



Trade Fair Highlights at SMM 2010

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MAN Diesel & Turbo showcases innovations for cutting marine emissions

At SMM (shipbuilding, machinery and marine technology) in Hamburg, the world's most important shipping trade fair being held from the 7th to the 10th of September 2010, MAN Diesel & Turbo will be unveiling technical innovations aimed at reducing the emissions and improving the efficiency of marine engines. The presence at the trade fair is inspired by environmental and climate protection at sea. The stand's highlight is the ten-metre-long, six-metre-tall model of an ultra-modern, type 20V32/44CR common rail large-bore diesel engine with SCR catalytic converter. This is the largest exhibit MAN Diesel & Turbo has ever showcased at any trade fair. With this model as an example, the company will be showing just how the extremely strict "Tier III" emissions specifications set down by the International Maritime Organization (IMO) and coming into force from 2016 onwards for coastal regions are already being complied with today.

State-of-the-art marine engine construction

The 20-cylinder, four-stroke engine is a lightweight construction version of the 32/44CR type, produced especially for the trade fair and weighing 89 tonnes. Equipped with common rail injection, variable valve control (VVT) and variable turbocharger geometry (VTA), the 20V32/44CR is one of the most efficient engines in its class. Even without an SCR catalytic converter, it satisfies the "Tier II" emissions directive from the IMO which is set to come into force in 2011 and calls for a 20% reduction in nitric oxide emissions.

The third stage, "IMO Tier III", applies from 2016. Further technical measures and solutions will be needed to reduce nitric oxides by 80 per cent, which is the level required by the new directive. This is why MAN Diesel & Turbo will be unveiling its engine at SMM 2010 for the first time in combination with an SCR catalytic converter. With the SCR method (Selective Catalytic Reduction), the exhaust gas is treated with ammonia or urea and fed through a catalytic converter at a temperature of 300 to 400 degrees Celsius.

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A further means of cutting emissions is the use of low-sulphur fuels, such as natural gas. For this reason, MAN Diesel & Turbo offers its customers in the four-stroke and two-stroke sector dual-fuel engines. These can burn gas as well as conventional, liquid fuel. They can be switched from one type of fuel to another at the press of a button, even while they are still running. At SMM 2010, MAN Diesel & Turbo will be showcasing the cylinder head of an MAN B&W ME-GI two-stroke engine with a 50-cm cylinder bore that illustrates the particular features of dual-fuel fuel injection.

As well as large-bore diesel engines for seagoing vessels, MAN also offers fast-running, four-stroke engines for yachts or smaller utility boats. A modern, common-rail type D2862 engine will be on display at the stand.

After-sales solutions from MAN PrimeServ

With the “diesel switch” system, MAN PrimeServ, the after-sales brand of MAN Diesel & Turbo, will be unveiling a feature that allows the chief engineer of any ship to switch from one type of liquid fuel to another automatically, once the system has been installed. In coastal protection zones or harbours, engines can therefore be operated with lower-sulphur marine diesel, while on the high seas they can switch to running on conventional fuel.

Customers keen to find out more can also visit MAN PrimeServ’s Online Service: this technology enables MAN experts based at service centres to monitor engine parameters on board the ship in real time via a satellite link and diagnose any faults. This reduces the customer's maintenance costs and maximises the reliability and service life of the engines.

PrimeServ PIN is MAN Diesel & Turbo’s system for helping customers to optimise maintenance work and quickly and uniquely identify original spare parts. The prototype of this system, being unveiled at SMM, tells the ship’s operator in good time of the required maintenance intervals for wear parts and helps service engineers install them. PrimeServ PIN therefore helps to not only reduce downtimes during maintenance, but also helps ensure compliance with environmental and safety guidelines.

At a time when fuel prices are high, many container ships, freighters and tankers are permanently reducing their maximum speed. By lowering the ship’s speed by 20 per cent, fuel savings of almost 50 per cent can be achieved. However, in most cases a conversion of the propulsion system is



needed for this "slow steaming". Man PrimeServ offers shipping companies the option of installing a swing gate for this. With this system, one of the two to three turbochargers normally fitted to a marine diesel engine can be automatically cut out – a basic requirement for responding flexibly to different speed demands and achieving the best possible savings from "slow steaming".

Engineering the Future – since 1758.

In accordance with MAN's claim, "Engineering the Future – since 1758.", MAN Diesel & Turbo is working on a range of technical systems aimed at reducing emissions. As well as the SCR catalytic converter already mentioned, the company is also turning to further innovative solutions to protect the maritime environment. These include, for instance, the innovative EGR exhaust gas return system or the HAM Humid Air Motor in which the charge air is moistened with water. To reduce sulphur emissions, MAN Diesel & Turbo's engineers are also working on a number of different scrubber methods. Depending on their design, these exhaust gas cleaners use salt water or special granules to "wash" the sulphur components out of the exhaust gas. Further information on MAN Diesel & Turbo's green technology can be found at www.mandieselturbo.com/greentechnology.

Innovative propellers, turbochargers and accessories

The efficient operation of ships requires more than just a low-consumption engine, however. It also calls for optimisation of the entire propulsion train. Consequently, MAN Diesel & Turbo will be showcasing a modern, controllable pitch propeller of type Alpha VBS Mark 5 at SMM. Its flow-optimised and compact design helps it to improve the overall degree of efficiency as well as keep the oceans clean: after extensive tests, MAN Diesel & Turbo has been the first company in the world to approve the use of bio-degradable bio-lubricants for its controllable pitch propellers (CP propellers).

With the TCR10, MAN Diesel & Turbo is extending its broad portfolio of turbochargers downwards. It is designed for a new generation of small, four-stroke engines that can be operated using conventional heavy fuel oil, marine diesel or even gas.

The TCR10 will be on display at the trade fair, along with the new Active Balancing System (ABS), which reduces machine noise and vibrations. This

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system is particularly useful on cruiseliners for improving the comfort of passengers and crew.

About MAN Diesel & Turbo

MAN Diesel & Turbo SE, based in Augsburg, Germany, is the world's leading provider of large-bore diesel engines and turbomachinery for marine and stationary applications. It designs two-stroke and four-stroke engines that are manufactured both by the company and by its licensees. The engines have power outputs ranging from 450 kW to 87 MW. MAN Diesel & Turbo also designs and manufactures gas turbines of up to 50 MW, steam turbines of up to 150 MW and compressors with volume flows of up to 1.5 million m³/h and pressures of up to 1,000 bar. The product range is rounded off by turbochargers, CP propellers, gas engines and chemical reactors. MAN Diesel & Turbo's range of goods includes complete marine propulsion systems, turbomachinery units for the oil & gas as well as the process industries and turnkey power plants. Customers receive worldwide after-sales services marketed under the MAN PrimeServ brand. The company employs around 12,700 staff at more than 100 international sites, primarily in Germany, Denmark, France, Switzerland, the Czech Republic, Italy, India and China. MAN Diesel & Turbo is a company of the Power Engineering business area of MAN SE, which is listed on the DAX share index of the 30 leading companies in Germany.