MAN Diesel

DIESELFACTS

• SERVICE • ENGINES • TURBOCHARGERS • PROPULSION SYSTEMS • MARINE • STATIONARY •

• 2008 • 2 •

Green Partnership of the Future

A.P. Møller-Mærsk and MAN Diesel in unique collaboration

»It's an unbeatable partnership«, says Ivan Seistrup, A.P. Møller-Mærsk Group Vice President for Technical Organisation / Engineering & Projects, about the A.P. Møller-Mærsk-MAN Diesel 'Green Ship of the Future' collaboration

The 'Green Ship of the Future' is an untraditional project whose vision is to develop environmental and energy effective technologies to reduce both CO_2 emissions and air pollution arising from the activities of the shipping industry. The project is aimed at both existing ships and newbuildings.

Shipping is an environmentally friendly form of transport but Danish companies, shipping lines and research institutes within maritime Denmark want to make an extra effort to protect the Earth's climate and environment. Accordingly, A.P. Møller-Mærsk and MAN Diesel have joined together with other Danish companies to tackle this challenge.

This goal will be achieved through a combination of solid research and innovative projects. The Green Ship project places the climate on the maritime world's agenda by

Continued on page 2 »

MAN Diesel PrimeServ Continues North American Expansion

Inside report on the grand opening of PrimeServ New York

MAN Diesel PrimeServ expanded its network recently with the opening of its New York service centre. Situated in Woodbridge, New Jersey, just a half-hour from Manhattan, DieselFacts paid a visit on opening day to view the latest jewel in PrimeServ's crown and uncover the hard work behind preparations for the big day.

It's midday in New Jersey and the sun shines strongly, giving a brilliant shine to the service centre's new, white coat. The car park is mostly empty, belying the bustle of activity inside the building.

Inside, in the midst of said bustle, is Christine Aust, HR Manager of MAN Diesel North America. Christine has been "busy" the past three months, helping to set up the new service centre, and "hectic" over the last week laying the groundwork for the international, street-fair theme ("Just like they have on Manhattan") that underpins today's proceedings. She adds: "This is a full production facility and we only stopped production yesterday at 3:30 so as to prepare for today." Christine and her team are expecting 300 guests in a few hours and there are still lots of last-minute issues to resolve before the off, so she rushes away, leaving DieselFacts in the capable hands of Steinar Gulbrandsen.

John E. McCormac, Mayor of Woodbridge, officially opens PrimeServ New York, flanked by (from left to right) Poul Korsgaard, Tore Pedersen, Jeroen Lagarde and Dr. Stephan Timmermann

Steinar is Norwegian but came to the States as a young man. His career path took him eventually to H.W. Ramberg Incorporated, an established Diesel repair company in Brooklyn, New York City that PrimeServ is integrating into its North American network and moving location here to Woodbridge. Ramberg was originally founded in the 1920s and signed an initial repairs agreement with MAN Diesel in the early '70s.

He has a history of 34 years at Ramberg and is Superintendent Engineer in PrimeServ's Fuel Department, which deals with the reconditioning of injectors and fuel pumps. Most other Ramberg

Continued on page 4 »

» Continued from front page

Green Partnership of the Future

making it more visible and creating a synergy between the different projects it inspires. The results of the collaboration will form an important part of the Danish contribution to the United Nations Climate Change Conference, due to be held in Copenhagen next year.

DieselFacts visits A.P. Møller-Mærsk

DieselFacts visited A.P. Møller-Mærsk group headquarters in Copenhagen recently to discuss the new collaboration with Ivan Seistrup, Group Vice President for Technical Organisation/ Engineering & Projects.

Educated as a marine engineer, Ivan Seistrup also trained as a ship officer and served in the Royal Danish Navy before joining A.P. Møller-Mærsk. During his 12 years at sea, he worked as chief engineer aboard many of the company's ships.

The Group Vice President believes that it's a positive development that A.P. Møller-Mærsk can come out and inform people about the extent of its ships' emissions because: "with the focus on the environment these days, the truth is also emerging that A.P. Møller-Mærsk is one of those companies that does most for the environment and the reality is that the world would benefit if more ships came under the A.P. Møller-Mærsk flag. We want to speak openly about what we do because we're actually bloody proud of it. I mean, when the A.P. Møller-Mærsk Line compares its ships to those of our competitors, the bottom line is that we use less fuel. And that's not something that's just happened by itself. We look after our ships' engines.

Ivan Seistrup recently gave an exclusive interview to DieselFacts at A.P. Møller-Mærsk Group headquarters in Copenhagen

And so we have to look to the future because it's a constant interest of ours to look at what options there are for improving the environment by reducing pollution. And I'm not just talking about CO_2, which is mostly related to fuel consumption, but also NO_x, SO_x and particle emissions are also areas of interest for us. And there you can say that we have started a very important collaboration with MAN Diesel."

The conversation turns to talk of the latest IMO regulations, which dictate that ships should be capable of running on distillate fuel by 2020. Ivan Seistrup says that this means that if a technology can't be found that cleans exhaust gas as effectively, then ships will have to switch over to distillate. He thinks this will be a huge challenge for the market as there isn't a lot of fuel around today that can manage that, but believes that if exhaust gas can be made 'greener' through different techniques, heavier fuel oil can continue to be used.

"I would say that our intermediate targets are to reduce CO_2 emissions by 10% by 2012. It's important to note that we established our own innovation department a few years ago and it works constantly on emission-reduction projects, among other things.

A.P. Møller-Mærsk innovation

Vice President Seistrup still acts as head of A.P. Møller-Mærsk's innovation department, having come to it from A.P. Møller-Mærsk's technical organisation where he was head of its offshore unit for 10 years or so. He was subsequently administrative director of A.P. Møller-Mærsk Ship Design for four years until April last year when it merged with A.P. Møller-Mærsk's technical organisation. He now looks after ship operations, engineering and projects. Over 200 employees work in A.P. Møller-Mærsk's technical organisation in Copenhagen alone with others employed locally around the world.

DieselFacts: "If we look at the collaboration between A.P. Møller-Mærsk and MAN Diesel, how would you say the two parties complement each other?"

IS: "You could say it's an unbeatable partnership. MAN Diesel has the theoretical expertise; you know how the engines work and can design your machines optimally. We contribute with practical experience, which is our strong suit because we have many years' experience of running large engines and ships. We have the ships, we can use them as test ships, and we're very willing to do that, and gather data which we of course forward to you."

Reliability reliability reliability

Ivan Seistrup then makes the link between reliability and the environment and defines what reliability stands for: "If we lose an hour because the main engine breaks down, or if we arrive late at a destination, then we have to make that hour up on the rest of the trip. An hour's delay out of Europe means maybe over a hundred tons' extra fuel consumed on the way to the next destination. That is to say, reliability is a major factor in optimising fuel consumption. Because we can sail slower, we can avoid the unscheduled stops that mean that we have to make up time. I think that's an important thing too. And reliability also means that TBOs are increased. It's a constant partnership working towards increasing overhaul intervals where we carry out tests aboard ships.

Reliability also has a lot to do with how well an engine runs. There are engines that constantly need adjustment, or are poorly designed and have to be constantly monitored, whereas a well-designed engine is reliable and this is reflected in its fuel consumption. Fuel consumption doesn't increase over time – it remains the same – and therefore reliability and the environment are related."

How do you propose to achieve the 10% cut in emissions you mentioned earlier?

"Through route planning, reduction in ballast intake, better distribution of cargo (meaning you need less water), and the less the ship is pressed into the water, the lower its fuel consumption. Waste heat recovery, optimisation of engine set-up including constant monitoring of maximum pressure, optimisation systems, help systems, circulation of just that amount of fluid you need in the various sytems, be it fuel or cooling water, etc."

Are there other options that are yet to be researched in depth?

"Yes, such as recirculation of exhaust gas, adjustment of maximum pressure, scrubbers, water emulsion injection. I'm the chairman of the technical committee in the Danish shipping association and we are currently working a lot on the Green Ship of the Future project."

DieselFacts asks about A.P. Møller-Mærsk's environmental credentials and how the company rates when compared with other shipping lines globally. Ivan Seistrup replies that he's not sure if A.P. Møller-Mærsk is number one globally, but that it certainly is ahead of the field in many cases.

How innovative is the Green Ship Project in relation to everything else?

"It's saying a lot to say we're world leaders in this respect, but yeah, we're certainly in the lead when you look around internationally. We're constantly called up by foreign shipping lines who want to talk innovation with us. It's proof that we're an innovative company. We try many things and kick-start a lot of projects that go on to be success stories."

It's clear that Ivan Seistrup is very proud of A.P. Møller-Mærsk's Innovation department. He states that having such a facility that constantly instigates new projects with its suppliers is "unique" within the shipping industry. Not only does it benefit the environment and give A.P. Møller-Mærsk genuine, 'green' credentials, it gives it a competitive edge in a very competitive business. Allied with MAN Diesel's expertise, the prospects look good for the Green Ship of the Future project. ■

» See page 3

MAN Diesel Affirms Green Partnership

Head of marine low-speed division stands fully behind project

Thomas S. Knudsen, Senior Vice President, Head of Marine Low-speed, MAN Diesel

From MAN Diesel headquarters in Copenhagen, Thomas S. Knudsen, Senior Vice President, Head of Marine Low-speed, expressed his full support for the Green Ship of the Future project, stating: "MAN Diesel wants to play its part in designing environmentally responsible products that minimise emissions. In that respect, the 'Green Ship of the Future' project with A.P. Møller-Mærsk is a meeting of like minds.

The opportunity to test our engine designs on Mærsk Line ships, adjust them according to the data recorded, and to benefit from the practical experience they have built up over the years, is unique and one we will grab with both hands."

He continued: "In the coming issues of DieselFacts, we will carry updates on the progress made in the Green Ship project. It goes without saying, that the technology developed will be made available to all MAN Diesel customers."■

Green Ship project participants:
MAN Diesel, A.P. Møller-Mærsk, Odense Lindø shipyard, Aalborg Industries, the Danish Technical University, Force Technology and the Danish Centre for Maritime Technology.

Constituent Green Ship projects due for implementation by 2012

- Development of main engines with dual- or multi-certification for easy change of MCR rating for any trade route or speed
- Further development of Waste Heat Recovery systems
- Development of an Exhaust Gas Recirculation system
- Optimisation of pump and auxiliary systems
- Optimisation of engine settings by automated monitoring and information system
- Development of scrubber systems for removal of SO_x and particles
- Development and installation of a Scavenging Air Moistening system and a Fuel/Water Emulsion system
- Investigate the technical feasibility and economic viability of using LNG as a fuel for generators retrofitted to ships

Green Ship Demonstration Projects due for realisation by 2009
Based on the work package descriptions discussed previously, the following activities were selected for further consideration as these were deemed to be realisable before the end of 2009:

- Development of main engines with dual/multi certification for easy change of rating to any trade route/speed, including "slow steaming"
- A paper project for a Waste Heat Recovery Systems
- Optimisation of pump systems and auxiliary systems e.g. frequency control
- Optimisation of engines setting by automated monitoring and information systems
- SCR for auxiliary engines
- Particulate filter development for auxiliary engines
- "Wet method": Fuel/Wate Emulsion

MAN Diesel's Environmental Milestone

Full engine portfolio to meet IMO Tier II limits

MAN Diesel is relaunching its portfolio, making all its engines compatible with the limits established by the International Maritime Organisation in its Tier II regulations. The relaunch is an historic milestone for the company, and one which preempts the January 2011 implementation of the new IMO NO_x emission limits by some time.

The new programme was launched recently at Asia Licence Days, a planned meeting of MAN Diesel licensees in Okayama, Japan. 160 participants, including the top management from MAN Diesel's two- and four-stroke licence family in Japan, China, Korea and Vietnam, met to discuss the new implications for MAN Diesel's product portfolio.

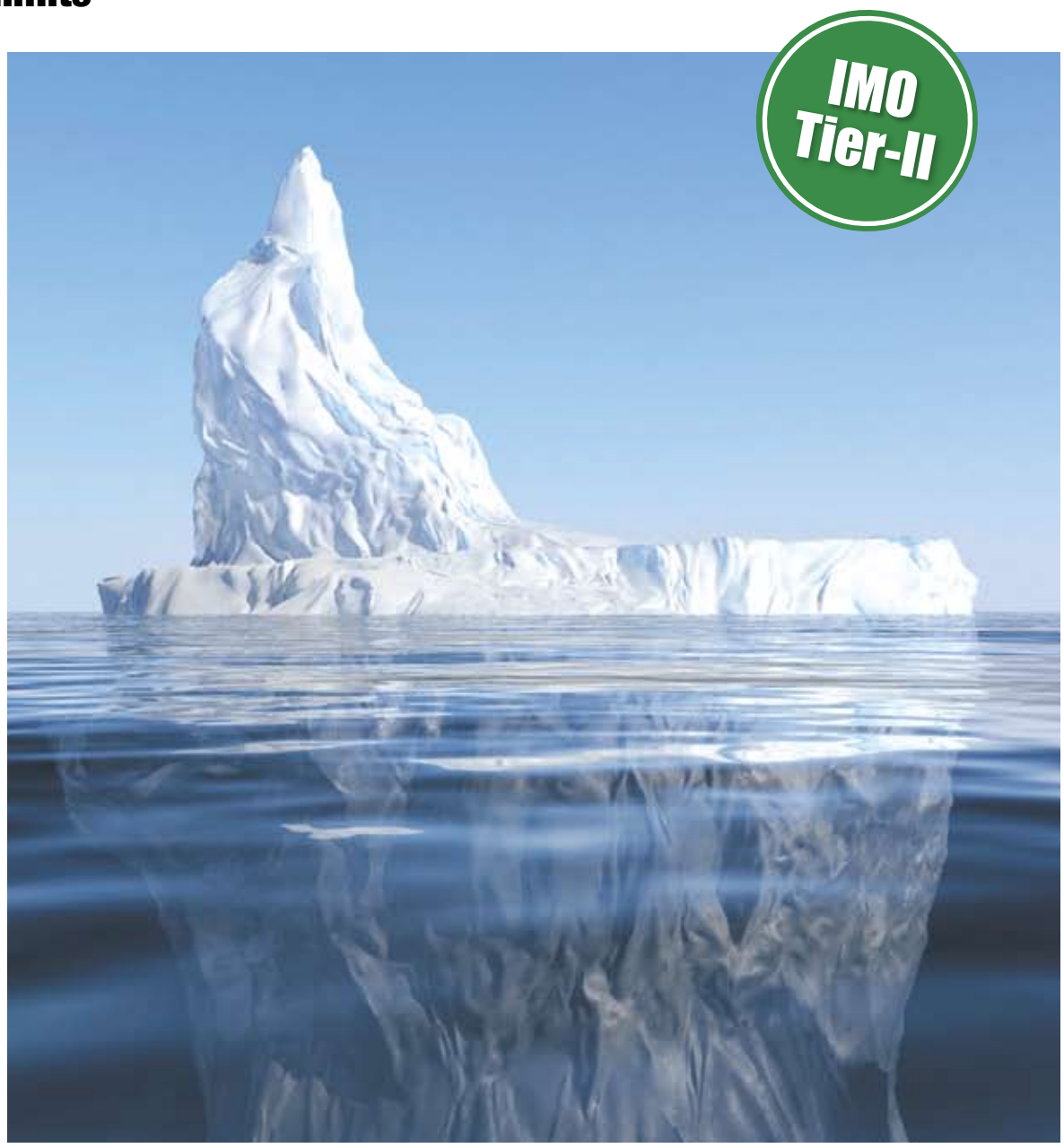
Executive Vice President of MAN Diesel, Peter Sunn Pedersen, commented: "During this summit, we updated our Asian family of licensees on the latest developments within marine and stationary diesel engines, and gave our view on diesel technology today and in the future.

We also discussed technological challenges with the main focus, of course, on environmental challenges such as cutting emissions and the application of bio-fuels." He concluded: "What we are doing is a complete optimisation of the engine-management system, whether electronically or mechanically controlled."

Locating the launch venue in Asia was an expression of how important the local market is to MAN Diesel. Asian builders will be expected to use the new designs as and when existing licences expire, and before the 2011 deadline. This also applies to many of the existing newbuilding orders currently placed at Asian yards, many of which are due for delivery in the wake of Tier II implementation.

"It is a milestone – we have been working on this for many years," said Klaus Engberg, Head of MAN Diesel Two-stroke licensing. "You can divide the changes into two groups. With the electronically controlled engines, we have focused on advanced rate shaping, while with the conventional engine types we have adjusted combustion through design."

Having addressed Tier II, MAN Diesel will next turn its focus to the Tier III regulations, successor to Tier II and due to come into force in a decade. ■



» Continued from front page

MAN Diesel PrimeServ Continues North American Expansion

employees have also chosen to follow their new employer to New Jersey, representing a valuable bank of knowledge and expertise that will ease PrimeServ New York's task greatly.

The new service centre provides a full range of services, including component reconditioning and spare parts provision to customers for two-/four-stroke engines, marine gensets, stationary powerplants, propulsion systems, control systems and turbochargers. Looking around the newly poured floor and neatly arranged machinery, it's hard to imagine that this building was a working plastics factory just a few months ago. Now, pretty much just the walls and roof are left intact from its previous employ.

Steinar thinks the Ramberg-to-PrimeServ transition has been smooth and he's happy with the floor space of 3,900 square metres in Jersey. He leads the way round the fuel and turbocharger departments, and the welding department where they work on spindles, seats and cylinder heads before sending them for sheening. Most of the machines here have been moved from Brooklyn to Woodbridge over the past couple of months. They include lathes and horizontal- and vertical-boring mills and bear quality names such as German Schiess, Czech Tos or Lodge & Shipley from Cincinnati.

Though stationed in suburban New Jersey, the service centre deserves its New York soubriquet being just 30 minutes from Manhattan and, more importantly, just 30 minutes from Port Newark that serves as the principal container ship facility for goods entering and leaving the metropolitan region of New York City and north-eastern North America. In 2003 alone, the port moved over 100 billion dollars of goods and PrimeServ New York is well placed to serve this important market.

As the event company continues to set up the street fair around us, Steinar introduces Michael Hollander. Danish by birth but living in the U.S. for 44 years, he's a Service Engineer in charge of turbocharger reconditioning and field service. He balances, dismantles and changes the parts of MAN Diesel (and other) turbochargers. He currently lives on Long Island but will probably move to New Jersey to reduce his work commute. Regarding the transition from Ramberg to PrimeServ, he says: "I've had just four days to set up my equipment before today and I'm not half done yet, but overall, it's been a smooth transition, especially because Ramberg was an authorised repair shop for MAN Diesel before." Michael estimates that he spends two-thirds of his time in the shop, typically using a C.A.B. shank-balancing machine, and the remainder at Port Newark. Sometimes he travels further afield and was south on a job in the Port of Baltimore recently for "an MAN B&W 60MC-C to change the crosshead bearing." While we talk, an accordian player serenades us - it must be getting close to party time.

Walking into the administrative part of the building, you can see that PrimeServ has invested in creating a good work environment with modern, bright offices and facilities. Poul Korsgaard, President of MAN Diesel North America, says that even though most administrative staff are still on Manhattan, the plan is to move them to New Jersey in the short-term and that it's vital they have a pleasant working environment. Korsgaard himself has spent the vast majority of his 28-year career in the service industry and still gets his hands dirty aboard ships "once or twice a year because I just can't let the service industry go!" He speaks of the "can do" attitude of PrimeServ in North America in general, and points to healthy growth in the PrimeServ turnover figures as a sign of the positive direction the company is taking on the continent.

The party hostesses arrive and there seem to be balloons everywhere. From their midst emerges Tore Pedersen, Director of PrimeServ New York, answering all manner of questions from his team and finalising last-minute arrangements. An engineer by trade, he joined Ramberg in 1980 where he served as General Manager and Vice President. He's yet another employee with Scandinavian roots and speaks fluent Norwegian, having moved to America from the Bergen area as a boy. He moves on to greet a new crowd of arrivals comprising MAN Diesel staff from around the world and including Dr. Stephan Timmermann, Executive Board Member of MAN Diesel with responsibility for MAN Diesel PrimeServ, and Otto Winkel, Senior Vice President of PrimeServ Copenhagen, who have both made the trip from Europe.

The MAN Diesel PrimeServ New York team in their new premises

Two flags seen more and more in juxtaposition

Christine Aust ordered from local businesses, a sentiment Mayor McCormac would appreciate

Steinar Gulbrandsen in the new workshop

Amidst this din of old and new colleagues meeting, DieselFacts grabs a few minutes with Nicole Sandoval. Nicole is Marketing Manager in PrimeServ Houston but came to Jersey a week ago to help out. She says that organisation of the logistics for the setup began last October, followed by a planning meeting in February. Last week, there was no landscaping, floods of rain, no signs, not even posters on the walls. But when the PrimeServ team got stuck in, things improved quickly: "Tuesday, the sun came out", says Nicole, "and it was all hands on deck to hang those signs, pick up garbage, buy plants and direct the contractors – the reception area was only finished within the last few days."

By now, it's close to 3pm – party time – and the catering staff has its uniforms on to serve the large crowd of employees and customers that has gathered. There's food from around the world. The Asian includes custom-made fortune cookies. DieselFacts' reads: "Did you know – worldwide, more than 50,000 high-efficiency MAN turbochargers are in operation?"

There's also a casino, although no-one is going to get rich today with the currency in circulation.

Just before 5, there are some short speeches. First up is Tore Pedersen who welcomes everyone and thanks his staff for "their efforts in making the move to New Jersey" and "the many weekends spent here and in Brooklyn preparing for the move."

Next up is Poul Korsgaard who calls 2008 "a significant year for both MAN and MAN Diesel, not only for opening this facility but also for the 250-year anniversary for the company that eventually became MAN, as well as the 150th birthday of Rudolf Diesel.

He applauds everyone's hard work and tells how MAN Diesel's recent expansion in the US started with the opening of PrimeServ Houston in 2006, and continued with PrimeServ Los Angeles in 2007.
He continues: "While both Houston and Los Angeles were basically green field start-ups, in New York we had to continue the reconditioning of components during the move into this facility. On February 12th, we were ready to make the machine foundations. On the 19th it was a mess, but a month later the floor was finished and the cranes in place. On April 14th, we had a lot of the machines installed and were already machining components. Now, a month later, I am very happy with the progress as well as the results to date."

Poul Korsgaard, President of MAN Diesel North America, pictured in one of the new sales offices

He concludes: "The PrimeServ network can now offer a comprehensive maintenance and repair service along all the coastlines of the US in response to the great growth of shipping the world has seen in recent years."

Woodbridge Mayor John E. McCormac is next on stage. State Treasurer of New Jersey from 2002-2006, McCormac has a reputation for creating jobs and growth. In his speech, he welcomes another corporate entity to his town "with open arms" and says that it's "great to see Woodbridge mentioned with L.A. and Houston." MacCormac says that he is "thrilled to have [PrimeServ] here contributing to the community," and speaks of the positive impact PrimeServ's presence will have in terms of tax revenues and employment locally.

Dr. Timmermann takes the microphone and reflects on how the PrimeServ adventure in North America started, "...sat in an office on Manhattan, looking at the Statue of Liberty. We started in Houston. The centre seemed too big but now it's too small! Then L.A., a big port – there must be business here! And now, with New Jersey, we've closed a gap in North America, with Halifax and Seattle yet to come."

Jeroen Lagarde, Head of the After Sales Business Unit, delivers the final word and states that PrimeServ is going global on the three pillars of being willing to follow its customers wherever they go, creating a professional business, and a quality organisation. He concludes by mentioning PrimeServ Fort Lauderdale, which is due to expand with a new spare-part facility and Academy, and promises to go deeper into Africa and Asia to develop the PrimeServ group.

All the speakers then assemble by one of the giant lathes to cut the ceremonial ribbon with the biggest pair of scissors DieselFacts has ever seen – and PrimeServ New York is officially open. Formal duties over, Poul Korsgaard takes the microphone for one last time to apologise to guests "for disturbing your drinking and gambling – please enjoy the rest of your evening!". ■

M.T. Hatef Powers Ahead with MAN B&W Prime Mover

National Iranian Tanker Company builds new tanker generation

Hyundai Heavy Industries delivered the *M.T. Hatef* to the National Iranian Tanker Company (NITC) on February 28th last in Ulsan after a build that lasted eight months. The ship sails under a Cypriot flag and is registered in Limassol.

M.T. Hatef is a VLCC, one of 13 currently on order from NITC and all equipped with MAN B&W 6S90MC-C engines. The ship comes equipped with the latest, marine technology, while the MAN Diesel engine is designed with a focus on environmental issues, safety, fuel-oil consumption and user-friendly operation.

Some of the ship's features include:

- A design that facilitates speed with less fuel consumption
- An MAN B&W 6S90MC main-engine designed for minimum noise and vibration and which sea-trials have shown to be effective
- The fitting of an Alpha Lubricator on the main engine for the first time on an NITC ship. This controls the amount of cylinder lubrication and keeps both liner-wear and cylinder-oil consumption to a minimum. Lube-oil consumption can even be adjusted according to the percentage of sulphur content in the fuel
- Separate fuel-oil tanks hold the high- and low-sulphur fuels for the main engine apart, facilitating access to European ports that have strict sulphur-emission regulations
- NITC is a respected, Iranian tanker company that owns one of the world's youngest and most modern fleets. The company is involved in cross-trade and also charters vessels for the export of National Oil Company exports

NITC currently owns 16 VLCCs, five Suexmaxes, five Aframaxes, three IMO-III chemical/products carriers, plus one LPG carrier. The tanker operator also has a sizable order book with South Korean yards and many projects ongoing in local, Iranian shipyards.

As a result of hydrocarbon developments in Iran, especially in the South Pars Gas Field, NITC has launched its newbuilding programme to ensure adequate capacity for the transportation of Iranian oil, LPG, LNG and petrochemical products to foreign markets. These will play an important role in the global energy business in the near future. ■

Archive photo of the MAN B&W 6S90MC-C two-stroke engine

M.T. Hatef Building Programme	
Steel cutting	07/06/2007
Keel laying	01/10/2007
Launching	08/12/2007
Delivery	27/02/2008

MAN Diesel India Begins Engine Production

Aurangabad plant successfully completes first GenSet

MAN Diesel India recently announced the successful production of its first engine. The Aurangabad plant produced an MAN Diesel 8L32/40 GenSet for Royal Boskalis Westminster, the international dredging group based in the Netherlands.

MAN Diesel nominated its Indian location as a production hub in the last quarter of 2006 and subsequently announced at the beginning of 2007 that it would initially produce L32/40 engines with production of the L32/44CR type to follow. In September 2007, plans were announced for the Indian hub to initially produce more than 50 engines over the next few years to meet the global requirement for marine and power-plant applications.

The Aurangabad works underwent an initial audit by Bureau Veritas and DNV in October 2007, receiving approval from both bodies.

Aurangabad management discussing plans on the shop floor

Fitting the lube-oil pump to the new GenSet

Presently, 15 people are employed in the production and service-support (maintenance) facility, a figure that is expected to rise to over 50 in time. Of the initial 15 staff, eight have been trained in engine assembly, testing, and quality & logistics at MAN Diesel's Augsburg headquarters.

All parts for the 8L32/40 GenSet were supplied in complete knock down (CKD) condition by MAN Diesel SE, Augsburg, while plans to manufacture components locally will be executed in due course. Assembly and testing of the GenSet was carried out using Aurangabad's existing facilities, special assembly tools and a testbed similar to that found in Augsburg. All work standards and quality records were followed in accordance with MAN Diesel standards.

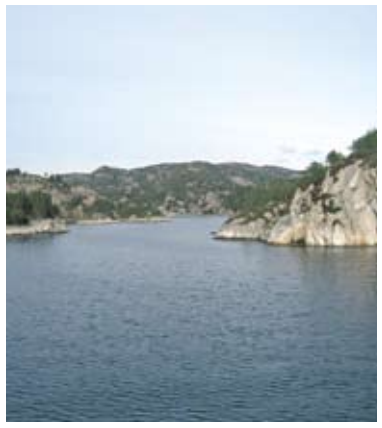
Engine testing (FAT) and component inspection were carried out in February 2008 in the presence of representatives from Royal Boskalis and Augsburg, and all engine parameters were found to be well within acceptable limits.

The new GenSet was shipped from Mumbai to Durban port in March of this year. ■

North Sea Water Runs Through The Veins

PrimeServ signs significant agreement with Norwegian DOF group

MAN Diesel PrimeServ has recently signed a service agreement with the DOF group that has extensive interests in platform supply vessels (PSVs), anchor-handling tug supply vessels (AHTSs) and construction support vessels/multi-support vessels (CSVs/MPSVs). DieselFacts travelled to Norway to interview Lars Heine Njåstad, DOF's Head of Procurement.



Lars Heine Njåstad pictured at DOF headquarters on Storebø. DOF has remained close to its origins and he says that, locally, »people are proud of being a part of the big industry that DOF has subsequently become«

DOF's headquarters lie in Storebø, a small town on the island of Huftarøy, about an hour south of Bergen. On a sunny morning, the *Stord* ferries us from the mainland and through the local archipelago, the snow-topped mountains in the distance a reminder that winter still lingers this far north. Company headquarters are a low, modern, wooden building by the harbour. Despite having a global business and an office up the road in Bergen, DOF likes to stay close to its roots.

The company descends from a very proud maritime background. Locally, most everyone fishes in their spare time and, as they say, if you don't have a boat, then you can just borrow one off your father, your cousin, or your friend's friend. The sea is central here. Even the local council's coat of arms displays four herring on a blue background.

Lars Heine Njåstad initially gained a bachelor's degree in engineering from the Bergen Higher Technical College of Education. He worked as an offshore engineer for different engineering and drilling companies and had three years as second-in-command of a yard group before working as a DOF vessel manager. He became DOF's Head of Procurement two years ago.

(DieselFacts) What are the main elements of the agreement?

(LHN) "The maintenance programmes, the spare-parts agreement, a discount agreement, and the overhaul programme. And you have this special thing with PrimeServ, the Pit Stop programme, where they give you a special box with dedicated parts for an engine. They pack it up and send it out to the vessel. Then you use that to replace the old items, put the old parts in the box and ship it back to shore where the parts are reconditioned and prepared for the next time. This really makes overhauling easier."

To date, the agreement covers all DOF vessels with MAN Diesel engines on board, approximately 13 engines, and there are two newbuildings so far. "The feedback that I've been getting so far is very good and is actually much better than we're used to. So you can take that back [to the DieselFacts office in Copenhagen]!" smiles Njåstad.

What does your role as Head of Procurement involve?

"I'm head of the processes in the Procurement department. The department is responsible for buying and sending goods out to vessels. While purchasers take care of the day-to-day contact with the vessels, my job is mainly to get supplier agreements into place, to develop them and keep in touch with the head of the technical department on a daily basis so that we can look ahead and think strategically in regard to optimising our supplier relationships. Furthermore, it is important to have a close relationship with the main suppliers (like MAN Diesel), to make sure that the intentions in such agreements are followed."

What kind of suppliers are you referring to?

"All the suppliers for the different vessel components. This could be main engines, where MAN Diesel is very important as a supplier, cranes, navigation equipment, automation equipment, electrical systems, everything. Both large and small suppliers are vital because we are dependent on them to keep the vessels moving. In today's market, it's very important that we develop partnerships with our preferred suppliers and make sure that we are a preferred customer when it comes to giving us the service that we require."

DOF ASA, DOF's holding company, currently owns 67 vessels and traditionally owned and managed PSVs and AHTSs. Its stategy has always been to go after more stable, long-term contracts although it also has some vessels in the spot market.

DOF ASA bought a construction and survey company called GEO in 2005 and has grown strongly since. Today, it has a newbuilding programme, comprising approximately 20 vessels, a global presence, and operates in the sub-sea (diving and ROV services) construction and surveying field as DOF Subsea. It also maintains a subsea-engineering capacity.

Why did DOF choose to work with PrimeServ?

"I remember talking to MAN Diesel for the first time two or three years ago, that was before we had decided to buy any engines, and suddenly we had bought one package, and then another, and then the market exploded and it was time to build boats. MAN Diesel had the ability to deliver engine packages an entire year before its competitors and has a good name in the industry so it wasn't a difficult decision.

We went to MAN Diesel PrimeServ and told them that we needed one contact point to centralise our service arrangement. They presented how things were going to work, and quite quickly we decided to make a service agreement with them with the centralised contact point making it easier for our vessel managers, purchasers, supervisors and service personnel to know where to go. Accordingly, it was also easier to plan business, overheads and spare-part procurement and any other materials needed."

Negotiations began in December 2006 and were signed in June 2007. Njåstad says that MAN Diesel

» Continued from page 6

North Sea Water Runs Through The Veins

PrimeServ took DOF seriously as a new customer and the deal was put together without too much bother, despite it being quite detailed because DOF's vessels have many different setups. While most of the details are in place now, he says the rest will fall into place as time goes by.

How flexible is the contract – could it change in the future?

"Yes, but I don't like to call it a contract, it's more of a framework agreement. If it's working, you put it into a drawer and don't look at it too much. PrimeServ has good documentation and it's quite easy to analyse the details and work out what's what. MAN Diesel PrimeServ has done some very good work in that respect as not every supplier is so thorough with their service agreements. Things look good so far."

When asked what the project's greatest challenge has been, Njåstad refers to MAN Diesel's size, calling it "a very big company, a traditional, old, industrial house, known for very good quality." He thinks that such companies are not always as flexible as they could be, but that "the idea of creating PrimeServ shows that MAN Diesel knows that it has to be highly flexible and support its customers in every way. Especially in shipping which is maybe the most demanding industry to work with.

He adds: "There's no doubt but that MAN Diesel PrimeServ is moving in the right direction. Our people have been helped greatly, and we are getting good feedback, so it's evident that PrimeServ is on the right track."

In relation to working with PrimeServ, Lars Heine Njåstad thinks that it's difficult to have a true partnership that meets every second month when modern companies are as busy as they are, but states that DOF and PrimeServ are working closely. His day-to-day contact is with MAN Diesel PrimeServ's Norwegian office, which he uses as a map to find the right way into MAN Diesel's large organisation.

Can you see the agreement developing in the future?

"I think it will be more like a living document as we go along. The intention is that the document should not be too rigid but should give us the guidelines on how to act towards each other and how to plan. It's early days yet, but I can only say that so far it looks promising."

Njåstad believes that he would recommend such an agreement to others. He's a member of a Norwegian shipowners' association that was interested when he mentioned DOF had signed a deal with MAN Diesel. He says that if the PrimeServ agreement works as intended, he would absolutely recommend it.

How important is the standard of service?

"That's important, but things usually come back to money because if the standard of service isn't good enough, you'll maybe have a breakdown and then it's money down the drain because you might lose the hire for your vessel and incur extra costs for fixing it. So, it's not all about the money but having a good partnership and easy communication but, still, it's all about the money anyway [laughs]!"

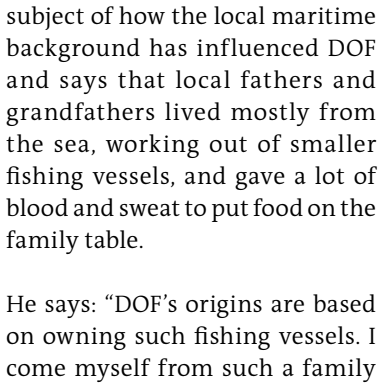
In response to a final question, Lars Heine Njåstad gets animated on the subject of how the local maritime background has influenced DOF and says that local fathers and grandfathers lived mostly from the sea, working out of smaller fishing vessels, and gave a lot of blood and sweat to put food on the family table.

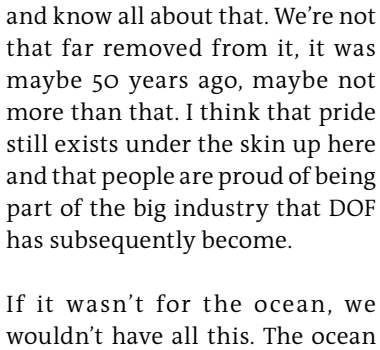
He says: "DOF's origins are based on owning such fishing vessels. I come myself from such a family and know all about that. We're not that far removed from it, it was maybe 50 years ago, maybe not more than that. I think that pride still exists under the skin up here and that people are proud of being part of the big industry that DOF has subsequently become.

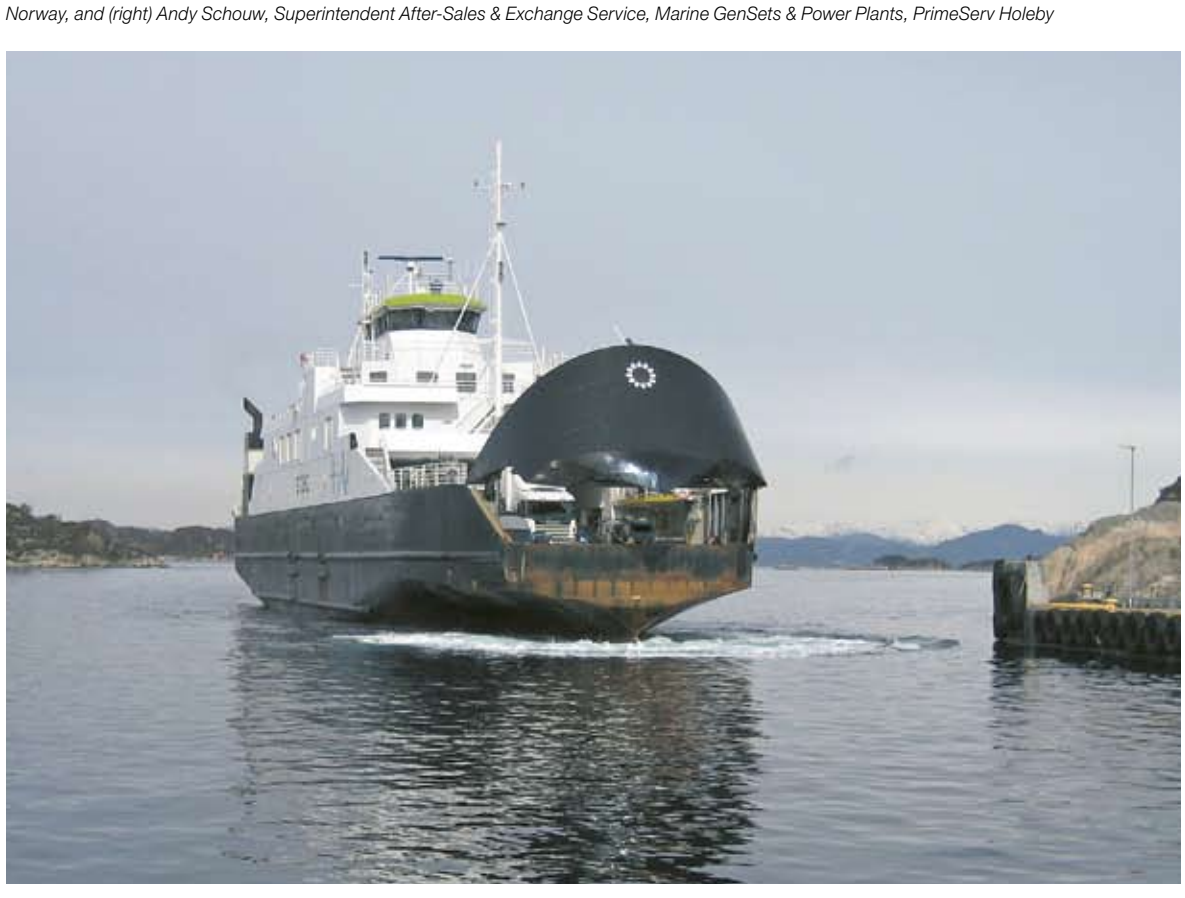
If it wasn't for the ocean, we wouldn't have all this. The ocean provides us with a living. It's not just because fish are out there, it's where the oil rigs are in Norway. When DOF started, it was the North Sea, and now we have the world as our playground, but everything is still about the ocean." ■

The entrance to DOF

Lars Heine Njåstad at DOF Headquarters in Storebø, pictured during a visit from (left) Dirk Folchert, Senior Manager Sales & Marketing, MAN Diesel Norway, and (right) Andy Schouw, Superintendent After-Sales & Exchange Service, Marine GenSets & Power Plants, PrimeServ Holeby







Having departed Krokeide on the mainland some 35 minutes before, the Stord opens its bow doors approaching Hufthamar, on the northern tip of the island of Huftarøy. The local municipality of Austevoll is considered to have one of the largest ocean-going fish trawler fleets in the world

PrimeServ Converts Indonesian Opportunity

The biggest diesel engine ever converted to gas is now up and running

Following four months' work onsite at Indocement's Citeureup cement plant, 30 km east of Jakarta, a MAN Diesel PrimeServ team successfully converted a PC 4-2 Pielstick engine to dual-fuel running – the first of its kind. It is the first time that such a large diesel engine (570-mm bore) has run on gas-mode after conversion.

The Citeureup plant comprises nine 18 PC 4-2 engines (18 MW each on HFO) that supply power to the adjacent cement plant. During the converted engine's initial performance test, it produced the contractual power (15.5 MW at the alternator terminal) and even exceeded this (17 MW), garnering 95% energy from gas and 5% from diesel-oil pilot injection. Efficiency in gas mode was similar to that when running in HFO mode.

The converted engine's new gas line

The changeover to diesel oil can be made without load-fluctuation, regardless of its extent (in situations where the gas supply is temporarily suspended). Where a gas shortage is of longer duration, the engine can be changed over to HFO-running after a few modifications.

A second engine from the same facility will be similarly converted within the next few months; the current gap between HFO and gas prices makes the time for return on investment very short – less than 18 months.

Currently, the customer has only enough gas to run two engines. The Pielstick units are completed with two gas turbines (aero-derivated) that provide 40 MW each in combined cycle, and the national grid (PLN) for another 50 MW. Indocement is in negotiation with its supplier, state-run Pertamina, to boost the supply so one more engine can be run on gas in the near future, with possibly more to follow in the future.

MAN Diesel PrimeServ's success in Indonesia is an important first step in the gas conversion of existing engines, which is potentially a very promising market. ■

The Indocement plant is located in Citeureup, 30 km east of Jakarta

View from inside the power plant

PrimeServ Delivers Busan Boost

Meets market demand for technical support in key port

Just March 28th last, MAN Diesel Korea officially announced the inauguration of PrimeServ Busan and hosted an opening ceremony at the new office with 60 customers from licensees, shipyards, shipowners and classification societies.

MAN Diesel Korea moved location last October, and this opening ceremony was the first official event at the new office. The event included presentations on PrimeServ Busan's aims and ambitions. Dr. Stephan Timmermann, executive board member of the MAN Diesel Group, attended proceedings and gave an optimistic speech, while K.K. Lee (Managing Director, MAN Diesel Korea) and J.H. Ryu (Team Head of PrimeServ Busan) introduced MAN Diesel Korea and Primeserv Busan, respectively, in their own speeches.

The Port of Busan's Pier 1, showing its International Ferry Terminal. Busan is renowned as one of the world's largest ports and can handle up to 6.44 million TEU containers per year.

Since 1984, MAN Diesel Korea has had three different functions as a technical liaison office involving sales promotion, licensee support and component sales. However, the idea of changing the Korean office's role was mapped out years ago and has evolved to include an ME-simulator training centre, Group Purchasing and PrimeServ, all of which will change MAN Diesel Korea's role greatly in the future. The Group Purchasing and PrimeServ functions finally kicked off in December 2007.

PrimeServ Busan employs highly qualified, experienced engineers and is ready to provide a high standard of service in a market where there is a great demand for excellent technical support. The city of Busan is well known for its shipping-related industries. Therefore, it is no wonder that many, world-renowned shipowners have begun to settle around its port area as a location near one of the world's largest ports makes sense on many different levels. ■

Reliability is the Word

Type 27/38 engine reaches 45,000 operating hours

The type 27/38 engine installed in the Irish fishing vessel, *F/V Mark Amay*, has successfully reached 45,000 hours of operation.

The propulsion plant was installed in 2000 by Karstensen's shipyard in Skagen, Denmark and its 6L27/38 main engine, which operates on marine diesel oil (MDO), was overhauled for the first time in 2003 after 20,000 hours of operation.

As the expected overhaul interval for a 27/38 engine is 24,000 hours, the overhaul came somewhat sooner than expected but, during the 2003 overhaul, various combustion chamber components were replaced by a new improved design.

As a result, by the summer of 2007 and its next overhaul, the engine had accumulated an additional 25,000 hours of operation, i.e. a total of 45,000 hours. During this latest overhaul, the engine was thoroughly inspected, and the new components installed in 2003 revealed an improved performance.

The complete Alpha propulsion system installed in the Mark Amay consists of Alpha module gear type 52VO27, Alpha CP Propeller type VB860 and remote-control system type Alphatronic 2000, as well as the main engine.

Over time, the propulsion system has proven very reliable in operation, and the owner has been able to fish with very few interruptions over the last 7 years. With an average of approximately 6,500 operating hours per year achieved by the engine, a convincing argument has been made for new owners looking for a reliable propulsion plant and strong, after-sales support.

The Mark Amay

In the period 2003-2007, extensive field tests were carried out on 27/38 engines operating on both MDO and heavy fuel oil (HFO). This occurred in close cooperation with MAN Diesel PrimeServ customers in order to improve overhaul intervals, especially those of 27/38 engines operating on HFO.

Such engines are designed to reach 18,000 hours before scheduled overhaul. While the first engines performed below par, this situation was quickly reversed through continuous development and field testing with results now indicating that the cylinder condition on HFO-operated 27/38 engines is exceedingly reliable.

With total sales of 350 propulsion engines and over 1,600 gensets having been reached, the 27/38 engine can now be considered a success and a valuable contribution to MAN Diesel's reputation for reliability. ■

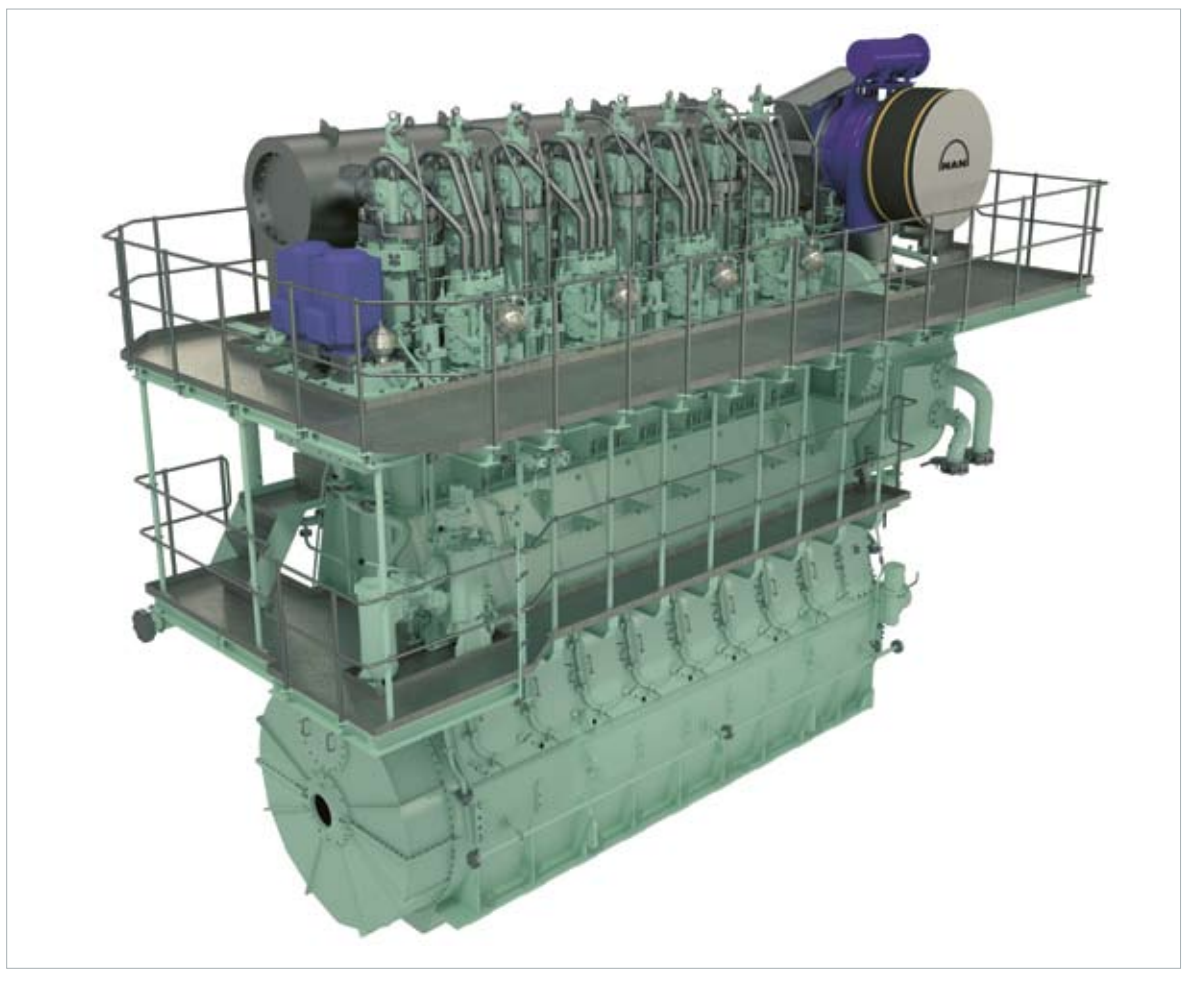
MAN Diesel Broadens ME-B Engine Programme

New engines released to market

MAN Diesel has enhanced its electronic, low-speed, ME-B engine programme with the launch of the MAN B&W S46- and S60ME-B type engines. These add to the existing MAN B&W S35ME-B and S40ME-B engines that were introduced in mid-2006, and the S50ME-B that was introduced in early 2007.

The ME-B design is based on the experience gathered from MAN Diesel's existing engine ranges, among the most popular engines available on today's market with a combined total of over 3,000 engines in service. The economical ME-B design utilises a camshaft-operated exhaust valve and an electronically controlled fuel-injection system. In addition, the physical dimensions of the S46- and S60ME-B bedplates are identical to those of their MC-C and ME-C equivalents, greatly facilitating installation of the new technology with the same footprint if required.

Electronic fuel injection makes the new ME-B engines well-equipped to meet the new Tier II emission requirements, and is an efficient way of managing current environmental-emission requirements.
As with the larger MAN B&W ME-engines, the Alpha Lubricator comes as standard with all engines, ensuring a very low, cylinder lubricating-oil consumption as the advanced, electronic, user-friendly interface allows precise adjustment. Market reception for the ME-B series has been very positive to date with a significant 88 orders already received.


3D model of an ME-B engine

The first ME-B engine was built in December 2007 by STX Heavy Industries Co., Ltd. at its Changwon works in Korea. The 6S40ME-B delivers 6,810 kW at 146 rpm with an MEP of 21 bar and, on account of its excellent performance, MAN Diesel decided to extend the ME-B concept to the S46 and S60 segments.

With the launch of the new engines, the entire ME-B programme now boasts a total output range from 4,350 kW to 19,040 kW.

Ole Grøne, Senior Vice President, MAN Diesel Promotion and Sales, commented: "The ME-B series has been an outstanding success since its inception and orders have exceeded even our own, optimistic expectations. The ME-B range fills a gap in the modern prime-mover market and, with the introduction of the S46- and S60ME-B units, MAN Diesel's latest engine family now has an even broader appeal."
In summary, the ME-B series offers optimal engine performance in powerful, economic and future-oriented diesel engines, ensuring that they will remain market leaders for decades to come. Based on well-proven diesel technology, the ME-B series provides engines geared to market requirements for:

- electronic fuel-injection control
- reliability
- longer time between overhauls
- better vessel manoeuvrability
- very low life-cycle costs ■

MAN Diesel Gets China Hooked

MAN Diesel engines to power Asia's largest floating crane

MAN Diesel Shanghai has successfully landed another engine contract in the specialised segment for large floating cranes and construction barges. Seven MAN Diesel 9L32/40 gensets will power a newly designed (DLV 4400), heavy-lift, floating crane from Shanghai Zhenhua Port Machinery Co Ltd (ZPMC) that has a 4,400-ton lifting capacity.

Graphical representation of the DLV 4400

The total, installed output of 31.5 MW will supply the crane's propulsion and manoeuvring power, as well as a hotel-accommodation load for 250 people. The vessel, which can propel itself at up to 12 knots in trial conditions, will also be equipped with a dynamic-positioning system classed GL DynPos–AutR. The specified propulsors are 2 × 2,500 kW tunnel thrusters at the bow of the vessel, 2 × 2,500 kW retractable azimuth thrusters at the bow, and 2 × 4,500 kW azimuth thrusters at the stern.

A helicopter platform will be located on the foredeck, with the fully rotational main crane to be installed on the afterdeck. The DLV 4400 hull will be built by an as-of-yet undisclosed, Chinese yard, with ZPMC handling the final outfitting and mounting of crane equipment at its own shipyard on Changxin Island in the mouth of the Yangtze River.

Zhou Ming Li, MAN Diesel's Senior Sales Manager for Offshore Business, reported from Shanghai that the record-breaking, floating crane will support the ever-growing, offshore, oil-and-gas-exploration activities in Chinese waters. He continued, "Additionally, the ZPMC organisation has several floating cranes in their portfolio. For Asia, the largest, revolving, floating crane in operation to date is also designed and manufactured by ZPMC and is a (DLV 4000) unit with a lifting capacity of 4,000 tons. The latest, repeat order for this type of floating crane is powered by a package of MAN Diesel gensets, comprising 3 × 6L32/40 and 2 × 7L23/30 engines. This vessel's basic construction will be carried out by Jiangsu Eastern Shipyard." In contrast to the larger, 4,400-ton crane, the 4,000-ton unit is neither self-propelled nor self-navigated, but will be moved by tug and positioned by thrusters and anchor winches. The MAN Diesel engines for both floating cranes are packaged with alternators from ABB, and manufactured by South Korean MAN Diesel licensee, STX Corporation.

ZPMC

Shanghai Zhenhua Port Machinery Co. Ltd (ZPMC) is a world-famous manufacturer of cranes and large steel structures. Its main products include quayside container cranes, rubber-tyred gantry cranes (RTGs), bulk-material ship loaders and unloaders, bucket-wheel stackers and reclaimers, portal cranes, floating-crane engineering vessels, and large steel bridge structures. ZPMC is the only large-crane manufacturer in the world that owns vessels for transportation. ■

Principal Particulars – Floating Crane DLV 4400	
LOA	174.80 m
LPP	165.00 m
Breadth moulded	48.00 m
Draught moulded	15.00 m
Crane-lifting draught	~8.00 - 10.00 m
Pipe-laying draught	~7.00 - 8.00 m
Navigation draught	~6.60 m
Speed	11.5 kn
Accommodation	250 people
Navigation area	unrestricted

Crane capacity:	
Boom length – main hook	80 m
Aux. #1 hook	95 m
Aux. #2 hook	105 m

Hook capacity:	
Main hook (slewing)	3,000 tons × 30 m
Main hook (fixed)	4,400 tons × 37 m
Aux. #1 hook	550 tons × 95 m
Aux. #2 hook	100 tons × 109 m

Isabella Kosan Acclaimed as 'Ship of the Year'

Ethylene carrier with MAN Diesel machinery package snags prestigious award

The *Isabella Kosan* recently took the award for Ship of the Year 2008 at the prestigious Lloyd's List Awards. The ship is the first in a series of 12 × 8,000 m3 ethylene carriers ordered by Lauritzen Kosan, the gas-carrier division of Danish shipowner, J. Lauritzen A/S, and was constructed by Sekwang Heavy Industries in Korea.

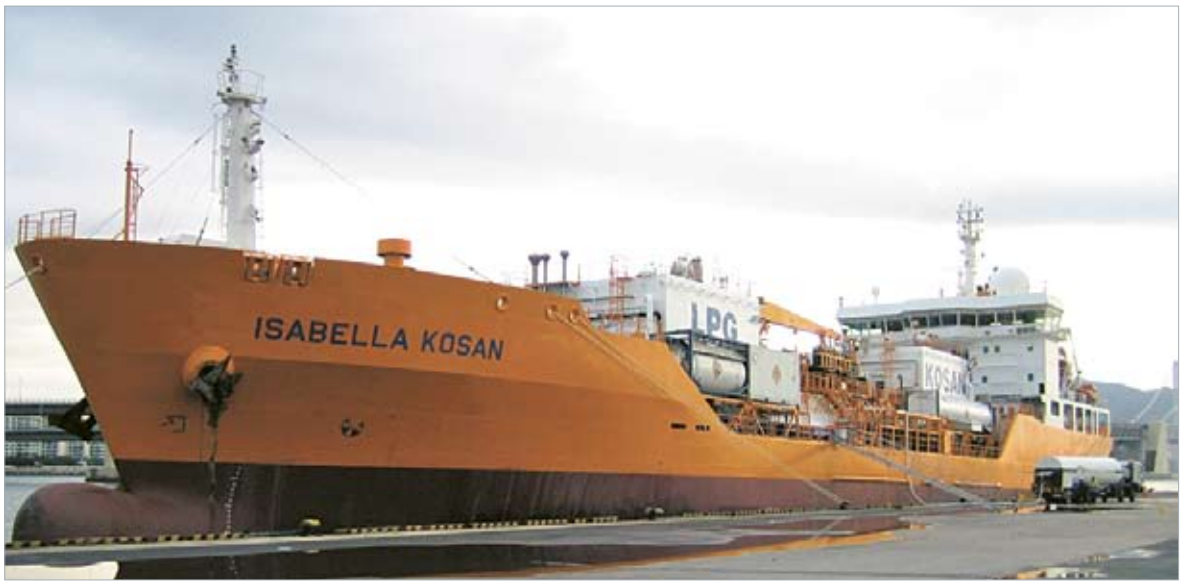
The Ship of the Year award celebrates engineering innovation in shipbuilding and ownership and considers the many factors which go into a successful, new design. The judges took into account such vital elements as innovation, safety, environmental protection and operating efficiency.

Throughout the design and building phases of the vessel, special attention was given both to minimising environmental impact and optimising the working environment aboard.

The Isabella Kosan's main engine is an MAN B&W 8S35MC driving an Alpha CP Propeller via a RENK KAZ propeller-shaft-disconnecting-device, and a RENK SHHL tunnel gearbox via a 1500 KVA electrical motor/alternator. With this take-home/take-away system, the main engine can be disengaged, and propulsion power to the propeller delivered by the auxiliary generators.

Auxiliary and emergency power is supplied by 1 × MAN Diesel 6L16/24 and 3 × MAN Diesel 7L16/24 GenSets. One of the 7L16/24 engines has also been specially adapted by MAN Diesel's GenSet division in Holeby to run on dual-fuel, the additional fuel in this instance comprising gas evaporation from the cargo.

The ship is equipped with containerised deck tanks and nitrogen units to further enhance the vessels' operational and environmental flexibility. The Isabella Kosan is capable of transporting products at a minimum temperature of -104 degrees Celsius and a maximum pressure of 6 bar.



The Isabella Kosan

"The design of our new ship has only been accomplished by utilising the accumulated know-how and through the team efforts of our skilful employees worldwide. The award is a welcome recognition of our continued efforts of optimising our ship design through innovation and dedication to protect the environment and to provide our customers with the best possible transportation solutions," says Jan Kastrup-Nielsen, president of Lauritzen Kosan A/S. ■

Seasoned Campaigner Returns South

Centurion Del Atlantico back fishing in southern hemisphere after major PrimeServ refurbishment

MAN Diesel PrimeServ Frederikshavn has successfully completed a large, main-engine repair and overhaul aboard Argentinian factory-trawler, *Centurion Del Atlantico*. The 21-year-old vessel arrived at Orskov Yard, Denmark for a complete, main-engine overhaul and an extensive updating and renewal of its accommodation facilities, as well as its fish-processing plants.

From Japan to Argentina

The ship's Norwegian owner, Aker BioMarin, decided to bring the vessel all the way to the northern hemisphere due to the vast amount of specialist work required onboard and the complex technology involved.

The Centurion Del Atlantico was originally built in Japan in 1986 as the Akebono Maru, and at the time was the world's largest fishing vessel. It is a 118 m factory-trawler, with a crew of 100 when fully operational. Today, the vessel operates in the triangle between Argentina, the Falkland Islands and Antarctica where it typically processes such catch as southern blue whiting and hoki into surimi (fish-purée).

The vessel is powered by a MAN Diesel main-engine type 6L58/64. The four-stroke, medium-speed engine was built by MHI (Mitsubishi Heavy Industries) and had clocked up approximately 140,000 hours prior to arrival in Denmark.

Japanese documentation

Dan Larsen, Group Manager of PrimeServ Frederikshavn, said: "It has been a demanding and challenging process – not just another routine repair task. Jörg Oppermann, from PrimeServ Hamburg, has been a great and indispensable help in this project. Andreas Schmager from PrimeServ Hamburg handled the sourcing of components, which was rather difficult as the plate/item numbers are for an old, Japanese licence-engine originally built for a Japanese customer. Accordingly, most of the engine documentation aboard was only in Japanese."

Teamwork

The extensive main-engine project was handled by MAN Diesel PrimeServ in Frederikshavn and supervised by Jörg Oppermann, MAN Diesel's L58/64-expert from PrimeServ Hamburg.

Superintendent /Technical Manager, Aage Linningsvoll, and Chief Adviser, John Mortensen, coordinated the ship's engine crew along with the owner's representative and the MAN Diesel/Orskov yard team. In particular, the Orskov yard team was involved in the efficient crane handling of such major, main-engine components as the engine frame and crankshaft.

The Centurion del Atlantico at dock in Frederikshavn

Principal Particulars – Centurion Del Atlantico

Previous name	Akebono Mary (1986 - 1992)
Class Relation	DNV Class - 1A1 Stern Trawler
DNV ID	17945. IMO No: 8610021
Port	Ushuaia, Argentina
Year of Build	1986
Loa	118.5 m
Lbp	107 m
Breadth	18 m
Draught	7.5 m
GT (ITC 69)	5,943
DWT	4,797
Crew	100 (fully operational)
Yard	Mitsubishi Heavy Ind. Ltd.

Splash oil system

The vessel's existing oil-mist detector needed replacement and therefore the engine was updated with a new Splash Oil System. This was ordered from PrimeServ Hamburg and fitted in just two days. Starting-up, quay trials and the subsequent sea-trial passed with just minor hitches to report, one of these being a fuel pump that needed replacement.

Back on the job

Since its overhaul, the Centurion Del Atlantico has returned to fishing in the harsh, Argentine waters and has operated reliably without problem.

Summary of Repairs and Overhauls

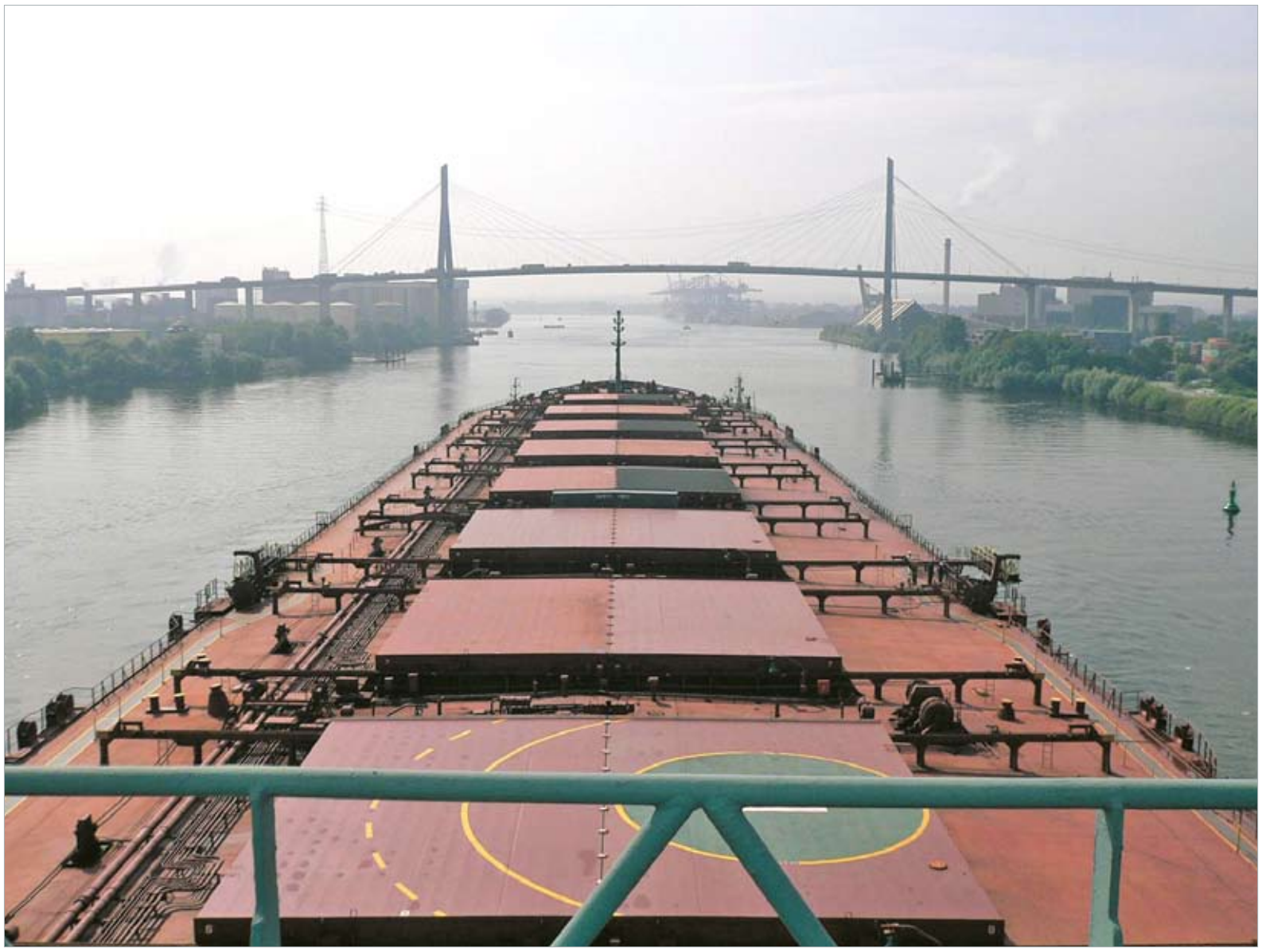
- The owner replaced all cylinder heads before the vessel arrived and dismantled the engine.
- A complete set of new cylinder-head stay bolts was fitted as two were broken on arrival.
- Seven cylinder liners were honed in PrimeServ Frederikshavn's workshop, including the spare liner stored onboard.
- All pistons were forwarded to PrimeServ Hamburg for overhaul.
- Connection rods were control-measured aboard the vessel with the upper parts forwarded to Hamburg for overhaul.
- Due to local corrosion, the cooling jacket 'backing rings' were forwarded to PrimeServ Hamburg for metal-spraying and machining.
- The vibration dampeners on the crankshaft and camshaft were overhauled on site.
- Two injection pump-cams were replaced due to wear.
- All camshaft bearings were replaced.
- During the crankshaft-polishing process, some dents were found. These stemmed from the onboard straightening of the crankshaft eight years previously after a bearing breakdown. Further investigation showed large areas on the crankshaft with excess surface hardness and small cracks. During a 'true-running' test, a large bend was also revealed. To save time, the owner was prepared to install a new crankshaft. However, due to the delivery time, it was decided instead to send the existing one to PrimeServ Hamburg for dismantling and machining of all journals. The crankshaft was subsequently re-assembled and fitted to the engine frame with oversize bearings.
- All fuel-injection pumps were forwarded to Hamburg for complete overhaul.
- All roller guides were overhauled at PrimeServ Frederikshavn.
- All cylinder-head covers with rocker arms were dismantled and control-measured at Frederikshavn.
- The governor was forwarded to Woodward in Holland for complete overhaul.
- During engine start-up and quay-trial, excessive clearance of the terminal, shaft-bearing bushings for the fuel-injection pumps was discovered. New bushings were fitted.
- The MHI-manufactured turbocharger was dismantled and overhauled by an external, Mitsubishi turbocharger specialist. A new filter insert was manufactured in Frederikshavn.
- Alignment and seating of the engine on the ship's foundation was performed by PrimeServ Frederikshavn. ■

The reconditioned crankshaft pictured on its restoration to the engine room

Hamburg Renews Constance N

PrimeServ applies unique technology to repair old lady

Something was ailing the *Constance N*. The 24-year-old bulk carrier's 12,335-kW main engine K8SZ 70/150 C – Lic KHI just wasn't performing satisfactorily anymore. Strange engine operating-parameters indicated that there was something wrong with the fuel pumps. The German shipowner and operator, Neu Seeschiffahrt GmbH, Hamburg, asked MAN Diesel PrimeServ in Hamburg to investigate the cause. PrimeServ visited the ship in Rotterdam to check the fuel pumps and the engine operating-parameters during the short sea-passage to Hamburg.



The Constance N arrives in Hamburg

PrimeServ Superintendent Engineer, Philipp Heine poses with the story's main character in the Port of Hamburg. Known as »Germany's gateway to the world«, it is the ninth largest port globally

The bulkhead between the engine room and first cargo hold was cut open to create extra space for, among other things, the propane gas canisters and burners used in heating up the crank web

The reason for the abnormal parameters was found when PrimeServ engineers Luciano Marcarini and Philipp Heine checked the fuel-pump timing where the crank webs cylinder 2 aft and cylinder 6 fwd. of the semi-built crankshaft had slipped by 10.5 and 16 degrees respectively. Accordingly, the engine's firing sequence was in turmoil, which explained the strange engine-parameters and unsatisfactory performance to a large extent.

The shrink fit marks of crank web and journal are to be in line. The photo indicates the reason for the wrong engine timing.

The defect was immediately reported and a quotation for repairs was prepared and accepted by the ship owners even before the ship had arrived at the port of Hamburg.

The shipowner had good reason to react so quickly with the repair order. And that's because, uniquely in the world, MAN Diesel has the technology to open the shrink fit between a crankshaft's journal and web in situ, using liquid nitrogen gas for cooling, liquid propane gas for heating and predetermined pistons and cylinder liners of the engine as hydraulic jacks to reposition the crank webs.

MAN Diesel PrimeServ Hamburg has successfully carried out this type of repair on many occasions around the globe, using about three days to reposition one web. Importantly, because of the high charter rates that currently exist for bulk carriers, the Constance N's owners wanted her back in service as soon as possible. The alternative repair of removing the crankshaft partly rebuilding it in a workshop would have taken at least four months and proved five to six times more expensive.

The Constance N can carry 224,666 tons of cargo, with its length of 315 m, width of 50 m and total height of 26 m from the ship's keel to the main deck. Accordingly, the Hamburg Port Authority would not allow the ship to dock alongside MAN Diesel PrimeServ's own berth at Hachmannkai because of its large size. Therefore, upon discharging its cargo, another repair berth at Unikai within the port of Hamburg was provided.

The repositioning of the crankshaft's two crank webs took four days.
The ship's large CP propeller has a diameter of 9.15 m. At the engine's full rate of 132 rpm, this makes 52.8 rpm and a speed of 14.7 knots. The Constance N is one of the few ships with a two-stroke engine that has a reduction gear. Because the main engine and two NA 57 turbochargers had completed approximately 160,000 operating hours, some more servicing work had to be performed in order to restore the Constance N's original performance. Finally, in December 2007, she sailed again and has since successfully completed two round trips from Brazil to Europe. ■

MAN Diesel A/S

Teglholmsgade 41
DK-2450 Copenhagen SV
Denmark

Tel.: (+45) 33 85 11 00
Fax: (+45) 33 85 10 30

MAN Diesel SE

Stadtbachstrasse 1
D-86224 Augsburg
Germany

Tel.: (+49) 821 32 20
Fax: (+49) 821 3 22 33 82

MAN Diesel Ltd.

Bramhall Moor Lane
Stockport
SK7 5AQ
United Kingdom

Tel.: (+44) 161 483 1000
Fax: (+44) 161 487 1465

MAN Diesel SAS

Le Ronsard Paris Nord 2
22 Avenue des Nations
BP 84013 Villepinte
95931 Roissy Ch de Gaulle Cedex
France

Phone: +33 1 48 17 63 00
Telefax: + 33 1 48 17 63 49

For further information

Group Marketing Communication
MAN Diesel A/S
DK-2450 Copenhagen
Denmark

Tel.: (+45) 33 85 11 00
E-mail: dieselfacts@dk.manbw.com
www.mandiesel.com

Publisher: Peter Dan Petersen, MAN Diesel A/S