



schip en werf

50ste jaargang, 10 juni 1983, nr. 12

TIJDSCHRIFT VOOR MARITIEME TECHNIEK

Schip en Werf – Officieel orgaan van de Nederlandse Vereniging van Technici op Scheepvaartgebied

Centrale Bond van Scheepsbouwmeesters in Nederland

Nederlands Scheepsbouwkundig Proefstation

Verschijnt vrijdags om de 14 dagen

Redactie

Ir. J. N. Joustra, P. A. Luikenaar en
Dr. ir. K. J. Saurwalt

Redactie-adres

Heemraadssingel 193, 3023 CB Rotterdam
telefoon 010-762333

Voor advertenties, abonnementen en losse nummers

Uitgevers Wyt & Zonen b.v.
Pieter de Hoochweg 111
3024 BG Rotterdam
Postbus 268
3000 AG Rotterdam
tel. 010-762566*, aangesloten op telecopier
telex 21403
postgiro 58458

Bij correspondentie inzake abonnementen s.v.p. het 8-cijferige abonnementsnummer vermelden. (Zie adreswikkell).

Jaarabonnement	f	67,40
buiten Nederland	f	109,75
losse nummers	f	4,80
van oude jaargangen	f	5,95

(alle prijzen incl. BTW)

Vormgeving en druk

Drukkerij Wyt & Zonen b.v.

Reprorecht

Overname van artikelen is toegestaan met bronvermelding en na overleg met de uitgever. Voor het kopiëren van artikelen uit dit blad is reprorecht verschuldigd aan de uitgever. Voor nadere inlichtingen wende men zich tot de Stichting Reprorecht. Joop Eijstraat 11, 1063 EM Amsterdam.

ISSN 0036 – 6099



The XVth CIMAC and Rudolf Diesel

The XVth CIMAC Conference to be held this year in Paris; 125 years after the year 1858 in which Rudolf Diesel, the inventor of the Diesel engine, was born in the same city of Paris. The engine he invented 90 years ago is now the main reason, for the 15th Conference of Dieselenine manufacturers, scientists and users from all over the world. Rudolf Diesel started 90 years ago to build the prototype of an internal combustion engine in the Maschinenfabrik Augsburg, the origin of the MAN company of today. His engine combined reliability and durability with a high economy, which has not been surpassed today; it's thermal efficiency has now passed the 50%.

It was Rudolf Diesels invention which has helped mankind to achieve a significantly higher standard of living and greater prosperity. His engine is the most economical in converting crude oil into mechanical power. It is expected that no other engine will surpass this record in the next ten years. So the Dieselenine will hold this record for 100 years. The first dieselenine build in Augsburg, made its way in the world via many licences in hundreds of factories all over the world. The Dieselenine has been used for propulsion on land, at sea and even in the air and for the production of electrical energy used as a power source for all kinds of machinery.

The efficiency of the first Dieselenine amounted to 16% and was in that time already a sensation in comparison with the steam engine's efficiency. Today, efficiencies of over 50% are reached which is close to the limits of what is technically feasible. However, the majority of the marine engines which are those with the highest efficiency are now built in Japan and even in Korea, as the focal point of shipbuilding has shifted from Europe to Asia. Also the Peoples Republic of China is going to build medium speed marine Dieselenines in the very near future with a licence of MAN. This has caused considerable concern both for shipbuilders and the producers of big low-speed marine engines in Europe. In the Netherlands the only manufacturer of low-speed engines, the Royal Scheldt Company KMS is operating on its own

again after detaching itself from the RSV company and tries hard to survive as a builder in licence of Sulzer low-speed marine diesels.

Medium and high speed engines are still being built with success by Stork Werkspoor Diesel in Amsterdam, from where the TM 410 and 620 types medium speed engines find their way in the world of ships propulsion. In Zwolle SWD started the production of the SW 280 engine which will find its way to fishing vessel- and coast-propulsion.

In Appingedam Brons Industrie is busy with the production of a total of 40 a-magnetic RUB type engines for the Tripartite minehunters built in France, Belgium en The Netherlands. The first Dutch vessel was commissioned on the 28th of May. Brons Industrie also started the production of the MAN 20/27 type medium speed dieselenines.

The Bolnes Motorenfabriek B.V. in Krimpen is still producing its DNL and VDNL-series medium speed engines which were recently successfully adapted for the use of heavy fuel oil. The Bolnes engine is still widely used, especially on board dredging vessels, fishery vessels and tugboats.

Finally the only high speed diesel manufacturer DAF in Eindhoven is producing his engines for road traction, generators and in-land shipping. Daf is pinpointing their research on all factors related to the improvement of combustion efficiency and sound isolation.

Inhoud van dit nummer:

The XVth CIMAC and Rudolf Diesel

The Brons-MAN type 20/27 Diesel

A New Separation System for cleaning of High-density Heavy Fuel Oil

An Advanced Power System for Deepsea Fishing

Nieuwsberichten

Despite the worldwide economical recession, the Dutch medium and high speed dieselengine manufacturers managed to

keep their production on a healthy level and they all hope for an improvement in world shipping which will bring back new activity

to the shipbuilding industry.

P.A.L.



HNMS 'Alkmaar', the first of a series of 15 Tripartite mine-hunters commissioned on the 28th of May 1983. The GRP-hulled ship is built by Van der Giessen-De Noord and powered by an A-RUB 215 dieselengine, 1400 kW built by Brons Industrie, good for a speed of 15 knots.

The Brons-MAN type 20/27 Diesel. *

An economical universal engine

by Karl Wojik**

Summary

The 20/27 engine is offered with a cylinder rating of 100 kW (90 kW) at 1000 rpm (900 rpm). At the moderate mean effective pressure of 14.15 bar, its conservative firing pressure is 100 bar. The in-line version is available with 4 to 9 cylinders and the Vee version with 12, 14, 16 and 18 cylinders. The engine is designed to run on Diesel or heavy fuel oil, but can be adapted for Diesel/gas operation.

The concept of the 20/27 engine, developed with the expertise of a high-performance engine builder for the aforementioned moderate loads, has resulted in a very sturdy, reliable and attractively priced unit. The successful launching of the 20/27 engine on the market within a short time is to be attributed to these reasons as well as to its wide range of application.

The basic concept of the engine is presented. The design features of some components are explained in detail. The operating values mentioned prove that meticulous matching of the running gear, turbocharging and injection systems has led to remarkably low fuel consumption rates. The operating results achieved so far after 13,000 hours of operation are thoroughly positive.

* Lecture presented to the members of the Netherlands Society of Marine Technologist in Amsterdam and Rotterdam on 19th and 20th January 1983.

** MAN Augsburg.

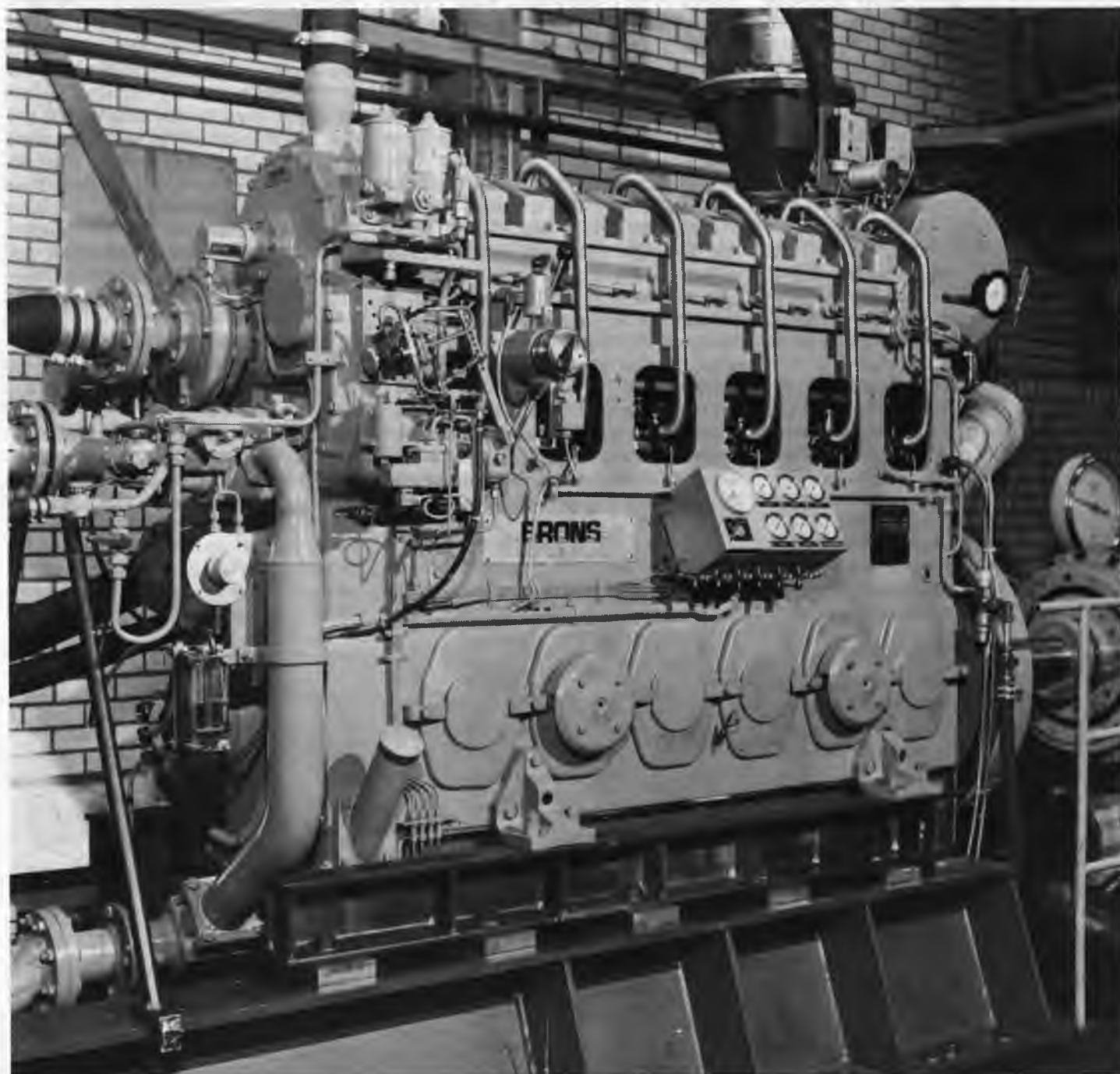


Fig. 1. A Brons-MAN type 6L20/27 engine rating 600 kW at 1000 rpm built by Brons-Industrie N.V. in Appingedam (The Netherlands).

Introduction

By February 1983, only three years after the launching of the MAN-B&W type 20/27 on the market, more than 450 engines aggregating 3,700 cylinders had been sold or commissioned. It is interesting here to look at the most important applications. About two thirds of the units sold are used as marine engines and the rest as stationary engines. About half of the marine engines operate as auxiliary engines and the second half is made up of almost equal shares of propulsion engines and offshore engines. Fig. 1 shows a view of a Brons-MAN diesel engine type 6L20/27. The total number of engines sold or delivered and the wide range of application underline how readily the engine has been accepted on the market, bearing in mind that it was only recently that the M.A.N.-B&W licensees began to phase this engine into production. The success of the 20/27 engine on the market is to be attributed above all to its high cost-effectiveness and sturdiness. On the basis of the experience gained in the production of heavy-duty engines, M.A.N.-B&W purposely designed the 20/27 engine as a moderately loaded, simple multi-purpose unit which is highly economical and covers a wide range of different applications. The engine is equally suitable as a propulsion unit for coasters, inland vessels, trawlers and tugs and as an auxiliary unit to drive generators, pumps and container handling gear aboard ships or generators and cogeneration plants ashore. The 20/27 engine is offered with the cylinder rating of 100 kW (90 kW) at 1,000 rpm (900 rpm). At the moderate mean effective pressure of 14.15 bar, its rather conservative firing pressure is 100 bar. The mean piston speed does not exceed 9 m/s. The in-line version is available with 4 to 9 cylinders and the Vee version with 12, 14, 16 and 18 cylinders. The engine is suitable for burning Diesel and heavy fuel oil but can also be adapted for dual-fuel operation.

Engine structure

When burning Diesel oil under ISO conditions the fuel consumption rate of the V 20/27 engine is 206 g/kWh and this engine is thus one of the leaders in its power class. High engine efficiency necessitates a comparatively high firing pressure to mean effective pressure ratio, an efficient turbocharging system, optimally matched injection and low friction inside the running gear. The 100 bar firing pressure at a mean effective pressure of about 14 bar is conducive to low fuel consumption rates of the 20/27 engine. Thanks to its sound configuration, the engine frame can withstand the aforementioned firing pressure. Frames of the same concept are also used for high-performance engines with peak pressures of 145 bar.

The in-line engine frame (Fig. 2) features an advantageous rectangular cross-section.

It is thus possible for the frame to accommodate not only the running gear and cylinder liners but also the charge air manifold on one side. In the case of the V engine (Fig. 3) the charge air manifold is located in the space between the two cylinder banks. The charge air is admitted to the individual cylinders from this manifold. Integration of the charge air manifold into the frame not only permits good utilisation of space, with the engine being narrow, but also efficient silencing, as borne out by the impressively low noise level of 102 dB (A) measured.

Sturdy supporting cross-sections extending over the entire length of the engine give a low-deformation frame. The underslung crankshaft is supported by main bearing covers. In the in-line engine, these covers are secured to the frame by two vertical bolts and in the Vee engine by two vertical plus two horizontal bolts. The crankcase of the in-line engine is closely matched to the enveloping curves of the running gear. The Vee engine uses the same cross-sectional dimensions. The power-flow-compatible wall arrangement in way of the cylinders and bearings results in low stresses of the frame, which is made of normal grey cast iron. The highest stresses were measured at the main bearing bolt holes where they amounted to $125 \pm 10 \text{ N/mm}^2$, which is indicative of high safety. The simple configuration and the efficient utilisation of space resulted in a very favourable power/weight ratio.

The engine frames feature large crankcase openings which ensure ease of access for connecting rod assembly. The walls on the two sides of the frame have threads at the bottom to which rigidly or resiliently seated

supports can be screwed. It is thus possible to select the engine mounting most suitable for the installation concerned, with minimum space being required.

With a view to making the engine simple and sturdy, the camshafts are arranged in way of the cylinder heads. The cams of the camshaft are thus able to actuate the charge renewal valves straight through rocker arms. It was thus possible to dispense with the tappets and pushrods, required by most other engine concepts. The camshafts are seated in a casing of their own. It is thus possible to keep the engine frame compact and its outer contours simple. Whereas simple mounting of the camshaft casing suffices with the in-line engine, the Vee engine has two surfaces arranged at right-angles to each other, for securing the camshaft casing to the frame. This arrangement facilitates correct positioning of the camshaft in two planes and ensures perfect cam and roller operation, which cannot be impaired by any assembly errors or operating forces.

The fuel injection pumps are bolted to the bottom of the camshaft casings. The camshaft casings of the Vee engine also have brackets on their outsides, which support the control racks of the fuel injection pumps. Camshaft casing, camshaft, fuel injection pumps and control racks thus form one assembly which can simply be mounted on the engine frame or lifted off, if required. The control racks are located before the injection pumps and are thus readily accessible for inspection at any time.

Low-friction running gear

A low-friction running gear concept contributes to the low fuel consumption rate of the 20/27 engine. The engine features a run-

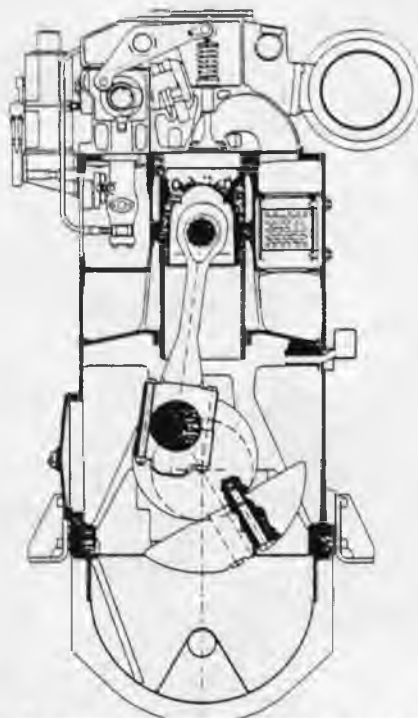


Fig. 2. Cross-sectional view of L 20/27 in-line engine.

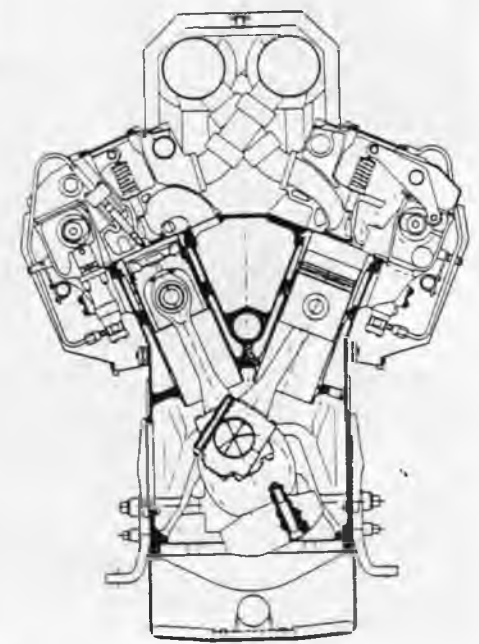


Fig. 3. Cross-sectional view of V20/27 Vee engine.

ning gear, whose geometry has been carefully matched and is thus favourable in terms of friction energy. There is a set of piston rings comprising only three compression rings and one oil scraper ring. The optimal piston skirt contour was found through a series of testruns.

In terms of strength, friction energy and costs the crankshafts for the in-line and Vee versions were optimised by means of extensive calculation work. The crankshafts are thus closely matched to the respective load conditions, with the in-line and Vee engine crankshafts having different main bearing diameters. The result is high mechanical efficiency, particularly noteworthy in the in-line engine, (Fig. 4).

The in-line engine crankshaft is a carbon steel forging. For the Vee engine crankshaft an easily machinable, heat-treatable steel is used. Moreover, a simple configuration of the webs permits drop-forging of the individual throws without any further metal cutting. Only the journals and crankpins including their fillets and flanges require machining. Both the journal and crankpin bearings use attractively priced standard bearing shells of a three-metal version which has even stood the test in high-performance engines.

The connecting rod (Fig. 5) is a simple-shaped drop forging with a horizontally split big end, held together by standard cap screws. The positive results of the finite element calculations of component strength, deformation of the connecting rod eye and resistance to fretting corrosion at the interface have been verified in engine operation. The horizontal split permits maximum supporting surface utilisation for the gas and inertia forces and thus gives a high load bearing capacity. The amply dimensioned upper connecting rod bore has no interference whatsoever and thus affords good bearing conditions for the piston pin bush. The piston pin has as simple, cylindrical shape and no cross bores which

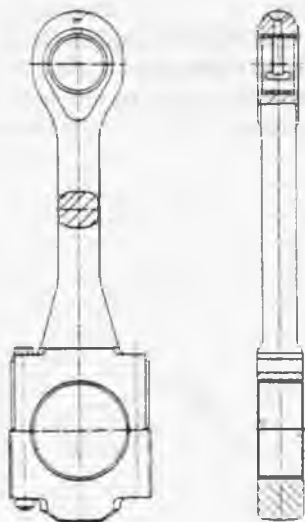


Fig. 5. Drop-forged, horizontally-split connecting rod.

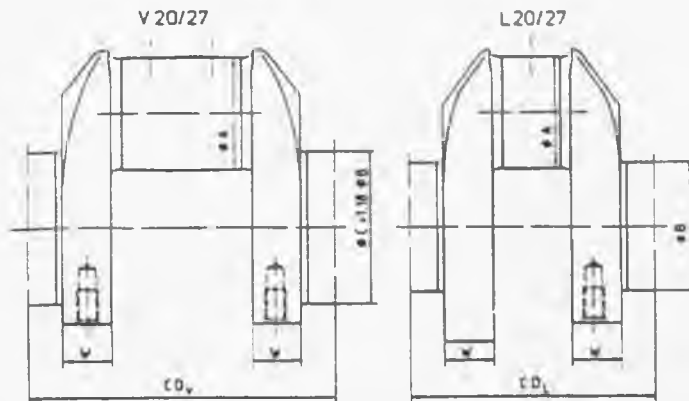


Fig. 4. Crankshafts optimised for both the in-line and Vee configurations.

would reduce the strength of the pin. For Diesel oil operation an integrally cast aluminium piston with a cooling duct, formed with the aid of a salt core, is available. A ring carrier is cast in for the top ring. For heavy fuel oil operation a composite piston with a nodular cast iron crown and a pressed aluminium skirt is used (Fig. 6). This type of construction – which was developed by M.A.N. in cooperation with the piston manufacturers – has rendered excellent service in heavy fuel oil engines aggregating far more than 12,000 cylinders and operating at up to the highest firing pressures. The cooling oil is admitted to both piston types by spray nozzles which are bolted to the bearing blocks in the frame below the cylinder liner.

Long-TBO combustion chamber components

The configuration of the components forming the combustion chamber influences not only the combustion efficiency and thus the fuel consumption rate but also the ability to reliably burn low-quality fuels.

The clearance between the piston crown and the cylinder liner of the 20/27 engine is a comparatively narrow one and, consequently, few combustion residues reach the piston rings. It is only at the top that the cylinder liner features a classic cooling col-

lar. It provides ideal conditions for a constant, effective lubricating oil film. Since the components of the 20/27 engine are relatively small it was possible to combine the cylinder head and the rocker arm housing in one casting (Fig. 7). In line with the purpose for which it has been built and its moderate mean effective pressure, the 20/27 engine features only one exhaust and one inlet valve per cylinder. It is thus not only possible to dispense with pushrods and tappets but also to substantially reduce the number of possible wearing parts. Amply dimensioned and flow-optimised valve contours which, compared with preceding versions, improve the flow coefficient by almost 20%, ensure low-loss charge renewal. There is no doubt that, thanks to these measures, a large amount of air is available in the cylinder and high-energy exhaust gas to the turbine.

The use of amply dimensioned charge renewal valves and the intention to locate the fuel injection valve as close to the centre as possible have resulted in the arrangement shown in Fig. 7 where the fuel injection valve is located slightly off-centre and is seated at an angle. A fixture ensures that the nozzle orifices are installed exactly in the requisite position and, consequently, assembly errors are impossible.

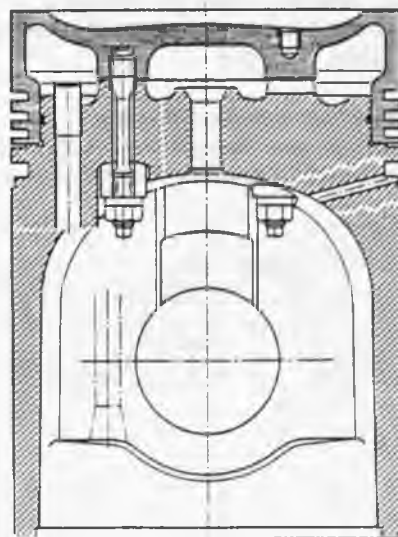


Fig. 6. Composite piston for operation on heavy fuel oil.

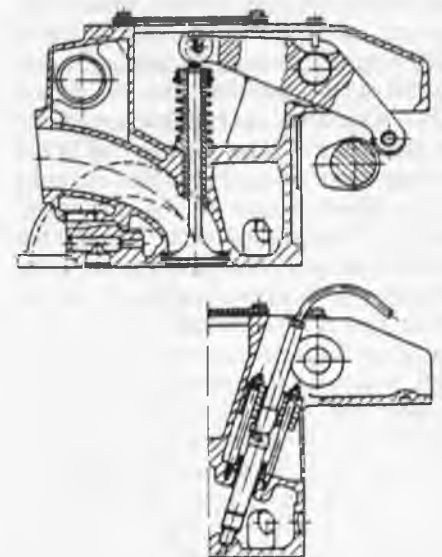


Fig. 7. Compact, easy-to-maintain cylinder head.

The charge renewal valves are made of ferritic material with very good heat conductivity and high strength. Armoured valves are used for heavy fuel as well as Diesel oil operation. Especially on these items the long-standing operating and production experience has a highly positive effect. The combination of ferritic base material with a nickel-based armouring material used for the valve seat has rendered excellent service in M.A.N.-B&W medium-speed engines for many years and is copied increasingly by other engine builders. Exhaust valve temperatures which do not exceed 400° C at any load also ensure long TBOs of this component. The description of the 20/27 cylinder head would be incomplete without a reference to the particular ease of maintenance. For instance, plug and socket pipes interconnecting the cylinder heads serve for discharge of the cooling water.

If a cylinder head is to be lifted off, the two plug and socket pipes are slid into the adjacent cylinder heads. After removing the four cylinder head bolts and disconnecting the exhaust pipe and the fuel injection pipe, the entire cylinder head complete with all items installed in it can be lifted off.

Valve timing

The camshafts, which are made up of sections for a maximum of 4 cylinders, are seated in casings of their own. The camshaft casings, which have already been mentioned in the description of the frame, provide sound shaft seats. For maximum utilisation of the space available, the camshaft casing also incorporates the guides for the fuel pump drive tappets, which run in the bores of the grey cast iron casing.

The camshaft drive gear is mounted at the 'free' end of the in-line engine and at the coupling end of the Vee engine. Thus, although the L 20/27 engine does not feature an outboard bearing of its own, the crankshaft flange nonetheless has a high load bearing capacity for the flywheel masses and couplings. In the case of the V 20/27 engine, however, an outboard bearing has been integrated into the engine frame. Allowance has thus been made for the fact that the mass forces due to the flywheel and the coupling section increase as the power output of the engine increases. The frame wall which supports the outboard bearing is also sturdy towards the top and ensures sound seating of the individual gears of the camshaft drive. With the size and arrangement selected for the camshaft drive gears, their interference with the engine frame contour is kept to a minimum and simple gear installation is ensured.

Thanks to the sophisticated arrangement of the idler gears for both cylinder banks, the V 20/27 engine can make do with the lowest number of camshaft variants for all numbers of cylinders and both directions of rotation, (Fig.8). As the camshafts of the

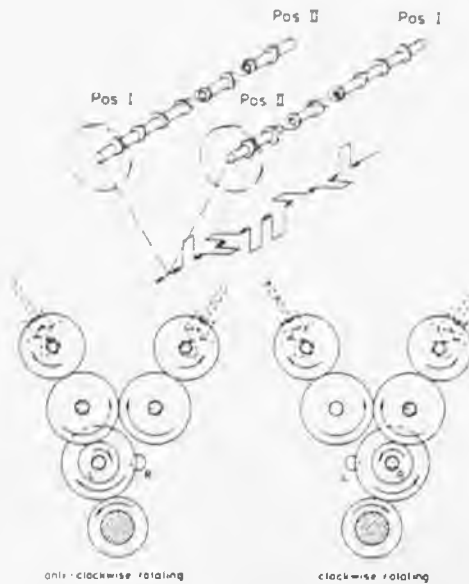


Fig. 8. Camshaft drive of the V 20/27 engine.

two cylinder banks are counter-rotating, that of the A bank of the engines with an even number of cylinders also fits the B bank after turning it through 180°, provided a camshaft gear is shrunk onto either end of the camshafts for this purpose, this being the only requirement. To change the direction of rotation from clockwise to anti-clockwise nothing is to be done but to mount the first idler gear in position 'L' instead of 'R' during assembly. The direction of camshaft rotation thus remains the same even if the direction of crankshaft rotation has been changed. Consequently, the firing-order-oriented cam distribution does not change either. A patent has been applied for the gear drive arrangement explained. This arrangement reduces the number of camshaft variants for the complete V 20/27 series from the usual 16 to 6. The gearwheels are made from drop-forged blanks. This production method involves low costs and permits good utilisation of material. The small masses of the gearwheels are also of advantage in terms of torsional vibrations.

High-efficiency turbocharging

Specialists have meanwhile recognised that constant-pressure turbocharging is of

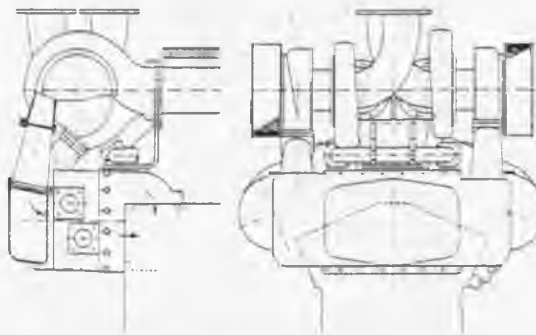


Fig. 9. Optimised free-flow design of charge-air ducting.

benefit in terms of fuel consumption and the ability to burn low-grade fuels. The engines developed by M.A.N. have been consistently constant-pressure turbocharged for many years. The operating results achieved with these engines have distinctly revealed the merits of constant-pressure turbocharging, also in ship operation. With this system, admission to the exhaust gas turbine is continuous, which results in a substantial increase in turbine efficiency. The very simple layout of the exhaust pipe system is evident. Such a straightforward layout is a prerequisite for a low maintenance load and simple maintenance.

Each cylinder bank of a constant-pressure turbocharged 20/27 engine has an exhaust manifold and turbocharger of its own. On the Vee engine the ends of the two manifolds are interconnected by a smaller pipe section. On the one hand, the cross-section of this gas transfer pipe is small enough for substantial reduction of the effect of the exhaust pulses on the cylinders of the opposite bank and, on the other hand, it is large enough for efficient balancing of the pressure between the two manifolds. This transfer socket also enables the engine to develop over 50% rated power in the event of one turbocharger failing.

Since not only the turbocharger efficiency but also the free-flow configuration of the charge air and exhaust pipes are of great importance, particular attention was paid to the air and exhaust gas ducting of the 20/27 engine. On the Vee engine, the combustion air is drawn in and compressed by the two M.A.N.-B&W turbochargers of type Nr 20, is then recooled in a common intercooler and is admitted to the charge air manifold in the space between the two cylinder banks, (Fig. 9). From this manifold, the compressed air flows to the individual cylinders. The air coming out of the compressor at a high velocity flows through diffusers, which ensure recovery of compressive energy and uniform admission to the intercooler which, in turn, ensures efficient re-cooling of the compressed air with the lowest possible pressure drop inside the cooler. Depending on the engine room layout, the entire package shown in Fig. 9 can be mounted at the coupling end or the 'free' end of the engine frame.



Fig. 10. Air ducting in the in-line engine frame.

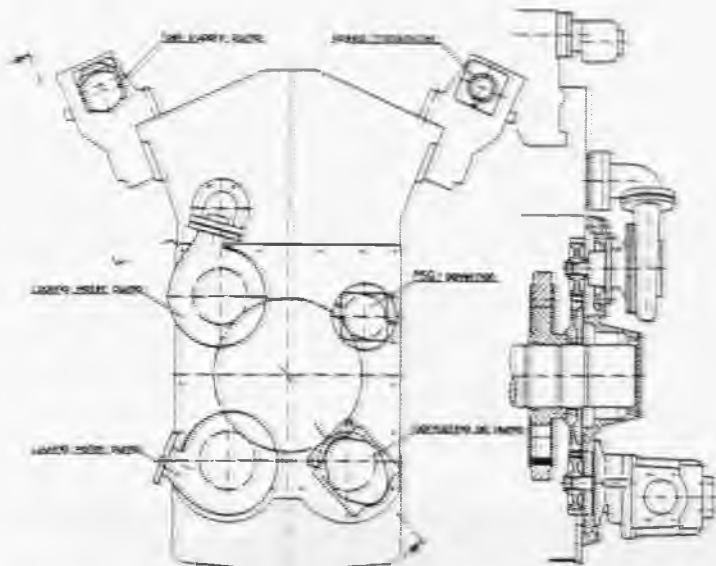


Fig. 11. Drive of supply pumps, governor and measuring units on the V 20/27 engine.

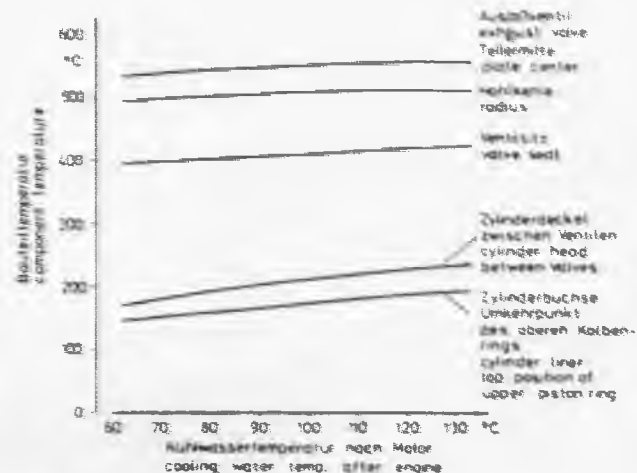


Fig. 12. Component temperatures of 20/27 engine at a high cooling water temperature.

In the case of the in-line version, the intercooler deserves particular mention as it is inserted into the engine through its ends. Since it extends over the entire length of the engines, it can make do with small cross-sectional areas. To achieve uniform admission to the cooler, the charge air flows from the compressor into the frame on the opposite side of the cooler. (Fig. 10). From the frame it flows between the individual cylinder liners to the opposite side where it passes through the cooler on a wide front. If the space inside the engine room is restricted, the intercooler can be divided into longitudinal sections. The air ducting outlined ensures a well-balanced temperature level at the contact surface of the cylinder liners, this being one of the reasons why the fuel consumption rate of the in-line engine is only 1 g/kWh higher than that of the Vee engine. It is an established fact that, with other engine types, the difference in fuel consumption between the in-line and Vee versions is larger.

Engine-mounted auxiliaries

All the auxiliaries required for largely independent engine operation, such as compressed-air starters, filters, cooling water, lubricating oil and fuel transfer pumps can be mounted on the engine.

The supply pumps of the L 20/27 engine are driven at the 'free' end by the gear wheels of the camshaft drive and those of the V 20/27 engine are driven by a central gearwheel mounted on the primary part of the torsional vibration damper, Fig. 11.

The universal governor drive permits the mounting of a host of different governors. It is thus possible to select the optimal governor for each requirement. Further auxiliaries such as speed transmitters and dynamos, etc. can be mounted at the free ends of the camshafts.

L 20/27 propulsion curve

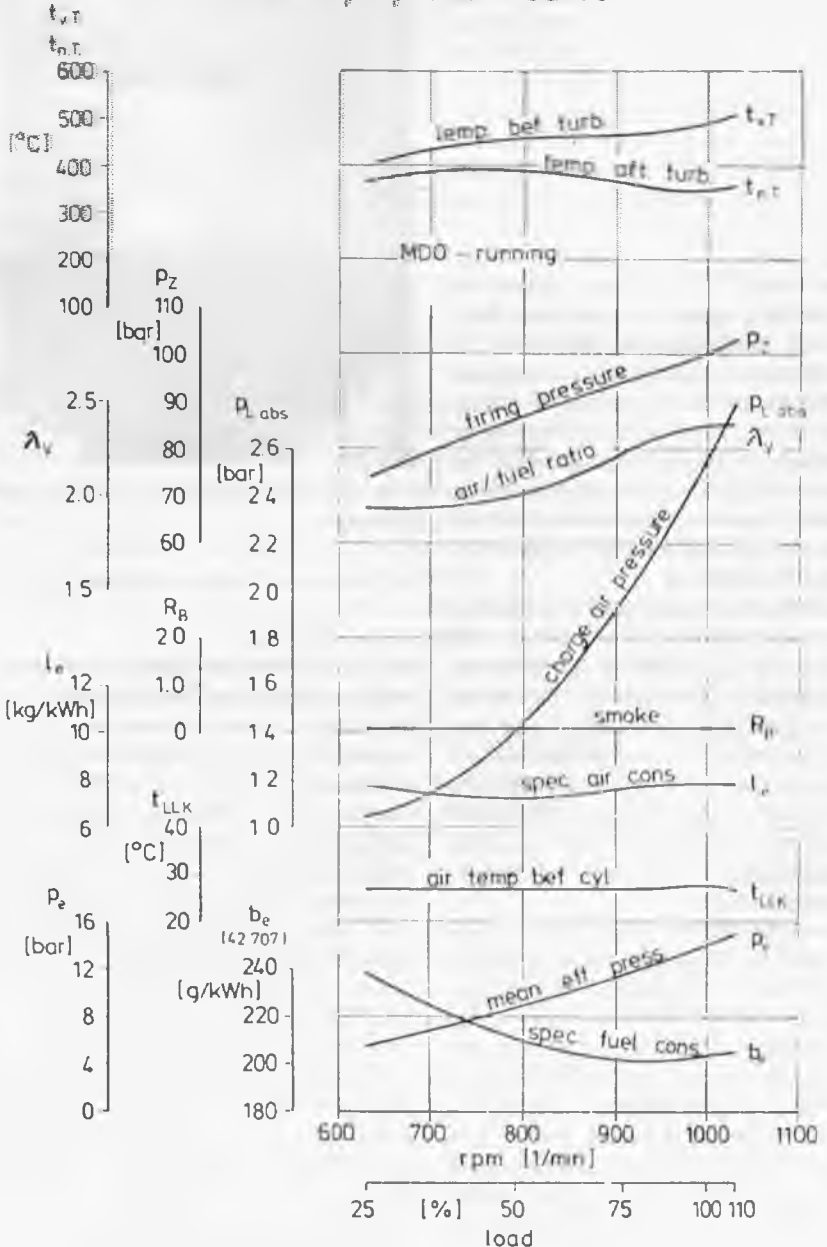


Fig. 13. Operating data of a 6L 20/27 engine (ISO conditions).

Operating results

Prior to the starting up of the first production engines, two test engines of the Diesel version and one prototype engine of the dual-fuel version had logged a total of about 2,500 operating hours. Over 5,000 hours of trial operation have meanwhile been reached.

One of these test engines burnt 240 cSt heavy fuel oil for about 800 hours at an increased cooling water temperature of 135°C. This operating method, which is termed 'high temperature water cooling' permits improved recovery of the heat contained in the cooling water, e.g. for heating purposes.

It became apparent that an increase in the cooling water temperature from 60°C to 135°C goes hand in hand with a slight increase in the exhaust gas temperature upstream and, to the same extent, downstream of the turbine, which is of advantage for waste heat recovery. Owing to the higher exhaust gas energy upstream of the turbine the charge air pressure rises too. The air flow rate rises as well, but to a lesser extent. A decrease in the fuel consumption rate was not noted. Although the absolute cooling water heat decreases, its temperature level is higher and the heat is thus more suitable for use. The smaller amount of heat dissipated in the cooling water appears mainly in the exhaust gas. It may be noted from Fig. 12 to what extent the higher cooling water temperature influences the component temperatures. A 60°C increase in cooling water temperature raises the exhaust valve seat temperature by only about 20°C. The higher temperatures of the exhaust valve in the fillet and in the centre of the plate are more dependent upon the state of the gas in the cylinder and thus respond less to the cooling water temperature.

A final alternating load and overload testrun with the aforementioned fuel viscosity and an increased cooling water temperature, which extended over more than 250 hours, proceeded without any trouble. All components inspected after this testrun were in perfect condition. These results justify the decision that, for the time being, the 20/27 engine should only be offered for selected applications and cooling water temperatures of up to 125°C.

The operating values of a 6L 20/27 engine with a normal cooling system in propeller operation may be noted from Fig.13. It is remarkable that the fuel consumption rate is low not only at the rated load but also within a wide part-load range, Fig. 14. Constant-pressure turbocharging ensures a balanced temperature level also at low loads. Not enough attention has been paid as yet to the advantage of the combustion chamber temperatures being higher at part load than with pulse-pressure turbocharging. The firing lag becomes shorter

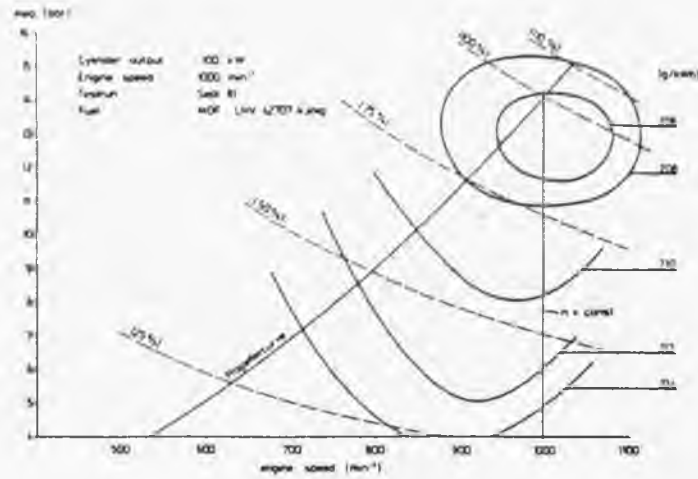


Fig. 14. Fuel consumption curves of the V 20/27 on the engine map of m.e.p. as a function of engine speed.



Fig. 15. Piston (left) and connecting rod bearing (right) after approx. 6000 hours of engine operation.

and combustion involves fewer residues which ensures that the combustion chamber remains clean in extended operation, especially when burning heavy fuel oil. Impressively low soot values over the entire load range are likewise indicative of the uniformly good combustion. For preheating the charge air in part-load operation, the constant-pressure turbocharged 20/27 engine does not require any connections as complicated as those used at one time for pulse-pressure turbocharged engines.

The fact that even the first production engines yielded good operating results is in all probability attributable in part to this extensive preliminary testing. Nevertheless, despite the extensive testruns, peripheral components of some of the first in-line engines delivered caused difficulties. Leaking intercoolers and under-rated water pumps were replaced by fully satisfactory units in cooperation with the respective sub-sup-

pliers. In the case of some engines with two particular numbers of cylinders, the bracing of the suction pipe in the oil sump cracked as a result of excitation of a natural frequency of this pipe. An improved pipe suspension was then phased into production and the few engines affected were fitted with an additional support.

The aforementioned teething trouble with a few peripheral units of the engines hardly detracted from the good impression gained from the running gear and combustion chamber components which have meanwhile logged 10,000 operating hours. The results of the piston, piston ring, cylinder liner, running gear bearing and charge renewal valve inspections carried out after operating times between 5,000 and 7,000 hours were so positive (Fig. 15) and the wear rates measured were so low that several operators extended the TBO to 10,000 operating hours.

An Advanced Power System for Deepsea Fishing



The stern trawler 'Peer Sluis' (KW 80)

Foto Pieter Kramer

'We started with a 240 HP Stork-Werkspoor Diesel engine. Today it is still Stork-Werkspoor Diesel, but now we have installed 4000 HP'.

Mr. M. Noordenbos, Managing Director of Visserij Maatschappij Kennemerland N.V. of Katwijk, The Netherlands, said this in June 1982 when taking delivery of the company's most advanced newcomer at that time, the stern trawler m.v. 'Peer Sluis' (KW 80). It illustrated the developments in the Dutch fishing industry which is constantly looking ahead to meet efficiency requirements.

At 78.2 m. in length overall and 1.700 dwt, the fishing trawler 'Peer Sluis' KW 80 is distinguished for being the biggest of its type in the Dutch fishing fleet. With the large refrigerating capacity this ultra modern trawler is capable to carry 1.700 tons of frozen fish, which allows extended fishing periods at sea. The refrigerating plant can handle 126 tons of fish a day (deep freeze temp. -28°C), through a pre-cooling tank which cools 180 tons of fish from 25°C to 0°C in 10 hours.

The 'Peer Sluis' is the first of two sister ships built for Visserij Maatschappij Kennemerland N.V., Katwijk by the shipyard 'Har-

lingen' in Harlingen, The Netherlands. The second ship, m.v. 'Hendrika Johanna' (KW 74), was delivered six months later in December 1982.

Fuel economy

A feature of the ship is the power unit (see Fig. 1). It is a Stork-Werkspoor Diesel 6 TM410 engine, rated at 4000 bhp and designed to burn low grade heavy fuel. Through a Vulcan clutch coupling and a Tacke HSU 710 reduction gear box, power is supplied to the 3 m. Berg 4-blade controlable pitch propeller and a 600 kW DC power take-off generator for electricity supply to the trawler winch and the anchor winch.

A second power take-off generator, three phase – 1302 kVA for refrigerating plant and ships electricity supply, is driven from the forward end of the engine.

Wide variations in the power demand occur with this type of installations (see Fig. 2).

Some load conditions are continuously far below max. capacity of the engine. No restrictions however on part load running on heavy

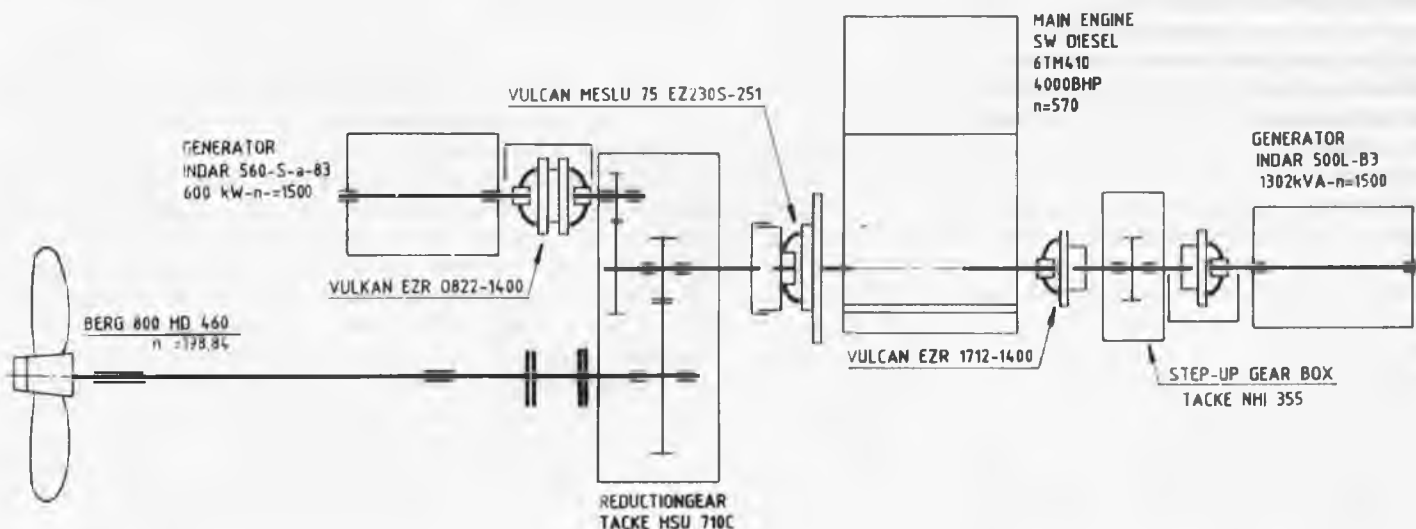
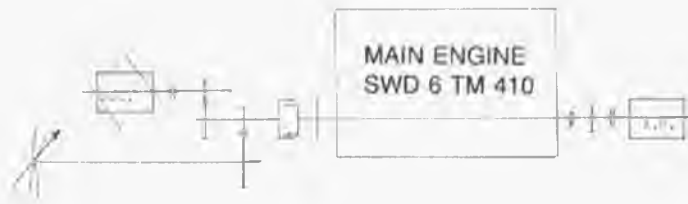
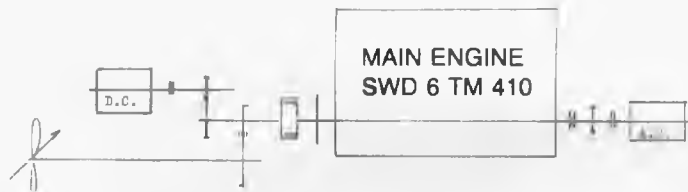


Fig. 1. Lay-out of the main engine, with couplings, gear boxes and generators.



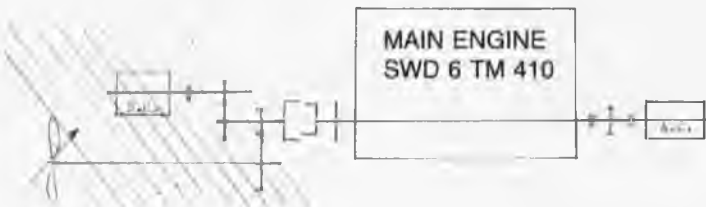
A. Vessel on the way in search for fish and refrigerating plant in service:

Power supply to controllable pitch propeller and AC generator, while the DC generator in idling.



B. Vessel fishing:

Power supply to propeller, the DC generator and the AC generator.



C. Vessel stationary:

elastic clutch couplings disengaged, refrigerating plant in service: Power supply to AC generator only.

fuels or fast power acceleration after say 24 hours at 25% load. To avoid fouling or excessive smoke at such conditions the engine is provided with a heater in series with the scavenging air cooler. An automatic air temperature control in the scavenging air system will maintain the correct elevated air temperature. An auxiliary diesel engine, running on diesel fuel, is installed to drive two generators with an output of 1.160 kVA and 600 kW and is used for the refrigerating plant etc., if power supply from the main engine is not available.

Cargo Handling

Fish is frozen and packed on board. Storage handling in refrigerating holds at different levels is fully mechanical. The refrigerating holds have a capacity of 2.650 m³. The cooling/freezing plant has freon 22 direct evaporation for the freezing installations and indirect cooling freon 22/brine for the pre-cooling installation. The refrigerating plant includes four GRASSO compressors and is installed by GRENKO 's-Hertogenbosch.

New approach

Accommodation is up to date and allows a crew of 26. The Kennemerland management wishes to introduce a continuous working shift system which on board fishing boats is quite unique. Until now it was 'all hands on deck' to handle a catch of fish. Another new item is the maintenance agreement for the main engine. The owners decided to take advantage of the possibility and have all preventive maintenance carried out by Stork-Werkspoor Diesel in compliance with the engine builders' advice and classification requirements. The ship has now been in operation for almost one year. The economic results are very promising for the future and prove the optimum combination of design and equipment.

Fig. 2. Operating conditions of the main engine.

J. C. Pasman

Boekbesprekingen

COMPUTER METHODS IN PRELIMINARY SHIP DESIGN

Door: L. K. Kupras. Uitgave: Delft University Press. 221 pagina's met een dertigtal figuren. Prijs f 49,90

In de afgelopen jaren hebben computers hun intrede in vele deelgebieden van de scheepsbouw gedaan. In dit boek wordt ingegaan op de mogelijkheden die de computer de ontwerper bij het opstellen van een voorontwerp kan bieden. Voor het bepalen van de hoofdafmetingen aan de hand van de gestelde eisen kan men allerlei methodieken gebruiken. De schrijver behandelt in dit boek hoe men bij de optimalisatie-methode en bij de methode is gebruik maakt van parameterstudies een computer kan gebruiken. De methodieken worden beschreven en met een eenvoudig getallen-voorbeeld toegelicht in de eerste twee hoofdstukken. In de hoofdstukken 3, 4 en 5 worden de ontwerpprogramma's voor een bulkcarrier en een chemicaliencarrier gegeven. In hoofdstuk 6 worden de procedures, de hulpprogramma's, beschreven die men kan gebruiken voor de bepaling van de inhoud van ruimen, het vrijboord, het machinevermogen, het gewicht en de scheepsstabiliteit.

De toelichtende tekst is buitengewoon kort gehouden, zodat ruime kennis van zaken voor het lezen van het boek een voorwaarde is. Alle gebruikte programma's worden in het boek gegeven, waarbij de programmateksten van goede toelichting zijn voorzien. Iemand die enige ervaring heeft met het programmeren in Algol-60 zal dan ook zonder veel moeite de structuur van de programma's kunnen terugvinden, en deze kunnen aanpassen aan eigen behoefte. Door de goede overzichtelijke modulaire programmastructuur is het voor ervaren programmeurs zeker mogelijk de gegeven programma's in een andere computertaal om te zetten. Een boek dat

het begin van een geheel nieuwe soort van scheepsbouwliteratuur vormt en dat de wenselijkheid van een goede samenwerking van alle betrokkenen op een bepaald deelgebied duidelijk doet gevoelen.

Dr. Ir. K. J. Saurwalt

**MARITIEM
Nederlanders en de zee**

Door H. Vandersmissen. Uitgave: De Boer Maritiem. Afmetingen: 29,5 x 22,5 cm.

184 pagina's met meer dan 48 afbeeldingen in kleur en meer dan 210 figuren en zwart-wit foto's. Paperback uitvoering met geplastificeerde omslag. Prijs f 29,50

Het boek is in nauwe samenwerking met de redactie van de NOS-televisieserie 'Maritiem' tot stand gekomen. Het is geen samenvatting van de televisieserie geworden, maar een aanvulling op de serie waarbij de onderwerpen die in de tv-serie aan de orde gesteld werden verder worden uitgediept en in een breder historisch kader worden geplaatst. Daardoor is het een geheel zelfstandig werk geworden dat een ieder die belangstelling heeft voor de scheepvaart en andere maritieme activiteiten met genoegen zal lezen. Het boek is rijk geïllustreerd en het is gelukt de tekst goed op te afbeeldingen en de daarbij gegeven vrij uitvoerige toelichting af te stemmen. In het 'Ten geleide' wordt dan ook door prof. dr. ir. J. D. van Manen, directeur Maritiem Research Instituut Nederland, terecht gesteld dat hij ervan overtuigd is dat dit boek evenals de gelijknamige televisieserie zal bijdragen tot een beter begrip van de problematiek van het maritieme bedrijfsleven en tot een hernieuwd vertrouwen in haar toekomstmogelijkheden.

Dr. Ir. K. J. Saurwalt

A new Separation System for Cleaning of High-density, Heavy Fuel Oil



Fig. 1

Alfa-Laval Marine & Power Engineering AB, a member of the Sweden-based Alfa-Laval Group, recently introduced a new separation system for cleaning of low-grade heavy fuel oil. Designated ALCAP, the system comprises a new FOPX separator, a water transducer, a water drain valve and a central control unit, the MARST I microprocessor. (Fig. 1). The system is used with Alfa-Laval's IPC or EPC discharge program equipment.

The FOPX separator is a further development of Alfa-Laval's ALFAX controlled partial-discharge type of separators. The FOPX operates similar to a clarifier, but water can be discharged intermittently from the bowl through a separate water outlet. The oil to be cleaned is continuously fed to the FOPX separator. Flow is not interrupted when sludge and water is discharged. The new separator features a flow control disc, instead of the conventional gravity disc used in purifier type separators. The same flow control disc is used for any heavy fuel oil. No adjustments are required for fluctuations in flow rate, viscosity, density and other process variables.

When separated water reaches the disc stack some water escapes with the clean oil. The water transducer, which is connected to the MARST I microprocessor, immediately detects the increase in water content in the clean oil. The MARST I unit interprets the signals from the transducer and controls the discharge of separated water from the FOPX separator bowl. The water is either discharged through ports at the periphery of the bowl or through the water drain valve, depending on the programmed discharge set on the IPC or EPC program control unit (Fig. 2).

ALCAP concept

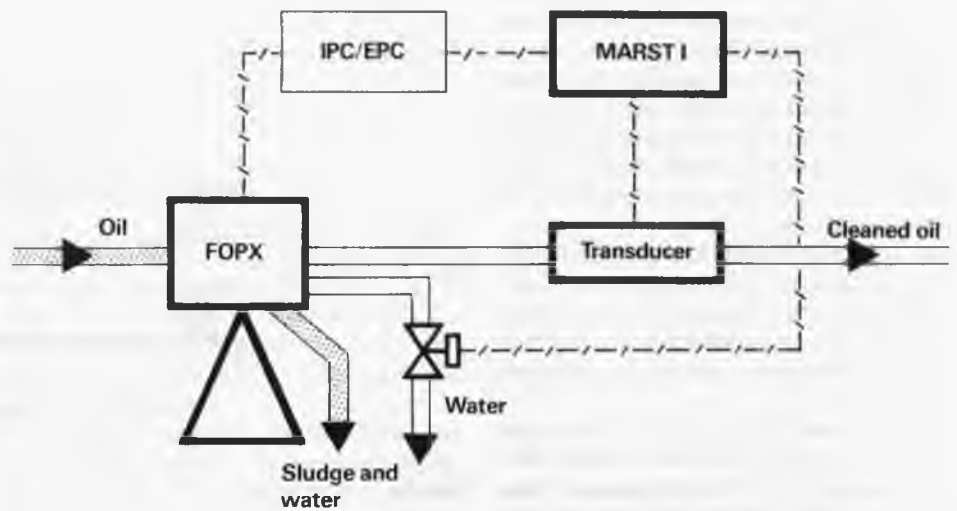


Fig. 2

The ALCAP system represents an entirely new approach to cleaning of low-grade, heavy fuel oil. Maximum density limit has been set at 1010 kg/m^3 .

The water transducer

A key of the ALCAP separation system is the WT 100 water transducer (Fig. 3) used to measure changes in the water content of the cleaned heavy fuel oil. The transducer is installed in the cleaned oil outlet of the new FOPX separator series used in the ALCAP separation system.

With the FOPX separator, Alfa-Laval has eliminated the gravity disc concept of controlling the oil-water interface in the separator bowl. This is possible through the use of a so-called flow control disc and the water transducer. When separated water reaches the disc stack in the FOPX bowl, some water escapes with the cleaned oil. The increase in water content is immediately sensed by the water transducer which

transmits signals to a microprocessor, type MARST I. The microprocessor unit, which is connected to an IPC or EPC program controller, initiates automatic discharge of the water accumulated in the bowl.

Selection of the water transducer concept was a result of efforts to develop a new separator design which would eliminate the gravity disc used in the ALFAX and MOPX series of separators. A number of 'off-the-shelf' transducers designs were considered, but none met the specific requirements for use with heavy fuel oils in a marine environment. As a result, Alfa-Laval technicians launched their own development project and designed the WT 100 unit. The measurement principle of the transducer is based on capacitance. Its accuracy is claimed to be about 0.05 percent for water contents in heavy fuel oil of up to 10 percent. The WT 100 unit comprises two concentric pipes and a box fitted to the outer flanged pipe of the water outlet. The concentric pipes are insulated from one another forming a circular capacitor. The full flow of the cleaned oil passes through this circular capacitor.

The box fitted to the outer flange houses an oscillator, a test control card and a terminal for a shielded cable which runs to the microprocessor.

Basic principle

The WT 100 unit represents a unique application of well-known and proven concept. A transducer is defined as any device which converts an input signal into an output signal of a different form; examples include the microphone, the loudspeaker and the photoelectric cell.



Fig. 3

ALCAP water transducer design

The 22 V direct current fed to the water transducer from the MARST I unit is converted to a fixed, high-frequency alternating current by the oscillator (Fig. 4). Mineral oil and water affect this current differently. When water escapes with the cleaned oil passing through the circular capacitor, there is a change in current. Simply stated, the 'input signal' is provided by the cleaned oil and separated water medium (as a change in atmospheric pressure is registered by a barometer). The 'output signal' is the change in alternating current which passes through the capacitor which is formed by the two concentric pipes of the water transducer.

The current fluctuation is registered by the microprocessor (in an aneroid barometer, the effect of the pressure on a thin-walled metal cylinder is transformed into the mechanical movement across a calibrated dial).

Admitting that the function of the water transducer may be difficult to grasp, Alfa-Laval designed the WT 100 as an 'install-and-forget component'. It requires no calibration and it is a very robust piece of equipment, the company claims. The calculated Mean Time Between Failures (MTBF) factor for the WT 100 water transducer is 50,000 hours in accordance with the MIL 217 C. specification for electronic components. This MTBF factor corresponds to five years of trouble-free operation. The WT 100 unit is the first in a series of water transducers the company is developing for various applications with lube and fuel oils in the marine and power industry.

Separation efficiency of the ALCAP system

The separation efficiency of the ALCAP system has been thoroughly tested with respect to removal of water, catalyst fines and inorganic solid particles. Tests were conducted in Alfa-Laval's laboratory in Tumba and on board M.V. Bilderdyk. The densities of the tested oils were 991, 993 and 1013 kg/m³ at 15°C.

The water analyses were made by Shell Laboratories in Amsterdam; aluminium content by Det norske Veritas, Hovik, and inorganic particles content by Alfa-Laval.

The test results are summarized as follows:

- seawater contamination is efficiently reduced in heavy fuel oil with densities up to 1013 kg/m³ at 15°C.

Example: 4% seawater was reduced to 0.3-0.5% in oil with a density of 1013 kg/m³ at 15°C.

- freshwater contamination is efficiently reduced in heavy fuel oil with a density of 993 kg/m³ at 15°C.

Example: 3% fresh water was reduced to 0.5-0.6%. However, the upper density limit for satisfactory reduction of fresh water is probably higher, up to 1010 kg/m³. Additional tests are planned to confirm this.

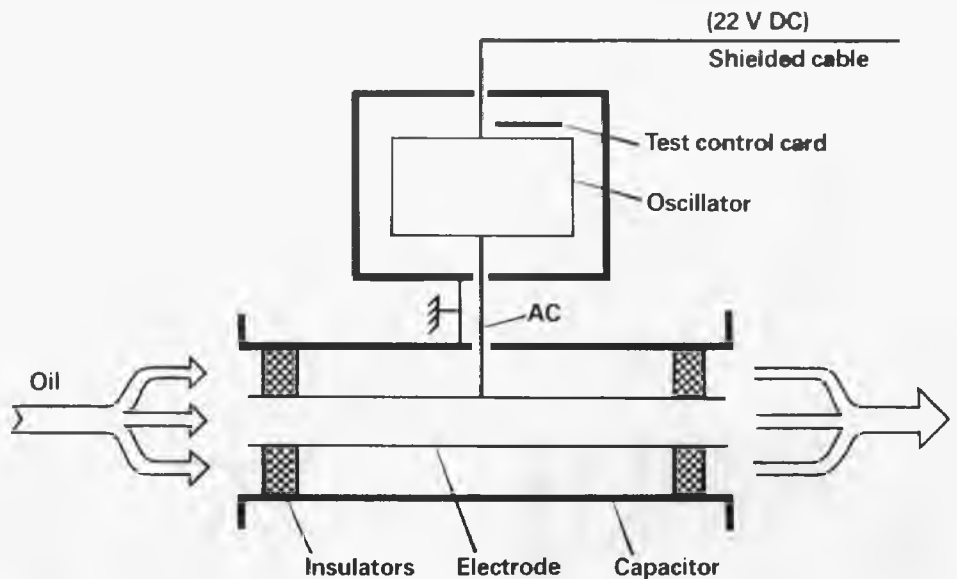


Fig. 4

- catalyst fines and other inorganic solid particles are efficiently removed from heavy fuel oil with densities up to 1013 kg/m³ at 15°C.

Example: 18.6 ppm aluminum in oil with a density of 1013 kg/m³ at 15°C was reduced to 3.3 ppm, corresponding to an 82% separation efficiency.

- laboratory and shipboard tests conducted to date confirm that the ALCAP separation system delivers optimum separation efficiently, continuously.

Based on these findings, the recommended maximum density of heavy fuel oil cleaned with the ALCAP separation systems is 1010 kg/m³ at 15°C measured at 50°C.

Tests also included a comparison of the performance of the ALCAP separation system with a traditional clarifier. Results confirmed that the separation efficiency of a traditional clarifier with respect to water and solid particles is drastically reduced when separated water has reached the disc stack.

Alfa-Laval, Shell and Sulzer cooperation

Laboratory and shipboard testing of Alfa-Laval Marine & Power Engineering's new ALCAP separation system involved cooperation with two other main actors on the fuel oil cleaning scene: Shell International, which supplied the test fuel and conducted independent tests on the water separation efficiency at Shell Laboratories in Amsterdam; and Sulzer, whose 9RND90 diesel propulsion unit powered the test vessel, the M.V. Bilderdyk.

The test oils supplied by Shell International had densities of 991, 993 and 1013 kg/m³ at 15°C with viscosities of 380, 360 and 410 cSt at 50°C respectively. The oils had an

aluminum content of up to 20 ppm for testing of the catalyst fines content. Shell International technicians took independent samples of the cleaned oil after each phase of the lab and shipboard testing.

The real test of the ALCAP system came during a series of voyages of the M.V. 'Bilderdyk', including a six-week round trip to the U.S. from Rotterdam. During the journey, samples of the cleaned oil were taken following injection of fresh water and seawater to simulate various contamination levels.

The density of the oil was 1013 kg/m³ at 15°C. The oil was from the same batch supplied by Shell International for the laboratory tests. After cleaning, the fuel was burned in two cylinders of the Sulzer engine. Sulzer technicians boarded the Bilderdyk on her return to Rotterdam and carefully inspected the test cylinders to evaluate engine performance and wear.

Alfa-Laval, Shell and Sulzer will continue to cooperate throughout continued endurance testing of the new separation system during the remainder of 1983. Based on test results to date the recommended maximum density of the heavy fuel oil cleaned with the ALCAP system is 1010 kg/m³ at 15°C measured at 50°C.

Recommended maximum viscosity is 700 cSt at 50°C.

P.A.L.



NEDERLANDSE VERENIGING VAN TECHNICI OP SCHEEPVAARTGEBIED (Netherlands Society of Marine Technologists)

VERENIGINGSNIEUWS

Personalia

Gec Benelux verhuisd

Het Benelux kantoor van The General Electric Company is verhuisd van Den Haag naar Gouda op 26 mei j.l. Het nieuwe adres aldaar is:

The General Electric Company, (plc England), Antwerpseweg 1, 2803 PB Gouda, tel.: 01820-35222, telex: 20372.

Proeftochten

Alkmaar

Na een geslaagde proefvaartperiode werd het eerste mijnenbestrijdingsvaartuig van de Alkmaarklasse op 28 mei j.l. door de scheepswerf Van der Giessen - De Noord te Alblasterdam aan de Koninklijke Marine overgedragen en onder de naam Hr. Ms. *Alkmaar* in dienst gesteld. Zoals gebruikelijk bij de Kon. Marine, is het eerste schip uit de serie naamgever van de klasse.

De kiel van dit glasvezel versterkte polyester schip is op 15 december 1978 gelegd waarna het op 18 mei 1982 door Hare Majesteit de Koningin werd gedoopt.

Na enige aanloopproblemen met de verwerking van het nieuwe materiaal lopen de schepen nu volgens schema van de band. De bouwwijze van deze schepen is te vergelijken met seriebouw van vliegtuigen. Daarvoor zijn in de speciaal voor deze schepen gebouwde hal vier stations. In een bepaald bouwstadium schuift het schip naar een volgend station waarna het buiten, via een schepenlift, te water wordt gezet en afgebouwd.

Door het ministerie van defensie is thans voor 10 schepen een bouwopdracht verstrekt. Het tweede schip, de *'Delfzijl'*, is momenteel met haar proefvaart bezig. Daarnaast verkeren zes schepen in verschillende stadia van afbouw.

Verkochte schepen

Maasrix

Via bemiddeling van Supervision Shipping & Trading Company te Rotterdam is de turbinetanker *'MAASRIX'*, eigendom van RSHV Maasrix B.V. te Rotterdam, verkocht aan de Griekse Thenamaris groep te Piraeus. Het schip heeft een draagvermogen van 318.754 ton en werd gebouwd door Verolme Dok- en Scheepsbouw Mij. te Rozenburg in 1975. Het is uitgerust met een stoom-turbine-installatie van 35.526 S.H.P.

De overdracht vond onlangs te Brunei plaats. De nieuwe eigenaar zal het schip onder Cypriotische vlag brengen.

Technische Informatie

Meter will analyse corrosion

Instruments suitable for determining the corrosion status of underwater parts of ships without resorting to dry dock inspection are now being marketed by Roxby Engineering International, of Sidcup, Kent in southeast England.

The 'Datacorrrometer' incorporates the latest developments in microprocessor and software technology and collects, stores, analyses and retrieves cathodic protection data.

Roxby has developed 'Bathycorrrometers' since 1971 when they were first used in the rigorous conditions of the North Sea. Since then the company has gained experience with drilling platforms, submarine pipelines, jetties and other marine work.

The new instruments give a direct readout of the corroding conditions at specific points.

While the ship is in harbour, specific but different sections can be checked in turn without delaying the ship from sailing. At a later date, at a more convenient time, the procedure can be continued until a complete assessment has been made. This then enables an analysis to be undertaken at the best time for the ship to enter dry dock.

The 'Bathycorrrometer' enables a direct readout to be obtained at the point of application which allows the diver much greater surveying freedom. There is also the facility of remote monitoring. (LPS)

Diversen

Internationale Vergadering van Bureau Veritas

Een honderdtal hoofdvertegenwoordigers van Bureau Veritas, die met 370 inspectiecentra wereldwijd gevestigd is, kwamen op 13, 14 en 15 april j.l. te Parijs bijeen voor een werkvergadering. Onder meer kwamen daarbij aan de orde technische, administratieve en economische onderwerpen met het uiteindelijke accent op de verbetering van de kwaliteit van de dienstverlening, de verbetering van de opleiding van het technische personeel en de mogelijke uitbreiding van bepaalde activiteiten in sectoren zoals: niet-destructief materiaal onderzoek, offshore interventies en missies

met betrekking tot reglementaire verificaties op luchtvaart en bouwkundig gebied. Deze bijeenkomst van hoofdvertegenwoordigers van vele nationaliteiten en van zeer verschillende professionele achtergronden heeft sterk bijgedragen tot de vorming van interessante ideeën en daarbij een nieuw licht geworpen op de hoofdvragen die bepalend zullen zijn voor de nabije en verdere toekomst van Bureau Veritas. Als achtergrond voor de 32 gehouden voordrachten en de talrijke daaruit voortgevloeide debatten kwam vooral naar voren de behoefte aan een nog grotere verbetering van de onderlinge communicatie.

Het onderhouden, op wereldwijd niveau, van zo veelzijdige activiteiten op het gebied van inspectie en controle vereist uiteraard een complexe organisatie, waarin de snelle doorstroming van gegevens en verdere informatie van wezenlijk belang is.

De deelnemers aan dit uitzonderlijke internationale forum, wel doordrongen van de noodzaak van optimale interne communicatie, hadden op deze wijze tevens een goede gelegenheid om elkander beter te leren kennen in het belang van de veiligheid en de kwaliteit.

Meer dan 3500 ingenieurs, technische assistenten, inspecteurs en experts, verspreid over de gehele wereld, werken dagelijks aan de verbetering van de veiligheid en de kwaliteit in het kader van de organisatie die hen met elkaar verbindt:

BUREAU VERITAS, dat zich nu al meer dan 150 jaar bezig houdt op velerlei gebied met betrekking tot de veiligheid van mens en goed zoals schepen, maritieme platformen en werktuigen, materialen, industriële uitrustingen en installaties van velerlei aard, produktie van kernenergie, burger-vliegtuigen en helikopters, grote bouwwerken, civiele werken en sedert kort ook computer- en informatieverwerkende systemen in het algemeen.

Chinese offshore nu echt van start

Een internationaal consortium van vijf olie-maatschappijen onder leiding van British Petroleum (BP) heeft het eerste grote contract getekend voor ontsluiting van oliereserves in de Chinese kustwateren. Dit is in Peking bekendgemaakt door China National Offshore Oil Corporation (CNOOC). Het contract heeft betrekking op vijf concessiegebieden met een totale oppervlakte van ruim 14.000 vierkante kilometer. Vier daarvan zijn gelegen in de Zuidchinese Zee ter hoogte van Kanton en het vijfde in het zuidelijke deel van de Gele Zee in de omgeving van Shanghai.

De vijf maatschappijen zullen gedurende de exploratiefase alle kosten dragen. Deze periode is voorlopig vastgesteld op drie jaar met twee mogelijke verlengingen van twee jaar. Als het in die periode tot rendabele winning komt zal het consortium schadeloos worden gesteld met ruwe olie. De contracten voor de concessiegebieden hebben een maximale looptijd van dertig jaar. Als de productie begint, zullen er nadere onderhandelingen moeten plaatsvinden omdat China dan mogelijk ook een belang wil. Volgens BP zal in principe alle olie beschikbaar zijn voor de export.

BP heeft een belang van 45 procent in het consortium. De andere deelnemers zijn de Australische Broken Hill Proprietary met twintig procent, Petrobras uit Brazilië met vijftien procent, Petro-Canada Exploration met tien procent en Ranger Oil met eveneens tien procent. BP hoopt al aan het eind van dit jaar boorplatforms in de vijf concessiegebieden te hebben geïnstalleerd.

DS. 16-5-'83

MaTS-presentatie

Stalen offshore constructies bestaan voor een belangrijk deel uit verstijfde plaatconstructies en buisverbindingen. Om de sterkte van plaatconstructies te berekenen bestaan er reeds ontwerpregels die zijn gebaseerd op de lineair elastische plooi-theorie. Bij het ontwerpen van buisverbindingen wordt tot nu toe gebruik gemaakt van experimenteel bepaalde ontwerpformules.

In het kader van het Marien Technologisch Speurwerk programma (MaTS) van de Industriële Raad voor de Oceanologie (IRO), wordt door het Instituut voor Bouwmaterialen en Bouwconstructies TNO (IBBC-TNO) onderzoek uitgevoerd met als doel het opstellen van ontwerpregels ter bepaling van de bezwijklast van plaatconstructies en buisverbindingen ('*Knik- en bezwijklastberekeningen voor stalen offshore constructies*'). In deze op te stellen ontwerpregels worden het plastische gedrag van de constructie, geometrische imperfecties en restspanningen meegenomen. Met behulp van deze ontwerpregels zullen gecompliceerde constructies economischer kunnen worden gedimensioneerd dan met de traditionele ontwerpmethodes. Rondom dit project wordt op 21 juni 1983 een presentatie verzorgd, waarbij wordt ingegaan op de behaalde resultaten, de toepassingsmogelijkheden, en de relevantie van eventueel vervolgonderzoek.

Nadere inlichtingen bij: Bureau IRO, Postbus 215, 2600 AE Delft. tel.: 015-56 93 30 tst. 3009

Overslag in Rotterdamse haven opnieuw gedaald

De goederen-overslag in de Rotterdamse haven heeft in het eerste kwartaal van 1983 in alle sectoren een teruggang te zien gegeven ten opzichte van het eerste kwartaal

van 1982. De totale overslag daalde van 68,8 miljoen ton naar 56,1 miljoen ton nu. De daling ten opzichte van de laatste twee kwartalen van 1982 was aanzienlijk geringer: in het derde kwartaal van 1982 werd 60,4 miljoen ton overgeslagen, in het vierde kwartaal 58,6 miljoen ton.

In het massagoed werd in het eerste kwartaal van 1983 47 miljoen ton overgeslagen, 11 miljoen ton minder dan het vergelijkbare kwartaal in 1982, aldus blijkt uit cijfers van het gemeentelijk havenbedrijf. Vooral de overslag van ruwe olie en ertsen daalde fors. In het eerste kwartaal van 1983 werd 18,9 miljoen ton ruwe olie overgeslagen en 7 miljoen ton ertsen. De minerale olieproducten daalden licht, van 10,1 miljoen ton in het eerste kwartaal 1982 naar 9,5 miljoen ton dit eerste kwartaal.

In de stukgoedsector werden in de haven het eerste kwartaal van 1983 9,1 miljoen ton goederen aan- en afgevoerd (1982 1e kwartaal: 10,1 miljoen ton). Ook de containersector toonde een lichte daling: van 5,7 naar 5,3 miljoen ton. Het overige stukgoed daalde van 2,8 naar 2,5 miljoen ton.

ED. 16-5-'81

Laatste bouwdokken pijlers Oosterschelde onder water

Onlangs werd begonnen met het onderwater zetten van de twee overgebleven bouwdokken waarin de pijlers voor de stormvloedkering in de Oosterschelde staan. Met de bouw van de pijlers is in 1979 begonnen. Alle 66 pijlers zijn thans klaar. Zij staan in drie bouwdokken in een grote bouwput van 800 bij 1200 meter bij het werkeiland Neeltje Jans. In augustus 1981 werd het eerste van de drie bouwdokken onder water gezet. Van hier uit heeft het hefschip *Ostrea* een proevenprogramma afgewerkt voor het heffen en plaatsen van de pijlers. De eerste pijler zal in de tweede helft van dit jaar worden geplaatst in de stroomgeul Hammen. Het vierde bouwdok bij Neeltje Jans wordt voorlopig nog niet onder water gezet. Daarin zijn thans de zogenaamde dorpelbalken in aanbouw, die de voeten van de pijlers met elkaar zullen verbinden. Deze dorpelbalken zijn zeer grote betonnen kokers. De excursies naar Neeltje Jans zullen voortaan dus niet meer door de bouwdokken van de pijlers kunnen leiden. De route van de rondleidingen voert nu langs andere interessante objecten op het werkeiland.

Rijnvaartcommissie wil sloop- en capaciteitsregelingen

De Centrale Rijnvaartcommissie heeft zich in zijn voorjaarsvergadering uitvoerig beziggehouden met het probleem van de grote overcapaciteit in de Rijnvaart. Dit breed samengestelde overlegorgaan, dat de Acte van Mannheim bewaakt, acht twee soorten maatregelen dringend noodzakelijk: gecoördineerde sloopregelingen en het verhinderen van nieuwe overcapaciteit.

De tijd ontbreekt om een overkoepelende internationale sloopregeling op te zetten. Nationale regelingen moeten uitkomst brengen. Over de wijze waarop nieuwe overcapaciteit voorkomen moet worden lopen de meningen uiteen. In elk geval moet het marktobservatiesysteem van de EG uitgebreid worden.

De maatregelen zullen in samenhang met elkaar, en bovendien in nauwe samenwerking met de Europese Commissie, moeten worden genomen, zo besloot de Rijnvaartcommissie.

De overcapaciteit in de Rijnvaart bedraagt voor de droge ladingvloot 1,5 miljoen schepstonnen, ofwel 20 procent. Het totale Rijnvervoer is vorig jaar van 270 tot 257 miljoen ton lading teruggelopen. In tonkilometers uitgedrukt nam de vervoersprestatie in de droge ladingvaart met 3,6 procent af, terwijl die van de natte ladingvaart met 8,8 procent toenam.

ED 18-5'83.

Verolme Brazilië start productie van supervrachtwagens

Het Verolmebedrijf in Brazilië gaat supervrachtwagens fabriceren. De RSV-werf in Brazilië boekte vorig jaar nog een winst van ongeveer 100 miljoen gulden, maar omdat ook hier de klad zit in de scheepsbouwsector besloot Verolme-Brasil te beginnen met de bouw van vrachtwagens van 220 ton voor het vervoer van ertsen.

De vrachtwagens hebben een hoogte van 6,5 meter met wielen van ruim drie meter hoogte. De prijs ligt tussen de vier en 5,5 miljoen gulden per eenheid. De nieuwe produktielijn vergt een investering van ca. acht miljoen gulden. Het eerste voertuig rijdt dit jaar nog de werf uit.

Vorig jaar werd een akkoord afgesloten met het Amerikaanse bedrijf Wiseda, dat voor Verolme nu de supervrachtwagens gaat produceren. Gebruik wordt gemaakt van een soortgelijke dieselmotor als die welke Verolme-Brasil in zijn schepen stopt.

ED. 18-5'83.

Britse scheepsbouw zou bouwtijd kunnen halveren

Door een betere organisatie van het werk kan de produktiviteit van de Britse genationaliseerde scheepsbouw verdubbelen. Dat staat in een rapport dat in de boezem van British Shipbuilders is opgesteld. De scheepsbouwersvakbond SAIMA heeft het plan al direct verworpen omdat er duizenden mensen door overbodig zouden worden.

De Britse scheepsbouw is in de zes jaar sinds de nationalisatie van de grote werven al afgeslankt van 90.000 tot 63.000 werknemers. Ontslag voor 9.000 anderen is momenteel op komst.

De vergroting van de produktiviteit zou vooral moeten worden bereikt door het gebruik van computers om het produktieproces te begeleiden. Volgens het rapport

gaat dertig procent van de werktijd verloren doordat de werknemers niet kunnen doorwerken omdat de aansluitende onderdelen er nog niet zijn.

De vakbond staat niet afwijzend tegen een efficiënter gebruik van de werkdag, maar vindt het plan als geheel te ambitieus.

ED. 18-5'83.

Hemspoortunnel geopend

Met de bouw van de Hemspoortunnel, die op 19 mei 1983 werd geopend, wordt opnieuw geschiedenis gemaakt in de bereikbaarheid van de totale Amsterdamse haven. De nu 67 jaar oude Hembrug zal worden afgebroken. Hiermee is een einde gekomen aan de lange strijd om een waterweg zonder hindernissen van IJmuiden naar Amsterdam.

Het is belangrijk voor de haven van Amsterdam dat de Hembrug wordt verwijderd, want zij is een groot obstakel voor het doorgaande scheepsverkeer. De brug moest meestal gesloten blijven voor een regelmatige treinverbinding tussen Amsterdam en de rest van Noord-Holland. Het gevolg hiervan was echter dat de brug slechts op een beperkt aantal tijdstippen en niet al te lang opengedraaid kon worden voor het scheepvaartverkeer. Zo ontstonden er soms belangrijke vertragingen voor de schepen die in het havengebied, oostelijk van de brug, moesten laden en lossen. Economisch gezien een moeilijk verteerbaar feit, want in de scheepvaart is het harde noodzaak dat de schepen zo spoedig mogelijk kunnen laden en lossen en daarna met de meeste spoed weer zee kunnen kiezen.

Verschillende keren liep de brug door aanvaringen zodanige schade op, dat zij niet meer open of dicht kon. Het gevolg daarvan was dat het scheepvaartverkeer voor kortere of langere tijd was gestremd. Alleen al de aanwezigheid van de brug legt beperkingen op aan de schepen die de Amsterdamse haven willen aandoen. De ruimte tussen de pijlers waarop de brug is gebouwd, laat namelijk niet toe dat schepen met een breedte van meer dan 42 meter de brug kunnen passeren. De haven zal een symbool gaan missen, maar het zal in dit geval in Amsterdam weinig weemoed veroorzaken.

Computers patrol Anglo-French sea lanes

Computers have taken over the policing of the world's busiest sea lanes between Britain and France.

A new £ 1 million network of 34 mini computers, which has been officially handed over to the UK Coastguard at Dover, in south-east England, effectively takes control of the 75-mile-long strait.

The network, centred on the Maritime Rescue Coordination Centre on the Dover clifftop, will watch over an average of 300 ships passing daily through the 21-mile-

wide channel plus the 250 ferry ships and hovercraft that crisscross the sea lanes between Dover and Folkestone on the UK side and the French and Belgian ports.

The computers take information from three radars stationed along the UK coast and plot the passage of up to 250 ships at any one time. The computers can thus give the coastguard operators information on any or all of the ships including their position and speed, and even predict their course.

By automatically processing the mass of information coming from the radars, the computer network greatly speeds up the work of the coastguards. This enables them quickly to spot, track and identify any 'rogue' ships that are travelling the wrong way in the channel's one-way system of sea lanes.

Such offenders, once spotted on radar, are identified from a coastguard aircraft or patrol boat and reported to their owners for action to be taken against the master. However, since the one-way traffic separation system was introduced in 1967 the number of offenders has dropped from more than 40 a day to an average of three or four.

More important still, the number of collisions in the channel has been more than halved. Last year there were seven recorded collisions in a year that saw 200,000 movements through and across the strait. When the new computer network was handed over, it was described as the most advanced and the best in the world. The system was developed for the coastguard by a team from the Racal Electronics Group. It is known affectionately by its coastguard operators as Super Fred because it supplements a small experimental computer system that was known as Fred. (LPS)

MacGregor and Navire to join forces

MacGregor and Navire Cargo Gear are to merge, thus creating one organisation which will combine the design skills, product ranges and marketing expertise of the world's two best known marine cargo access equipment suppliers.

The new company will result from the takeover of the interests of the International MacGregor Organisation by Kone Oy, already the Finnish parent of Navire Cargo Gear, and will be marketed worldwide as MacGregor-Navire International.

Officially, MacGregor-Navire came into being on May 8th 1983 when Kone Oy took over full control of the International MacGregor Organisation. A period of integration is foreseen, with a planned reorganisation and rationalisation programme being intended. All commitments regarding orders on hand, guarantees and after sales service will be honoured in full.

Dwindling orderbooks in European and Far Eastern shipyards are a reality which all marine equipment suppliers have to face.

Furthermore the global capacity of these yards exceeds by far any reasonable foreseeable demand. Consequently, shipbuilding and allied industries have been forced into programmes of rationalisation as the overall nature of the business has undergone a major metamorphosis.

Whereas once the shipbuilding industry consisted of hundreds of small companies worldwide, there is now a situation where a small number of large groups, backed either by governments or by giant industrial and commercial conglomerates, are dominant.

The marine equipment suppliers are under the same pressure. This is exactly what has been the main motive for the joining of forces between MacGregor and Navire Cargo Gear, so giving the international shipping and shipbuilding community the benefit of an unsurpassable accumulation of experience and know-how.

M.A.N.-B&W Licence Engine Manufacture in China

Under an agreement concluded between the China State Shipbuilding Corporation and the M.A.N. Maschinenfabrik Augsburg-Nürnberg Aktiengesellschaft, Augsburg Works, the Xinzhong Power Machine Plant in Shanghai have been granted the licence to manufacture medium-speed four-stroke engines in the 300-4,000 kW power range. The engines are suitable for installation in ships, as main propulsion engines for river vessels and auxiliary engines for shipboard electricity generation. They can also be used in stationary plants in combination with generators as stand-by generating sets or for smaller solo-operation power stations.

Following a two-year initial period the first three medium-speed 5 cylinder Diesel engines (612 HP/450 kW at 900 rpm), which were assembled there from parts delivered from the Augsburg Works, were subjected to rigorous trials on the testbed which they passed with flying colours.

Year-round drilling and foreign oil companies north of 62nd

The 62nd parallel will be erased from the map as an oil-policy dividing line between two differing parts of the Norwegian continental shelf. There will be year-round drilling in the north from 1985-86 and the government has no objections to giving overseas operators access to the Tromsøflaket, says the State Secretary of the Ministry of Petroleum and Energy.

Harder times in international oil activity will not affect activities on the Norwegian shelf. The State Secretary assumes that the Norwegian parliament, the Storting will approve the opening up of fresh areas for exploration drilling this year. This should lead to an exciting round of allocations this

autumn. Several attractive blocks will be on offer, which means that there will be exhaustive exploration activity in the coming years.

During the next decade British and Norwegian investments in the North Sea will reach a good 70 billion USD. It will be possible to develop new oil and gas fields as soon as the operators are ready, without overstraining the Norwegian economy.

The Norwegian authorities have no plans to ease taxation of the international oil companies, as the British have done. The oil companies haven shown great interest in the Norwegian shelf, and there are still huge ocean areas that are completely unexplored.

The State Secretary considers it important to drill on the Tromsøflaket offshore north Norway in order to ascertain whether there is enough gas to make development justifiable. The geological and technical experience gained in north Norway will be important when fresh areas are to be opened up for exploration in the future, for example central Norway and the ocean area between Norway and Svalbard.

The Shipbuilding Industry In Spain

The keen recession of the shipping market since the second half of 1981 has severely weakened the orderbook of the Spanish shipbuilding industry and, consequently, the economic situation – quite delicate already – of the shipbuilding companies at a time when most of them strive to implement wide structural readjustments.

During 1982, the Spanish shipyards delivered 472.000 GRT equivalent to 542.000 compensated tons. This means a production activity of the same level of the two previous years and a rate of global capacity utilization of less than 50% in terms of maximum historical output. About half of this tonnage – 48 ships with 262.000 CGRT – corresponded to foreign owners as it has been common in the Spanish shipbuilding industry with strong international projection.

In the same period the in-take of new orders experienced a deep fall as compared to the previous years, reflecting the depressed situation of the international maritime scene and the growing difficulties of the

domestic shipping sector. Therefore new contracts signed in 1982 amounted to 130.000 GRT equivalent to 239.000 CGRT, a figure not recorded since the sixties.

Thus, in addition to the impact of the new crisis in the world shipping market, the stagnation of the domestic market also fiercely hit the Spanish shipyards. An important factor in this situation was the shortage of official credit mainly due to the change in the lending institution with the result of a substantial lightening in the corresponding administrative process.

The circumstances have not substantially altered during the first months of 1983. The orderbook of the industry at the end of the first quarter amounts only to about 1,1 million CGRT, half of which corresponds to tonnage already afloat or even finished and being renegotiated with the owners.

The big majority of the yards have already entered, or will do in the coming months, into an unteachable stage that demand an urgent action to put into practice the deep restructuring measures that are the only way to obtain a healthy and competitive industry to match the economic and strategic needs of the country.

To this end, the industry worked vigorously in the last months.

The big state-owned shipyards continue their program through the National Institute of Industry. Meanwhile, the wide group of 34 medium and small-size yards (private owned in its majority), following the directives of the government, are in the process of setting up a joint company to conduct the 're-estructuration' plan of this sector. The actions should specially include capacity reduction and relocation of the redundant manpower to activities other than shipbuilding.

In any case the 're-estructuration' of the shipbuilding industry has to be conducted very cautiously in order to attain a final result in agreement with the requirements of the wide maritime interests of the country and its vital economic and strategic importance. This means, among other important aspects, to preserve the precious industrial skills developed throughout a long shipbuilding tradition. A disorderly dismantling of the industry would cause irreversible

damages preventing from an ulterior revitalization.

There is no room for doubting about the long term prosperity if the maritime activity without questioning the possibilities of future world-economic stability. In the same manner, it is not possible to conceive a positive economic development of a maritime nation without the contribution of a strong and competitive fleet and shipbuilding industry to grant an appropriate degree of independence.

As long as we embrace this concept, we shall be able to configurate the shipbuilding industry that Spain needs to face the new circumstances of the maritime market.

After all, this is the common goal of all western advanced countries to which shipbuilding means not only a focus of industrial and regional development but, specially, and unrenounceable strategic asset.

Hansa no. 9-'83

Boost for North Sea exploration

A further impetus has been given to exploration in the southern basin in the United Kingdom sector of the North Sea by the recent discovery of more gas off the Yorkshire coast by Hamilton Brothers.

Oil companies have returned to Britain's southern gas sector to search for new fields and evaluate existing discoveries, tempted largely by the promise of higher gas prices.

Six mobile drilling rigs are working in the area, including the jack-up Galveston Key which drilled Hamilton's successful wildcat well 130 kilometres off the coast.

The Hamilton Brothers' strike is in a relatively unexplored part of Britain's continental shelf, although it is only a short distance from a successful gas well drilled by the company some time ago. There is believed to be no direct connection between the two discoveries.

An appraisal well, drilled from the same location as the wildcat strike but to be deviated by several thousand kilometres, has already been started and is expected to be completed in August.

Hamilton has also discovered gas in another nearby block and this latest discovery is adding to the pool of knowledge about an area which may develop into a new gas production region. (LPS)