The New MAN 175D – 100% High-Speed

With the MAN 12V175D, MAN Diesel & Turbo will be presenting the first cylinder version of its new high-speed engine family at this year’s maritime trade fair SMM in Hamburg. The twelve-cylinder model, developed especially for use in the shipping industry, is part of a product initiative aimed at providing MAN customers with a product portfolio that covers every power requirement, from high to low speed.

“With the MAN 175D, we are supplementing and completing MAN Diesel & Turbo’s and MAN Truck & Bus’s product portfolio in the maritime sector,” explains Dr. Hans-Otto Jeske, Chief Technology Officer and acting CEO for MAN Diesel & Turbo. The new engine will be offered with an output spectrum from 1,500 to 2,200 Kilowatts and will be available to the first pilot customers from as early as 2015.

The 12-cylinder version of the MAN 175D being presented in Hamburg is designed to fit in precisely with the needs of commercial shipping and is optimized for propelling ferries, offshore supply vessels, tug boats and working vessels. Other central areas of application such as the markets for superyachts and marine applications are served by additional specialist model versions.

“The MAN 175D is compact, reliable and efficient – properties that are of essential importance for use on working vessels to allow safe maneuverability in the most challenging and roughest weather conditions,” says the Project Lead responsible for the MAN 175D, Dr. Matthias Schlipf. “The business case behind it also has to be right for the customer. And this is where the engine sets standards in more than just fuel consumption. Our aspiration is to make the MAN 175D the overall most efficient engine throughout its lifetime.”

The MAN 175D also scores highly in terms of its eco-friendliness. Its compact and modular exhaust gas after-treatment system uses the selective catalytic reduction (SCR) method and is based on the MAN AdBlue® technology that has undergone many thousands of hours of testing. The engine will therefore satisfy the strict environmental standards of the IMO Tier III from the moment it hits the market.

The compact and robust engine is designed for user-friendliness and... Continued on page 2

ME-GI Adds Ethane to Fuel Portfolio as the World’s First

Norwegian operator orders three ethane-fuelled gas carriers

Ocean Yield ASA, the Oslo-based shipowner, has placed orders for 3 × 36,000-m³ capacity LEGCs (Liquefied Ethylene Gas Carriers), to be built at Sinopacific Offshore & Engineering, China. Each will be powered by a single MAN B&W ME-GI low-speed, dual-fuel engine that will run on ethane, which ethylene carriers are also equipped to transport, and represents the first time ethane has been used as fuel to propel an oceangoing vessel.

Hartmann Schiffahrt, part of Hartmann AG, the German shipowning and management group, has acted as technical leader on the LEGC project, while Gaschem Service, another Hartmann division, is commercially responsible for the employment of the vessel. The vessels are scheduled for delivery in August, October and December 2016 respectively.

MAN Diesel & Turbo reports that ethane was chosen as fuel, in preference to HFO, due to its more competitive pricing as well as the significantly shorter bunkering time it entails. As a fuel, its emissions profile is also superior to HFO – in which respect it is similar to methane – and compared to HFO...

Continued on page 2

TCT Turbochargers
Declared the best overall package for two-stroke engines
> Page 3

Propulsion Trends in Bulk Carriers
New technical paper released
> Pages 6-7

First Gas-Powered Car Carriers
Dual-fuel ME-GI engine adds important reference
> Page 8

Hard at Work with PrimeServ in the City that Never Sleeps
News feature
> Pages 10-11
The ME-GI is a Diesel engine in a simple operation, simple development stage, we spoke to a number of customers across the whole world to get a detailed picture of their expectations and professional requirements. This feedback has been pumped directly into the development process.

MAN Diesel & Turbo is also creating a stir on the high-speed market with its service concept for the MAN 175D, which follows MAN’s trademark “one-face-to-the-customer” strategy. MAN 175D customers have full access to the world’s MAN PrimeServ service network with over 120 locations worldwide. A service support point is available in all major ports. Customers are able to rely on the global and high-quality service support that is provided by MAN PrimeServ everywhere. Visit the new MAN 175D website on www.175D.man.eu for additional information, picture and video materials.

ME-GI Adds Ethane to Fuel Portfolio as the World’s First

The New MAN 175D – 100% High-Speed

Continued from front page

“Time and again, we were asked to develop a high-speed engine with a true ‘MAN character’, i.e. a high-speed engine that works as reliably as a medium-speed engine and which has been tailor-made for maritime use”, explains Florian Keller, responsible for the business development and market launch of the MAN 175D. “Throughout the development stage, we spoke to a number of customers across the whole world to get a detailed picture of their expectations and professional requirements. This feedback has been pumped directly into the development process.”

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ME-GI engine represents the culmination of many years’ work and gives shipowners and operators the option of utilising fuel or gas depending on relative price and availability, as well as environmental considerations.

The ME-GI engine represents a highly efficient, flexible, propulsion-plant solution. An ME-LGI counterpart that uses LPG, methanol and other liquid gases is also available, and has already been ordered.

LEGs

Ethylene carriers are generally considered to be the most sophisticated of all gas tankers and are capable of carrying most liquefied gas cargoes, but also ethylene at its atmospheric boiling point of −104°C. These vessels have insulated, 5% nickel-steel cargo tanks and can accommodate most liquefied gas cargoes up to a maximum specific gravity of 1.6 at temperatures ranging from −104°C to +80°C at a maximum tank pressure of 4 bar.

Ethane

While ME-GI engines have been designed for use by several, different fuel types to date, ethane is a new departure. Ethane is one of the natural-gas liquids (NGLs) that are naturally occurring elements found in natural gas (and frequently separated removed and sold as a separate product), and include propane and butane, among others.

About Ocean Yield

Ocean Yield is a Norwegian shipowner with investments within oil-service and industrial shipping. The company focuses on modern assets such as dry bulk, product tankers, multi-purpose vessels and OSVs.

About Hartmann Schiffahrt

Hartmann Schiffahrt is a shipping company based in the northern German city of Leer. Founded in 1981, it manages the technical and economical aspects of its own and other fleets with a focus on the gas and container segment and is a world leader within the gas-tanker segment. The company is part of Hartmann AG that has diverse interests in the marine transport and logistics sector such as dry bulk, product tankers, multi-purpose vessels and OSVs.
The New TCT Turbocharger Generation

MAN Diesel & Turbo’s TCT turbochargers specifically matched to requirements for two-stroke engines and acclaimed as best overall package

The demands made on a modern turbocharger are manifold. It is crucial that the technical requirements of the engine manufacturer, as the direct purchaser of the product, be met at the lowest possible price. Shipyards demand small overall dimensions to facilitate installation in engine rooms where space is at a premium. Finally, shipowners, who operate the turbocharger, demand high operational reliability, low maintenance frequencies and long life. The conflict of objectives is obvious. When developing the TCT range, it was important to MAN Diesel & Turbo to balance the individual demands of the different groups of customers to achieve an optimum overall result. The range of turbochargers which emerged is thought to be the best overall package for two-stroke engines.

Low fuel consumption and low emissions (particularly NOx) are the twin development objectives of large new-generation two- and four-stroke engines. They are achieved by using the Miller process, which involves the introduction of a special timing system for the inlet valve in a four-stroke engine and the exhaust valve in a two-stroke engine. However, the ways in which this process is implemented differ.

Fundamentally, the temperature at the start of the combustion phase is lowered by reducing the compression ratio in the cylinder during the compression stroke, thus cutting the directly-related production of NOx. In order to create similar circumstances under the conditions of final compression pressure and cylinder charging (the combustion air ratio), part of the compression must therefore be shifted to the turbocharging phase in order to obtain similar conditions in relation to the final compression pressure. Higher turbocharger compressor pressure ratios are thus necessary.

In four-stroke engines, the gas exchange phase can also be used to make a considerable positive contribution to work, if the scavenging gradient between the inlet and exhaust is sufficiently positive. This is achieved by a higher degree of turbocharging efficiency, as provided by two-stage turbocharging with intercooling - as opposed to single-stage turbocharging - in parallel to potential for maximum charging pressures. In the new TCx range, MAN Diesel & Turbo has developed a turbocharger specifically for two-stage turbocharging of four-stroke diesel and gas engines with a total pressure ratio > 10.

Conversely, a positive scavenging gradient cannot be used for a contribution to work in two-stroke engines, but only for scavenging. The scavenging gradient required is moderate. Unlike four-stroke engines, a very high scavenging pressure (a very high pressure ratio) also appears to obstruct optimal scavenging. This means that high degrees of turbocharging efficiency at high compressor pressure ratios, which can be achieved by single-stage turbocharging, are required by two-stroke applications.

In the new TCT range, MAN Diesel & Turbo has developed a turbocharger which has been specifically matched to the requirements of two-stroke engines, without making any compromises. The turbocharger efficiency has been increased by 5% by using newly-developed compressor and turbine wheel geometry, consequently increasing the waste heat recovery potential by 30%, e.g. by means of a Turbo Compound System (TCS-PTG) from MAN Diesel & Turbo. At the same time, the new TCT range will deliver a 10% greater air flow at a turbocharging pressure 25% higher, while being 30% smaller and 40% lighter than the existing TCA range.

Individual TCT turbochargers will cover a wider range of engine ratings, depending upon their size. Engine manufacturers will be able to use just one size for turbocharging different numbers of cylinders. Individual adaptation of the turbocharger to the engine is by the established method of using a variety of exchangeable parts within the turbocharger. The TCT turbocharger can be manufactured cost-effectively by dispensing with the alternatives required for four-stroke engines.

The new TCT range provides shipowners and installation operators with significant advantages. Customers who are already familiar with the TCA range will find that TCT turbochargers still provide them with established, tried and tested solutions. For example, the patented Super-Bolt compressor wheel mounting has been adopted from the TCA range, making installation with ordinary tools a simple matter. This saves maintenance time. The life of expendable parts has been extended by using high-performance components. This is reflected in lower servicing frequencies.

In line with the well-established MAN maintenance philosophy, servicing can be undertaken either by the operator itself (MAN PrimeServ offers suitable training in this respect) or by outlets on the global MAN PrimeServ network (where our well-established engine and turbocharger service is available from a one-stop shop).

Too good to be true? The first customers will benefit from the TCT turbocharger - the best overall package for two-stroke engines - as early as 2016. Between now and then the TCT turbocharger will undergo an extensive validation programme in a thrust chamber and several months of field tests.
New Licence Agreement Signed at SMM

MAN Diesel & Turbo adds Chinese QMD to its two-stroke licensee family; added engine-building capability extends reach of company to Northern China

On Tuesday September 9, 2014 at Hamburg’s SMM Marine trade fair, MAN Diesel & Turbo signed a new licence agreement with QMD, a member of the CSIC Group together with Dalian Marine Diesel Co., Ltd. and Yichang Marine Diesel Co., Ltd. In the process, QMD became MAN Diesel & Turbo’s 12th Chinese licensee. QMD (Qingdao Haixi Marine Diesel Co., Ltd.) can boast of a modern facility dedicated to the production of large, two-stroke engines in North East China.

Klaus Engberg, Senior Vice President and Head of MAN Diesel & Turbo Two-Stroke Licensing said: “We have, today, signed an agreement that will extend our presence in the northerly part of China, such that we now have a greater geographical reach in this important market and are better able to reach customers in this part of China.”

“For over 30 years, we have had a successful licence agreement with CSIC, which QMD belongs to, and we look forward to an equally fruitful cooperation with our new licensee,” Engberg added. •

Daewoo Returns for Yet More Dual-Fuel Engines

Four two-stroke ME-GI engines ordered for two LNG carriers for BW Group

MAN Diesel & Turbo has received an order for four MAN B&W 5G70ME-GI engines in connection with Daewoo Shipbuilding & Marine Engineering Co., Ltd (DSME) agreeing a deal with the BW Group to build two LNG carriers.

The technical engine specification complies with IMO Tier II, with options to include remedies for Tier III compliance at a later stage. The 171,400 m³ vessels are scheduled for delivery in late 2017/early 2018 and will be built at DSME’s Okpo shipyard in Geoje, Korea. The deal represents the second LNG ME-GI contract for DSME after a previous order signed in 2012.

Tier III options

Compliance with IMO Tier III regulations basically requires an 80% reduction in NOₓ emissions – compared to Tier I – within the designat-ed emission control areas (ECAs) over a defined test cycle.

MAN Diesel & Turbo has successfully developed two main approaches to comply with these challenges: Selective Catalytic Reduction (SCR), which involves the catalytically accelerated reaction of nitrogen oxides with ammonia to form water and nitrogen, and Exhaust Gas Recirculation (EGR), which works by recirculating a portion of an engine’s exhaust gas back to the engine cylinders.

Both methods enable compliance with the most stringent of regulations and give the customer the flexibility to choose the solution that suits their individual requirements best, for example, distances travelled within ECA zones as a percentage of total ship usage, different ownership models or different engine-operation profiles.

The ME-GI engine

The ME-GI engine represents the culmination of many years’ work and gives shipowners and operators the option of utilising fuel or gas depending on relative price and availability, as well as environmental considerations.

The ME-GI uses high-pressure gas injection that allows it to maintain the numerous positive attributes of MAN B&W low-speed engines that have made them the default choice of the maritime community.

MAN Diesel & Turbo sees significant opportunities arising for gas-fuelled tonnage as fuel prices rise and modern exhaust-emission limits tighten. Indeed, research indicates that the ME-GI engine delivers significant reductions in CO₂, NOₓ and SO₂ emissions. Furthermore, the ME-GI engine’s negligible fuel slip makes it the most environmentally friendly technology available. As such, the ME-GI engine represents a highly efficient, flexible, propulsion-plant solution.

An ME-LGI counterpart that uses LPG, methanol and other liquid gasses is also available, and has already been ordered.

The G-type programme

MAN Diesel & Turbo’s G-type programme entered the market in October 2010 with the entry of the G90ME-C9 model. The G-types have designs that follow the principles of the large-bore, Mark 9 engine series that MAN Diesel & Turbo introduced in 2000. Their longer stroke reduces engine speed, thereby paving the way for ship designs with unprecedented high efficiency.

Such vessels may be more compatible with propellers with larger diameters than current designs, and facilitate higher efficiencies following adaptation of the aft-hull design to accommodate a larger propeller.

It is estimated that such new designs offer potential fuel-consumption savings of some 4-7%, and a similar reduction in CO₂ emissions. In this respect, the fuel savings and performance characteristics for propellers featuring MAN Diesel & Turbo’s unique Kappel blade design have been well documented in recent years. Simultaneously, the engine itself can achieve a high thermal efficiency using the latest engine process parameters and design features.

As such, the G-type series has revolutionised the marine market. Since its introduction, close to 900 engines bearing the G-prefix have been ordered (including, now, 15 × G95 units), representing a total power output of some 15.9 GW. Of these, over 100 G-type engines have already entered service. •
**Offshore Segment Orders Selective Catalytic Reduction**

MAN Diesel & Turbo has won the contract to provide a Selective Catalytic Reduction (SCR) system for each of 6 x MAN 16V32/44CR engines. The vessels will power the Petrofac JDS 6000 deepwater derrick-lay vessel ordered in January 2014 by Petrofac, the international oil and gas services provider. At the time, Yves Inbona, Managing Director of Petrofac’s offshore Capital Projects business, said: “We are delighted to be working with industry leaders on the design and build of key components of the vessel.”

The SCR systems and engines will be constructed at MAN Diesel & Turbo’s Augsburg, Germany facility, while the vessel will be constructed by the ZPMC yard in China using a proprietary Petrofac design. MAN Diesel & Turbo have also entered a 12-year service contract for the management, maintenance and monitoring of the 6 engines. Vessel delivery is scheduled for 2016 with the vessel expected to be available for offshore construction and installation activities from early 2017.

MAN Diesel & Turbo reports that its advanced technology and after-sales experience, as well as the lower running costs for the engines and their higher power per cylinder, were important factors in winning the contract.

The deepwater vessel will provide Petrofac with access to high-end, turnkey opportunities in the high-growth deepwater and SURF (Sub-sea Umbilicals, Risers and Flowlines) markets, while also expanding access to shallow-water EPCI (Engineering, Procurement, Construction and Installation projects).

The SCR technique

Selective Catalytic Reduction injects urea into exhaust gases and passes them through a catalytic converter at temperatures of 300 to 400°C. The subsequent, chemical reaction reduces undesired nitrogen oxides (NOx) by over 80%. The SCR system in its entirety consists of a catalytic converter with several control units and a surveillance-and-control unit.

In September 2014, the DNV-GL classification society awarded MAN Diesel & Turbo a Tier III-compliant certificate, based on a fully modular SCR-kit that covers the entire MAN Diesel & Turbo four-stroke engine portfolio. "For the last 8,600 hours, this particular engine aboard the Petunia Seaways has consistently met Tier III NOx limits under real-life operating conditions and in full accordance with the rules," said Dr. Daniel Struckmeier, Senior Project Manager Emission 2016 at MAN Diesel & Turbo.

**Technique of the future**

Petrofac designs and builds oil and gas facilities; operates, maintains and manages facilities and trains personnel; enhances production; and, where it can leverage its service capability, develops and co-invests in upstream and infrastructure projects. Petrofac’s range of services meets its customers’ needs across the full life cycle of oil and gas assets.

With more than 18,000 employees, Petrofac operates out of seven strategically located operational centres, in Aberdeen, Sharrgh, Abu Dhabi, Woking, Chennai, Mumbai and Kuala Lumpur and has a further 24 offices worldwide.

**Petrofac JDS 6000 – Particular Data**

<table>
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<th>Parameter</th>
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</tr>
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<tr>
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<tr>
<td>Depth to main deck (moulded)</td>
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<tr>
<td>Ocean transit speed (kn)</td>
<td>12.0</td>
</tr>
<tr>
<td>Main generator sets/power (kW)</td>
<td>6 x MAN 16V32/44CR / 9,600</td>
</tr>
</tbody>
</table>

**About Petrofac**

Petrofac is a leading international service provider to the oil and gas production and processing industry, with a diverse customer portfolio including many of the world’s leading integrated, independent and national oil and gas companies. Petrofac is quoted on the London Stock Exchange (symbol: PFC). Petrofac designs and builds oil and gas facilities; operates, maintains and manages facilities and trains personnel; enhances production; and, where it can leverage its service capability, develops and co-invests in upstream and infrastructure projects. Petrofac’s range of services meets its customers’ needs across the full life cycle of oil and gas assets.

**Kasper Moes, Head of the Technical Organization at DFDS (right) congratulates Arnd Löttgen, Member of the Executive Board, MAN Diesel & Turbo (left) at the ceremony marking the awarding of the Tier III-compatibility certificate from DNV-GL to benefit from SCR meeting international standards**, said Paul Woodall, Director of Sustainability & Public Affairs at DFDS Seaways.
The bulk carrier market, therefore, has been declining, but are now picking up again.

The optimum propeller speed is directly coupled with the propeller, and therefore, to reduce the fuel consumption for the propulsion of ships to the widest possible extent at any load. This also means that the inherent design CO2 index of a new ship, the so-called Energy Efficiency Design Index (EEDI), will be reduced. Thus, when using a somewhat lower pitch/diameter ratio p/d, the necessary SMCR shaft power will be reduced to about 16,700 kW at about 88 r/min. A more technically advanced development drive is to optimise the afterbody and hull lines of the ship, including bulbous bow, also considering operation in ballast condition. This makes it possible to install propellers with a larger propeller diameter, thereby, obtaining higher propeller efficiency, but at a reduced optimum propeller speed, i.e. using less power for the same ship speed.

As the two-stroke main engine is directly coupled with the propeller, the introduction of the latest MAN B&W ultra long stroke G engine types meets this trend of installing large propellers in the bulk carriers which may reduce the ship's fuel consumption. Therefore, today bulk carriers are often ordered with a G engine type as prime mover.

Market development
Definition of a bulk carrier
A bulk cargo is defined as loose cargo that is loaded directly into a ship's hold, rather than in barrels, bags, containers, etc., and is usually homogenous and capable of being loaded by gravity. This paper describes the dry-bulk carrier type, normally just known as bulk carrier or bulker.

The bulk carrier market, therefore, is very attractive, which caused a boost in newbuildings until the latest economic crisis in 2008. Since then, bulk carrier orders in a short period have been declining, but are now picking up again.

Recent development steps have made it possible to offer solutions which will enable significantly lower transportation costs for bulk carriers as outlined in the following.

One of the goals of the marine industry today is to reduce the impact of CO2 emissions from ships and, therefore, to reduce the fuel consumption for the propulsion of ships to the widest possible extent at any load. This also means that the inherent design CO2 index of a new ship, the so-called Energy Efficiency Design Index (EEDI), will be reduced.

The efficiency of a two-stroke main engine particularly depends on the ratio of the maximum (lining) pressure and the mean effective pressure. The higher the ratio, the higher the engine efficiency, i.e. the lower the Specific Fuel Oil Consumption (SFOC). Therefore, today the main engine may often be derated.

Further, the higher the stroke/bore ratio of a two-stroke engine, the higher the engine ef-
iciency. This means, for example, that an ultra long stroke engine type, as the 6G70ME-C9, may have a higher efficiency compared to a shorter stroke engine type, like a super long stroke 50ME-C9.

The application of new propulsion design technologies may also motivate use of main engines with lower rpm. Thus, for the same propeller diameter, these propulsion types can demonstrate an up to 4% improved overall efficiency gain at the same or a slightly lower propeller speed. This is valid for propellers with Kappel technology available at MAN Diesel & Turbo, Frederikshavn.

Furthermore, due to lower emitted pressure impulses, the Kappel propeller requires less tip clearance that can be utilised for installing an even larger propeller diameter, resulting in a further increase of the propeller efficiency.

Hence, with such a propeller type, the advantage of the new low-speed G engine types can also be utilised even though a larger propeller cannot be accommodated.

Average propulsion power demand

Based on the already described average ship particulars and ship speeds for bulk carriers built or contracted during the period of 2000–2013 with due consideration of the latest ones contracted, we have made a power prediction calculation (Holtop & Menhen’s Method) for such bulk carriers in various sizes from 5,000 dwt up to 400,000 dwt.

For all cases, we have assumed a sea margin of 15% and an engine margin of 10%, i.e. a service rating of 90% SMCR, including 15% sea margin.

The average ship particulars used are, basically, referring to standard single side bulk carriers, but the SMCR power demand found may, as a good guidance, also be used for double side bulk carriers, by referring to a slightly higher deadweight tonnage than valid for the single side hull design. For example, a 54,000 dwt double side hull design could be corresponding to an about 55,000 dwt single side hull design.

The graph in Fig. 3 shows the above-mentioned table figures of the specified engine MCR (SMCR) power needed for propulsion of an average bulk carrier. The SMCR power curves valid for the future 1.0 knot lower compared to the average design ship speed are also shown.

Propulsion power demand of average bulk carriers as a function of ship speed

When the required ship speed is changed, the required SMCR power will change too, as mentioned above, and other main engine options could be selected. This trend – with the average ship particulars and average ship speeds as the basis – is shown in detail in Figs. 4-6. See also the description below giving the results of the main engine selection for the different classes of bulk carriers.

If for a required ship speed, the needed nominal MCR power for a given main engine is too high, it is possible to derate the engine, i.e. using an SMCR power lower than the nominal MCR power, which involves a lower specific fuel consumption of the engine.

Considering the high fuel price and the EEDI demands, it is today normal practice to select a derated main engine in order to get an SFOC as low as possible.

Small and Handysize bulk carriers

For Small and Handysize bulk carriers, see Fig. 4, the selection of main engines is not so distinct as for the large bulk carrier classes. Some owners and yards might prefer four-stroke engines, while others prefer and specify two-stroke engines. For the larger bulk carrier classes, the selection of main engines is, as mentioned, more uniform.

Handymax and Panamax bulk carriers

The main engines most often selected for Handymax bulk carriers, see Fig. 5, are the 5 and 6S50ME-C9/ME-B9, with the 6/7S50ME-C9 types being the optimum choice for meeting the power demand of all Handymax bulk carriers sailing up to 15.0 knots in service.

The main engines used for Panamax bulk carriers, see Fig. 5, are mainly the 5/6G60ME-C9, 6/7G50ME-C9 and the 7S50ME-C9 types being the optimum choice for meeting the power demand for nearly all Panamax bulk carriers sailing up to 15 knots in service.

Capesize, Large Capesize and VLBC bulk carriers and examples of EEDI

Today, in particular the 6S60ME-C9, 6G60ME-C9 and 5/6S70ME-C9 and 5/6S70ME-C9 types are used for propulsion of the Capesize bulk carrier classes, see Fig. 6.

For large Capesize, it is particularly the 6S70ME-C9 which is of interest.

For VLBCs, the 7S80ME-C9 and 7G80ME-C9 engine types are almost exclusively used as the main engine today, see Fig. 6.

As an example, the influence of the ship speed on the EEDI is shown in Figs. 7 and 8, valid for 205,000 dwt Large Capesize bulk carrier with the design ship speed of 14.7 knots.

If the required ship speed at the given main engine is too high, it is possible to derate the engine, i.e. using a lower specific fuel consumption of the engine.

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New Order Placed for the Very First Gas-Powered Car Carriers

Dual-fuel ME-GI engine adds important reference to growing list of marine segments

United European Car Carriers (UECC) has signed a contract for the construction of two LNG-powered Pure Car and Truck Carriers at MAN A-Sing & MAN B&W 8S50ME-GI dual-fuel engine will power each newbuilding.

The PCTCs will be capable of operating on LNG fuel, heavy fuel oil or marine gas oil, providing greater flexibility and efficiency. They represent the first such vessels globally to be fitted with an LNG propulsion system. When in service, they will be capable of completing a fourteen-day round trip in the Baltic operating solely on LNG, including main engine and auxiliary power generation.

UECC ordered the newbuildings in conjunction with a long-term fleet evaluation process concerning its Baltic fleet. Among the key requirements for new tonnage was an ability to meet all expected environmental legislation (SECA).

In this respect, LNG is recognised as the cleanest and most environmentally friendly choice of fuel suitable for marine transport. LNG fuel significantly reduces CO₂, NOₓ emissions, as well as almost entirely eliminating oxides of sulphur (SOₓ) and particulate emissions. To this end, UECC has signed an exclusive contract for the supply of LNG fuels to the vessels in the port of Zeelburg, using a dedicated LNG ship-to-ship bunker vessel.

The vessels will be constructed at the NACKS shipyard in Nantong, China, which is a joint venture between Kawasaki Heavy Industries (KHI) and China Ocean Shipping (Group) Company. Delivery for both vessels is scheduled for the second half of 2016.

Exciting step
Glenn Edwardse, CEO of UECC, has previously stated: “The LNG installation is a pioneering design and will be one of the largest employed on a commercial vessel and the largest yet of its kind on a pure car and truck carrier. We are proud of the exciting step UECC is taking towards greener and more environmentally friendly shipping.”

Edwardse also said: “UECC will be able to provide our customers with transportation in the Baltic area with unparalleled efficiency, reliability and superior environmental performance”.

About UECC
United European Car Carriers – jointly owned by Nippon Yusen Kaisha (NYK) and Wallenius Lines – was founded in 1990 and is Europe’s leading short-sea RoRo operator. Today, the company transports around 1.5 million units a year, comprising cars, commercial vehicles, high & heavy equipment and trailers. UECC operates a vessel fleet of 23 Pure Car and Truck Carriers, all of which have been designed or adapted to meet the necessary flexibility and efficiency requirements of the short sea market.

<table>
<thead>
<tr>
<th>UECC Pure Car/Truck Carriers – main particulars</th>
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<tbody>
<tr>
<td>Length overall (m)</td>
</tr>
<tr>
<td>Beam (m)</td>
</tr>
<tr>
<td>Design draught (m)</td>
</tr>
<tr>
<td>Gross tonnage (t)</td>
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<td>Deadweight at design draught (t)</td>
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<td>Main engine</td>
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<td>maximum continuous output (kW)</td>
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<td>normal output - 80% MCO (kW)</td>
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<td>speed: optimised/design (kn)</td>
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<tr>
<td>Turbochargers</td>
</tr>
<tr>
<td>Finnish/Swedish ice class</td>
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<tr>
<td>Cargo and approx. capacity</td>
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*Designed to operate in difficult ice conditions, mainly without icebreaker assistance, facilitating year-round trading in the Baltic region.

China Orders More Dual-Fuel Units

MAN Diesel & Turbo has announced a further order for its MAN 51/60DF engine. After a longer period of evaluation, an international consortium, including Teekay LNG Partners, has selected a Dual-Fuel Diesel Electric (DFDE) propulsion solution featuring 2×12V51/60DF + 2×8L51/60DF engines for four LNG Carriers (LNGCs).

The new order follows that which MAN Diesel & Turbo announced in July 2013 when it won the contract to supply 30 × MAN 51/60DF dual-fuel engines for six LNGCs. In both instances, the DFDE solution provides the customer with the optimum redundancy.

The engines from both orders will be produced at MAN Diesel & Turbo’s Augsburg, Germany facility with delivery scheduled during 2015. They are specified as IMO Tier II-compliant in diesel mode with lower exhaust-gas emissions in gas mode than IMO Tier III stipulations.

The new LNG carriers will be constructed at Hudong-Zhonghua Shipyard in Shanghai, China’s only builder of large LNG carriers, as will those from the July 2013 order. Following delivery between September 2017 and January 2019, the ships will support the shipment of LNG cargoes from BG Group’s Queensland Curtis Island LNG project.

The project, developed off the eastern coast of Australia, will be the world’s first project to turn gas from coal seams into LNG.

Graphical rendering of the new ME-GI-powered PCTCs showing engine and fuel-tanks placement (courtesy UECC)
MAN Turbochargers Power World’s First ME-GI and 28/32 Dual-Fuel Engines

TOTE container ship receives all-MAN package including MAN B&W main engine, MAN auxiliary engines and TCA66 and TCR18 turbochargers

The recent delivery of the world’s first dual-fuel, low-speed ME-GI engine from Doosan Engine to the American National Shippers Council (NASSCO) set a new, historical milestone in engine technology. The 8L51ME-C8.2-GI main engine is aspirated by 2 × TCA66 turbochargers and will power a 3,100-teu container ship ordered by TOTE, the American marine transportation company. Furthermore, the ship will receive 3 × 9L28/32DF auxiliary engines, each featuring a single TCR18 turbocharger. A second, identical vessel is currently under construction.

With this set-up, TOTE has not only chosen the most environmentally friendly engine technology available but also the most flexible power solution in that both the ME-GI and 28/32DF engines can run on HFO or gas. Gas operation means a significant reduction in CO₂, NOₓ, particulate matter and SOₓ emissions – both engines are characterised by having no methane slip. TOTE’s containership is slated to be the first gas-powered container ship in the world and will lead the way for additional investments in infrastructure for liquefied natural gas.

Dirk Balthasar, Head of Sales and Promotion – Turbocharger Business Unit – MAN Diesel & Turbo, said: “Playing a crucial role for a leading developer and builder of two- and medium-speed engines as it does, the Turbocharger Business Unit has a deep understanding of all the core technologies of large engines and the way they interact with turbochargers. The result is world- and market-leading turbocharger technology that easily keeps pace with all innovations and new developments within large diesel technology.”

“MAN’s engines and turbochargers will allow TOTE to maintain its commitment resourcefulness, reliability, and responsiveness while reducing our impact on the environment” noted Anthony Chiarello, President and CEO of TOTE. “We are excited to be the world’s first LNG-powered container ship and the first to use MAN’s ME-GI engine.”

With the TCA66 and TCR18 turbochargers, TOTE has chosen proven products that integrate well with the latest engine technology and match operator’s requirements for long service intervals and straightforward maintenance. At this end, MAN Diesel & Turbo recently announced that not only had it extended the inspection intervals of its TCA turbochargers but, in fact, had totally omitted the previously necessary bearing inspection between major overhauls.

The company also stated that maintenance on its turbochargers can be carried out by the operator’s own crew – after appropriate training – or by MAN PrimeServ, MAN Diesel & Turbo’s global service organisation. “It’s one of our unique selling points: having chosen an all-MAN package, including main engine, auxiliary engines and turbochargers, TOTE can now enjoy the additional benefit of MAN PrimeServ’s one-stop service for engines and turbochargers”, Dirk Balthasar concluded.

About TOTE
TOTE is one of the United States’ leading marine transportation companies. TOTE’s subsidiaries include TOTE Maritime, TOTE Logistics, TOTE Services, and TOTE Shipyards. TOTE is a wholly-owned subsidiary of Saltchuk, a Seattle-based family business comprised of freight transportation and petroleum distribution companies located nationwide. For more information, visit www.toteinc.com and www.saltchuk.com.

PrimeServ Clinches Significant Service Deal with Major Offshore Operator

At a signing ceremony at SMM, the international marine trade fair in Hamburg, MAN PrimeServ, MAN Diesel & Turbo’s service division, signed a service framework agreement with DOF ASA, the Norwegian off-shore services company.

Wayne Jones – Head of MAN PrimeServ Diesel – signed the contract on behalf of MAN PrimeServ, with Lars Heine Njåstad – GPO of DOF, signing for DOF.

Jones said: “This is one of the pillars of our strategy: to enter into long-term contracts with professional clients who value the support of an OEM. Our global network, technical expertise and a strong commitment from all involved parties were the key factors in this success. When our organisation works together on such projects, we are a formidable team.

Pictured at the signing ceremony: (standing, from left) Mikael Adler – Managing Director, MAN Diesel & Turbo, Norway; Sargheil Nastas – MAN PrimeServ O&M Sales Manager; Dr. Stephan Timmermann – Member of Executive Board, MAN Diesel & Turbo; Stefan Eefting – Vice President, Head of MAN PrimeServ; (seated, from left) Lars Heine Njåstad – Chief Procurement Officer, DOF; and Wayne Jones – Senior Vice President, Head of MAN PrimeServ Diesel.

Lars Heine Njåstad stated: “With this agreement we get advice on long-term planning for the MAN equipment in our fleet. This increases predictability and we strongly believe that such a strong cooperation will contribute to ensure maximum uptime for our vessels.”

MAN Diesel & Turbo reports that the successful conclusion of the service agreement came about in great part as a result of intensive work carried out by PrimeServ teams in Norway, Holeby (Denmark), Brazil and Augsburg. Mikael Adler, Managing Director of MAN Diesel & Turbo, Norway said: “We are confident that the new framework agreement with DOF will be a great success and that it will form the basis for future agreements with other customers.”

Agreement details
The service agreement covers the servicing of 15 vessels and 68 MAN engines (44 × 32/40 + 24 other engines of 21/31, 28/32 and 27/38 MAN types) – covering a total of 518 cylinders. The scope of the agreement includes:

- maintenance-planning support
- the delivery of planned, unplanned and emergency spare parts
- the provision of technical support for scheduled and unscheduled service
- the provision of engine-related training
- online service access.

About DOF
DOF ASA is a Norwegian group of international companies operating within the offshore oil-and-gas industry. The Group operates 13 off-shore vessels (platform-supply vessels, anchor-handling tug supply vessels and construction-support vessels) equipped with MAN Diesel & Turbo-designed engines. Two additional vessels are currently under construction in Brazil and scheduled to enter operation during 2014, with activity primarily in offshore Brazil and the North Sea.
Hard at Work with MAN PrimeServ in the City that Never Sleeps

DieselFacts recently went out on a slide-fuel-valve retrofit with PrimeServ New York

It’s 10 in the evening when DieselFacts pulls up at PrimeServ New York’s premises in suburban New Jersey. We’ve been promised the opportunity to observe a PrimeServ team at work and have made the drive over to the service centre in Woodbridge to meet up with some of the local crew.

In the gloom, DieselFacts greets two of them – Jon Norman and Mario Wongshue. The men are loading tools onboard the PrimeServ pickup and wondering aloud where Steiner Gulbrandsen, the third man, is.

Gulbrandsen Gulbrandsen is noted for his punctuality but, this night, turns up 10 minutes late, stymied by the closing of the Outerbridge Crossing – between Staten Island and New Jersey – for maintenance and which two of them – Jon Norman and the third man, is.

Due in port around 11pm for just 10 hours or so, the PrimeServ team has been tasked with modifying the ship’s MAN B&W 8ST0MC-C engine cylinder covers for the retrofitting of slide fuel-valves.

Steiner navigates our way through a myriad of minor roads and different toll booths before we emerge onto the New Jersey Turnpike. The Bayway Refinery violently lights up the night sky and signals our passing into the extended Port of New York and New Jersey facility. The landscape becomes progressively more industrial as we drive along miles and miles of road fringed with jersey barriers, pass under innumerable flyovers, and appear into an ocean of containers so the cranes can immediately get to work. In the US, commerce always comes first.

On the road

En route, DieselFacts gets some more details about the job. We’re heading for Port Elizabeth, part of the Port Newark-Elizabeth Marine Terminal and itself a major component of the Port of New York and New Jersey. This latter entity is the principal container-ship facility for goods entering and leaving the northeastern US, a key reason for PrimeServ New York’s location.

We’re rendezvousing with the Manet, a 2,220-feet container ship owned by Global Ship Lease (GSL), the containership lessor.

Working for PrimeServ, patience is probably one of the better virtues to have. It’s 11pm and we’re waiting for US Customs officials who, by law, must come aboard before anyone else in order to process the ship, its cargo and crew. The one notable exception to this cast-iron rule is that the lashers are allowed aboard to loosen the straps on the containers so the cranes can immediately get to work. In the US, commerce always comes first.

Manet has berthed and there’s already a hive of activity onboard as we park the pickup and get the tools out. As we approach the ship, an alarm signals the approach of a gigantic gantry crane that slowly rolls along a dedicated track, which allows it to move alongside the full length of the vessel. Once in position, its giant arms reach over the Manet to pluck individual containers, which it then places on the quay where a small army of straddle carriers fetches them and dispatches them out to the terminal with PrimeServ’s twice weekly UCT departures.

While we’re waiting, DieselFacts talks to Mario Wongshue. Originally from Kingston, Jamaica, Mario came to America as a child and was raised in Queens. He’s been with PrimeServ New York since its Grand Opening in 2007 where he primarily takes care of welding jobs. He says working with PrimeServ has been full of variety and seen him sent on jobs along the east coast, the Bahamas, Mexico and Puerto Rico, among other places. He got up for work as usual this morning at 4.30 am, but

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slipped home for some extra sleep in the bedroom, before returning to Woodbridge in preparation for the Manet job.

A question of time

Time is getting to be an issue. It’s midnight and there’s still no sign of customs as, apparently, they’re busy with other ships. Gulbrandsen says PrimeServ might have to follow Manet down the coast to start the job if they don’t turn up soon. This would mess up his schedule as he has a main-bearing inspection job coming up on Monday aboard a ship in Wilmington, Delaware. Lupus in fact, the customs officials show up shortly afterwards. Steiner approaches them and PrimeServ receives permission to come aboard as long as we don’t interfere with their passport/papers inspection. At the top of the gangway, we show ID to a Manet crew member and receive our ship’s passes. PrimeServ holds a brief pow-wow with the Manet’s chief engineer who asks them to begin work on cylinder #8.

The PrimeServ crew gets into its work clothes and descends into the bowels of the ship to the engine room where it’s hot, humid and noisy. Wongshue and Norman immediately start unscrewing the fuel lines on #8 so they can get at the injectors and slide-fuel valves. At the same time, Gulbrandsen heads over to the spare cylinder cover where he uses calipers to measure how much the cylinder heads need to be reamed to accommodate the new fuel valves. With the fuel lines off, Wongshue and Norman remove the two existing fuel valves using a special jack to remove the valves as they sit at an angle and can’t be pulled straight out. Norman then sets about cleaning out the first of the two-fuel-valve seats so it can be reamed to the correct tolerances, while Wongshue starts disassembling the fuel lines on cylinder #7.

Norman

Jon Norman has experience from the automotive industry. The Pennsylvania native says: “The different car manufacturers all have their own, different set-ups and idiosyncrasies, and transferring my skills to PrimeServ and working with diesel engines hasn’t been as difficult as you might imagine. It was more a question of learning MAN’s way of building engines and adapting my skill set to that.”

He has been with MAN for one year, during which time he has been on a job where he sailed down the Mississippi from Savannah, Georgia across the Atlantic while overhauling an auxiliary engine. “Four-stroke engines make for long jobs while two-stroke engines sometimes mean more unsociable hours,” he says. “But tonight should be relatively straightforward and I’ve performed a similar job recently so know what to expect here.”

A time to work

The ship’s chief engineer drops by every now and then to see how the job is going but for now excuses himself as he is monitoring bunkering from the control room whose insulated walls provide respite from the noise and humidity of the engine room. “There’s no doubt but that it’s a tough working environment. When it’s this hard to communicate verbally, the PrimeServ crew frequently uses exaggerated expressions and hand signals to get a point across.

The Manet doesn’t have time to dock for the job to be completed so PrimeServ will do as much work as time here allows, and will follow the vessel down the coast to complete the job. Gulbrandsen thinks they’ll manage two cylinders and the spare piston cover cover tonight before we are ordered off. At 2.30, he confirms that they’re not going to open up any more cylinders and says: “They hate it when the ship has to wait. But as well as the two covers we’re working on, if we finish preparing the spare cylinder cover then, that’s time saved in the future.”

With the reaming complete on #8, Mario and Jon start to reassemble its fuel-injection assembly. The clock reaches 3 am and the PrimeServ crew is clambering about the engine and working up a good sweat. It’s hard, physical work at an hour when the vast majority of the 20 or so million inhabitants from the New York City metropolitan area are sleeping. Regarding the late hour, Mario Wongshue is happy with the progress PrimeServ has made and says that while the tiredness is tough, that as long as you keep moving, it’s not too bad. Standing still takes notes, DieselFacts is already desperate for bed.

Later, while Jon Norman finishes re-assembling #4, Mario moves over to #7 where he has to use a hydraulic jack, a powerful tool that employs an impressive 20 bar of pressure, to remove a recalcitrant nut on a pipe attached to the fuel valve. Shortly after 4 am, Steiner says the Manet is sailing at 7 so we need to be off by 6. The cylinder cover is then reassembled and the slide fuel valves inserted, having first been inspected, cleaned and lubricated in an adjacent tool room. Mario and Jon then clean up, wiping oil and lubricants off the engine and the fuel-injection assembly.

Counting sheep

Job done, the Manet’s Chief Engineer is rescued from his bunk to sign the job off and PrimeServ is free to go. We hand our ID back to ship security and climb down the gangway.

Dawn is breaking as we depart Port Elizabeth. Leaving proves to be tricky without an escort to show the way out, so soon, the V50L engine of the PrimeServ pickup roars as we hit the New Jersey Turnpike heading south. Around 7 am, PrimeServ reaches Woodbridge where the workshop is already open, ready for a new day.

In an earlier interview, Ruben Caparros, Regional General Manager at PrimeServ New York and himself a former PrimeServ engineer in his native Spain, said: “You get addicted to the life of a super-intendent – travelling to a job and the pressure you’re under, going aboard a ship. And the great feeling of freedom when you’ve solved a problem and walk down the gangway. Sometimes, you even find yourself getting bored after three days at home again!” But, right now, that’s a moot point. All anybody from the Manet job wants to do is count sheep while falling asleep.
MAN Propulsion Packages for New Trawler Series Advance North Atlantic Fishing

Orders for five fresh-fish trawlers feature two different ship designs driven by four-stroke MAN 6L27/38 engines and aft-ship equipment

Icelandic owners, HB Grandi, Vinnslustodin hf. and Hradfrystihusid Gunnvör, have ordered newbuildings based on two different ship designs from specialist fishing-vessel consultants and designers, Nautic and Skipasýn. Optimised for safety, operational economy and pulling power, the 50-metre-plus vessel series differ in their choice of specified propeller, aft-ship and propeller-nozzle configurations, apart from their principal design differences. The Nautic vessels for HB Grandi will be propelled by four-bladed, 3.8-metre propeller models. A key Alphatronic 3000 control-system feature will be the tailored ‘dual-propeller load curves’ for optimising towing/trawl and free-sailing conditions.

High bollard pull at low propeller revolutions

Designer/consultant Skipasýn has developed the efficient 50.7-metre trawler design for Vinnslustodin hf. and Hradfrystihusid Gunnvör. In relation to the design and layout of the propulsion plant, the ship designer’s fuel-saving focus has been on the deployment of a large, efficient, 4.7-metre propeller. As a result, the 800 r/min engine (MCR) speed has had to be geared down to an optimal propeller speed of just 89 r/min. Blade-number optimisation resulted in a three-bladed configuration. At the 2,040 kW operating point, the three-bladed MAN Alpha VBS 1020 propeller – using the Alpha High Thrust nozzle – is calculated to deliver a bollard pull above 50 tons. Both vessels will be built in China by Huanghai Shipbuilding Co. Ltd.

Reduced consumption under more operating conditions

The three Nautic-designed, 55-metre vessels for HB Grandi, which will appear with a distinctive bow design, will be built in Turkey by Celiktrans Shipbuilding Co. Ltd. As with the other series, the selected propulsion engine is MAN’s six-cylinder L27/38, accompanied by four-bladed, ducted MAN Alpha VBS 860 propeller models. A key Alphatronic 3000 control-system feature will be the ‘shaft-alternator mode’ with reduced engine and propeller speed (within the corresponding 50 to 60 Hz speed envelope). With this part-load optimisation feature offering up to 17% lower engine/propeller speed, fuel consumption is accordingly reduced. The L27/38 engines have perfect load and low-speed characteristics for floating frequency: high torque and approx. 50% power is available at speeds reduced from the 60 Hz load point to 50 Hz.

Alphatronic 3000

The general propulsion management and control system specified for both trawler designs is MAN Diesel & Turbo’s new, advanced Alphatronic 3000 generation. The installations will be configured for complete control-station set-ups at the vessels’ main bridges, starboard bridge wings, aft-ship and engine-control rooms.

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