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### **Less means more: MaK LESS cuts engine installation costs**

**Hamburg, Germany** – State-of-the-art marine engines are increasingly dependent on electronic engine monitoring and control. By using the advanced MaK Large Engine Protection/Safety System (LESS), the time required for engine installation, commissioning and maintenance can be considerably reduced. MaK LESS is available for the larger MaK long-stroke medium-speed marine engines, comprising the M 25 C, M 32 C and M 43 C series. At current the technology suits main engines driving a Controllable Pitch Propeller (CPP). However, a version tailored to easing operations of multi-engine plants on large cruise vessels is underway.

#### **Advanced engine control box**

MaK LESS integrates different functions involved in engine monitoring and control by using just two small, resiliently mounted control boxes at the back of the engine. The first box contains the engine protection system, the RPM switch unit, the start/stop control, an LED display and a graphic display. The second box contains the complete engine monitoring system and MODbus data output to the alarm system. This box can also be fitted with an exhaust gas mean value system as well as control devices for main and big-end bearing monitoring. If the MaK DICARE engine monitoring and maintenance system is on board, CANbus data output to the DICARE PC will also be placed in the second box. MaK LESS is type-approved by leading Marine Classification Societies (MCS), including ABS, BV, DNV, GL and LR.

The LESS technology has advantages for everyone involved – the vessel operator, shipyard, engine manufacturer and commissioning dealer. The engine manufacturer, Caterpillar Motoren, can easily adjust, test and approve all safety and control features prior to engine delivery. The shipyard saves both installation time and space because there are no separate electronic components and less wiring. Engine commissioning is quick and easy because pre-tests and class

approvals are done at the factory and there is reduced potential for wiring mistakes at the yard. Finally, the vessel operator benefits from the integrated protection/safety system because there is maximum engine availability and minimum risk of failures. Should failure occur however, the affected sensor or actuator is highlighted in the LESS display for easy repair or replacement.

### **Advanced engine control cabinet**

Cutting the time spent on engine installation and commissioning on board is also the idea behind the advanced engine control cabinet used for MaK multi-engine plants, for example on AIDA Cruises and NCL newbuildings. As with the MaK LESS approach, the complete set of controls and alarms can be pre-tested in the factory. Engine and control cabinet are connected with tailor-made cables in plug-and-play design. The complete set-up comprising engine, wiring harness and control cabinet will subsequently be shipped “as is” to the shipyard. As a result, installation and commissioning time on location as well as the risk of any wiring mistakes are all minimised.

Generally speaking, the advanced control cabinet contains the engine protection system and the electronic governor. The alarm system can optionally be included. As a standard, all MaK-powered cruise ship newbuildings rely on Flexible Camshaft Technology (FCT) for invisible smoke even at part load, and thus FCT failsafe control is also integrated into the cabinet. Depending on customer requirements, further modules can be included. AIDA Cruises, for example, ordered slow turning devices and enhanced main and big-end bearing temperature monitoring for its six newbuildings. Consequently, these functions and controls are also part of the advanced engine control cabinet.

### **Smooth installation – smooth running.**

MaK LESS technology as well as the advanced control cabinet allow for efficient testing, installation, commissioning and trouble-shooting of MaK marine engines. Even when all the monitoring and control tasks are integrated in a single device, both the control box and the control cabinet still rely on independent functional modules for flexible customisation. By using preassembled units which are connected via standardised bus systems, highest reliability and lowest cost can be achieved.

All modern cruise ships are powered by multi-engine plants in a diesel-electric configuration. Seen from the shipyard's perspective, smart concepts for engine installation and commissioning are a competitive advantage. But MaK LESS and the advanced control cabinet go even beyond that. They also safeguard daily vessel operations and ease trouble-shooting once it is needed. When they are combined with the MaK DICARE engine monitoring and maintenance system, cruise companies get a tailored solution for years of trouble-free power generation on board. It is more than coincidence, then, that Caterpillar Marine Power Systems (CMPS) sold 66 MaK M 43 C series engines for cruise ship applications in just four years.

**Characters: 4,976**

**Pictures available on request:**

- 1.) MaK Marine Engine with LESS Control Boxes**
- 2.) MaK LESS Engine Control Box – Inside View**
- 3.) MaK Advanced Engine Control Cabinet – Inside View**
- 4.) AIDA Cruises relies on MaK 9 M 43 C Engines and Advanced Engine Control Cabinets**

### **About Caterpillar Marine Power Systems**

Caterpillar Marine Power Systems, with headquarters in Hamburg, Germany, groups all the marketing and service activities for Cat and MaK marine engines within Caterpillar Inc. The organisation provides premier power solutions in the medium- and high-speed segments with outputs from 93 to 16,000 kW in main propulsion and 10 to 7,680 kWe in marine generator sets. The sales and service network includes more than 2,100 dealer locations world-wide dedicated to support customers in ocean-going, commercial marine and pleasure craft wherever they are.

More information is available at: [www.Marine.Cat.com](http://www.Marine.Cat.com).

### **About Caterpillar**

For more than 80 years, Caterpillar Inc. has been making progress possible and driving positive and sustainable change on every continent. With 2007 sales and revenues of \$44.958 billion, Caterpillar is a technology leader and the world's leading manufacturer of construction and mining equipment, clean diesel and natural gas engines and industrial gas turbines.

More information is available at: [www.Cat.com](http://www.Cat.com).

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