduling, and can be aligned to the customer's ship charter. Predictions for the next six months enable the ship owner to plan well in advance.

DMP INFRASTRUCTURE

Much of the necessary infrastructure needed to run CM is already in place onboard ship. It can be found on the bridge and in the engines, which are equipped with numerous sensors. CM uses an online concept to handle online support and produce the CM reports for both the engines and thrusters. Thrusters for offshore vibrations and oil analysis are done by connecting to a Wärtsilä operator interface system (WOIS). For example, the injection systems on modern engines are today adjusted by changing set-points, such as injection timing and duration, in PLC controllers (UNIC), the Wärtsilä engine control system. This data can be used by CBM. The data is transferred from the vessel to Wärtsilä and back by satellite. Of course, data can also be sent by the operator (crew) by e-mail.

This also leads to a risk assessment, whereby the safety aspect of ensuring a failsafe mode between the ship owner/operator and Wärtsilä is determined. The operator receives a summary report to take corrective actions onboard, and any minor maintenance work can be carried out by the crew onboard. Major maintenance will be planned, co-ordinated, and performed by Wärtsilä with assistance from the crew.

The ship owner/operator sets common goals with Wärtsilä according to the needs in order to ensure successful operation in a charter agreement.

ASSURING TRANSPARENCY

Finally, technical management assures transparency of the common goals. These goals are measured by key performance indicators. Normally, availability and reliability figures are measured and reported. The planned maintenance costs are also compared to the actual and unscheduled maintenance costs. From the outset, a schedule with goals is drawn up based on the maximum service intervals known to be acceptable today. This schedule considers the different equipment installed, the fuels used, and the operational pattern of the equipment. This process ensures communication between the stakeholders on both Wärtsilä's and the customer's side. This means less missing information, and the reporting flow is accurate.

Also, all spare parts needed for scheduled maintenance are budgeted for. The budget is updated once a year, but spare parts, labour and other services are invoiced according to actual consumption and the prevailing price list. The Technical Management agreements vary in scope and are tailor-made according to the customer's needs. If desired, exchange spares to shorten downtime can be included in the agreement or purchased separately. Wärtsilä has several service agreement concepts, for example over 5 or 10 years, all of which assure a long-term commitment.

With DMP new technology introduced in engine rooms, automation equipment and online systems are used to the fullest. Monitoring, measuring and analysing of engine parameters lead to better prediction of maintenance needs and the system's overall function. Flexible service intervals protect equipment and reduce overall costs, as service work gets done best when it is most needed. ●

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DMP makes use of the existing online 24/7 infrastructure.

