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Inhoud

TIJDSCHRIFT VOOR
MARITIEME-EN OFFSHORE-TECHNIEK
SCHIP EN WERF

CIMAC 1987 WARSZAWA

The main objective for a congress is to collect information in a short period of time, in which, after a pre-selection of papers, important products of knowledge are presented to a select audience.
Important is also that during a congress, the bearers of knowledge from all over the world meet again to exchange not only technical novelties but also personal news and developments from their countries.
A CIMAC Congress on 'prime movers' has always been a model of a world wide 'knowledge market'.

Technical developments

When we take a closer look at the main prime movers, the piston engine and the gasturbine, we notice an ever proceding development to greater power in smaller and lighter engines. Despite forecasts from the past it is remarkable that the piston engine is still in an ever proceeding process of development.
The progressive development in knowledge of modern materials, kinetic flow, electronic control and automation leads us step by step to the adiabatic process, the ideal of the technical pioneers at the end of the previous century.
It is most interesting to notice that, with an ever increasing firing temperature and -pressure, the fuel energy is converted into torque, which by means of a revolving shaft, results in an ever increasing efficiency of the propulsive power. The inavoidable loss of heat in the power conversion process is still decreasing. However, it has been found that, in spite of the importance of heat-loss control, the combination of high temperature and pressure and expansion to a great extend seems to reach high efficiency earlier than to stick to the mentioned old theory above.
With the higher efficiency of the gasturbine as part of the turbocharger, the efficiency of the dieselengineprocess passed some years ago the 50% limit and a slow but steady progress has started to reach the 60% limit, (not counting the more than 80% of total efficiency of the modern so called 'total energy systems').
These developments are not only found in above mentioned 'Knowledge pools'; more and more extreme conditions determine the design and application. Of course this has been so for many years. The Tractionengine has been developed according to the demands of the vehicle. Especially space was a decisive factor for the size and weight per kiloWatt of the engine. A long engine life and operation under variable load conditions were the requirements for the marine dieselengine.

Engine design

Where do we find nowadays the important and compulsory adjustments for engine designs to modern requirements?

1. *Reliability* first of all is not only a nice result of a good design, but it is a security demand that is a decisive factor for marketing the modern engine.
   Here lies one of the main objectives for the engine manufacturers and the oil companies.
   The 'maintenance free' engine with a long Time Between Overhaul (T.B.O.) is nearly ready to enter the market!
2. *Fuel quality*. A high reliability has to be realised in a period of uncertainty about a constant quality of the modern fuels. A better knowledge of the combustion process and its control is a second important subject of further study. Much has already been achieved in this field. The computer-integration in systems is a real step forward.
3. *Environment*. Sound emission, exhaust gasses, heat emission, and the consumption efficiency of fossile fuels are deci-

sive factors in the design of modern Internal Combustion Engines. Talking about limits we should realise that the future possibilities of the use of engines which derive their energy from fossile fuels, are defined by the above mentioned subjects (2) and (3). An exception to this is the sound emission which is already totally controlled, thanks to extensive research in the laboratories.

4. *Engine application* as a final factor. The use of Internal Combustion Engines, on land, at sea and in the air is still increasing and, as time goes by, more specific in every application. An increasing number of engine manufacturers turn to the design of complete systems of which the engine is only a part. Is the enginebuilder delivering more software than hardware in the future?

Conclusions

The variety of tasks besides the design and fabrication of prime movers gives the Netherlands engine industry an extra impuls to the construction of creative products.

The Netherlands diesel engine- and gasturbine manufacturers operate in a great variety of power ranges for the use not only in the Netherlands but also in countries all over the world. Remarkable is the increase in the international market share of DAF dieselengines in the automobile industry.

The extensive knowledge of the application and demands of installations of which Internal Combustion Engines are an important element, will be used by the Netherlands diesel- and gasturbine industry as extra possibilities for a further development of maintenance-free systems.

The coöperation of the group of combustion engine manufacturers G.V.M. in The Netherlands and Euromot in the European countries, will result in a way to better understanding in technical and economical fields.

The CIMAC Congress and the CIMAC working parties offer a solid platform for the exchange of knowledge on a worldwide basis.

Let CIMAC 1987 be a new impuls for important progress!

C. W. van Cappellen
Chairman of the Netherlands group
of Engine manufacturers G.V.M.

SMIT-LLOYD 56

'Smit-Lloyd 56', the first of a new class of tug/supply/firefighting vessels, entered service on April 1, 1987 commencing a two-year contract with NAM – supporting activities on the Netherlands Continental Shelf.

A sister in the new '50 series', the Smit-Lloyd 57, was launched on May 12. The '57' will begin work on the Netherlands Shelf in September this year, under a three-year contract from Petroland.

The third 50 Series vessel ordered from the Rotterdam yard of De Groot en van Vliet (Y.V.C.) will be handed over in december '87.

The three vessels are rated at 5,200 hp. They feature a four-engine main propulsion layout – two 'Wartsila' units of 1,500 hp and a further two of 1,100 hp. They have a bollard pull of 70 tonnes. This compares with the 4,500 hp rating and 60 tonnes bollard pull of the earlier Smit Lloyd 25 Series.' The 50 Series vessels have two 400 hp bowthrusters, a 400 hp sternthruster and Class I Firefighting outfit. Comprehensive deck machinery includes two hydraulic guiding pins at the stern, a stopperpin and a sternroller. Multipurpose tanks enable these ships to carry muds, brine, fuel, drillwater and a variety of other cargoes. Their flat wall/sloped bottom tanks are fitted with self-cleaning devices for fast vessel turnround. The new vessels' advanced electronic systems provide for full remote control from the engineroom of all loading and discharge operations.

HEAVY FUEL TREATMENT

HOW TO LIVE WITH TODAY'S POOR FUELS

*by J. H. Wesselo,**

At present, it seems rather quiet on the heavy fuel scene. The fear that further operation of diesel engines, particularly smaller engines, would become virtually impossible owing to deteriorating fuel quality has not materialised. Engine builders have introduced improvements to ensure that most engines of the output normally used for auxiliary engines and larger are well adapted to the fuel properties of the present and the near future. Fuel suppliers too, the large oil companies in any case, know how to avoid most of the possible sources of trouble aboard ships that now and then alarmed the shipping world some time ago.

In the field of fuel treatment it also seems as if the developments have led to the formation of fairly concrete concepts. It is generally accepted that centrifuges are the most vital part of an installation. We remember that in the past people proposed to use homogenisers and filters to replace centrifuges but, once catalyst fines had made their impact, nobody wishes to re-open that discussion.
Moreover, it is well known that a new generation of centrifuges has been introduced which apply no gravity disc and, consequently, allow the use of fuels with densities up to 1010 kg/m^3. For the rest, there is an increasing tendency to leave the layout of the treatment plant to the shipyard experts. In contrast with these impressions, the author, as chairman of a CIMAC working group on 'Heavy Fuel', has found that heavy fuel treatment is in a much more developing state than one would think.
The CIMAC working group is now preparing a 'Recommendation on Heavy Fuel Treatment' which will appear in the course of this year. Owing to the somewhat panic situation of some time ago quite a few developments have been initiated and are still going on. In addition, cases of trouble caused by fuel quality problems arise again and again. Some problems occur less often than earlier, but other problems arise. Hence, we are dealing with a moving target, as problems move from one part of the world to another and from one source of trouble to another. Altogether, there are several reasons for keeping a close eye on the development of fuel treatment installations. It may be of great economic importance to supply a ship with the equipment to give it the best possible chance to maintain its operational service when poor fuel has been bunkered.
It is the aim of this article to discuss the fuel treatment system as a whole and evaluate possible layout principles combined with different types of equipment. To achieve that purpose, we will refrain from detailed equipment descriptions but simply indicate the working principles.
Furthermore we shall discuss heavy fuel only, paying no attention to the treatment of marine diesel oil. Nor will any reference be made to special provisions for auxiliary engines and questions related to blending.

* Technical Advisor SW Diesel Amsterdam.

Fuel Quality

The first question is what fuel properties we can expect to occur – perhaps incidentally – which have an impact on the requirements for the treatment system.
Some fuel properties have nothing to do with fuel treatment at all. For instance, vanadium is part of the organic hydrocarbon molecules. If the fuel as bunkered contains much vanadium, the engine has to cope with it. Similar considerations apply to the carbon residue, to the ignition properties and to the sulphur content.
The treatment installation is of vital importance for other fuel properties. These include non-fuel constituents like water (sea- or fresh water) and abrasives (sand, rust and catalyst fines). We can simply say that it is the main task of the treatment installation to remove these contaminants.
There is a third group of properties that influences the process in the treatment installation itself. This group includes firstly, density, which should not exceed a certain value (991 kg/m^3 for conventional, 1010 kg/m^3 for modern centrifuges) if the centrifuge is to be able to remove water.
Next come cleanliness, stability and compatibility. Cleanliness is the content of organic and inorganic solids. In unstable fuels the content of organic solids ('sludge') increases, particularly at higher temperatures, and fuels are incompatible if the mixture or blend of two fuels, which are stable in themselves, is no longer stable. A high sludge content due to the coagulation of asphaltenes can easily block filters and, therefore, has to be removed from the fuel before the filtration stage. Excessive sludge can cause problems in the centrifuges to such an extent that insufficient clean fuel can be made to run the engines at the required output. Instability due to incompatibility is caused very easily by blending modern heavy fuels with marine diesel oil, which is an argument against blending on board. Incompatibility of two high viscosity fuels occurs much less often.
It is strongly recommended to *keep fuels of different sources apart*, not only in view of the incompatibility problems, but also to cope with any unexpected fuel property that can cause trouble. This applies to the aforementioned properties (e.g. poor ignition properties), to lack of stability or extremely high abrasive contents, but also to any possible new fuel constituents. For example, cases have been reported of waste from chemical industries containing hydrofluoric acid which causes severe corrosion and of rejected lubricating oil containing high contents of lead, calcium, nickel and other metals.

Task of Treatment System

When designing a fuel treatment system, one would like to be able to define both the properties of the fuel as bunkered and the required properties of the fuel as it enters the engine. Unfortunately, we fail on both counts.
With regard to the fuel as bunkered there would be no problem if we were sure that the fuel would comply with one of the modern specifications. The new CIMAC requirements, in particular, in which even some safeguard against unstable fuel has been incorporated, would make the task of the treatment installation easier to define. Only incompatibility problems are not covered and would still require special care.
From worldwide experience we can see, however, that very often owners are not in a position to maintain their requirement to obtain a fuel according to a standard specification. Operators of short line services

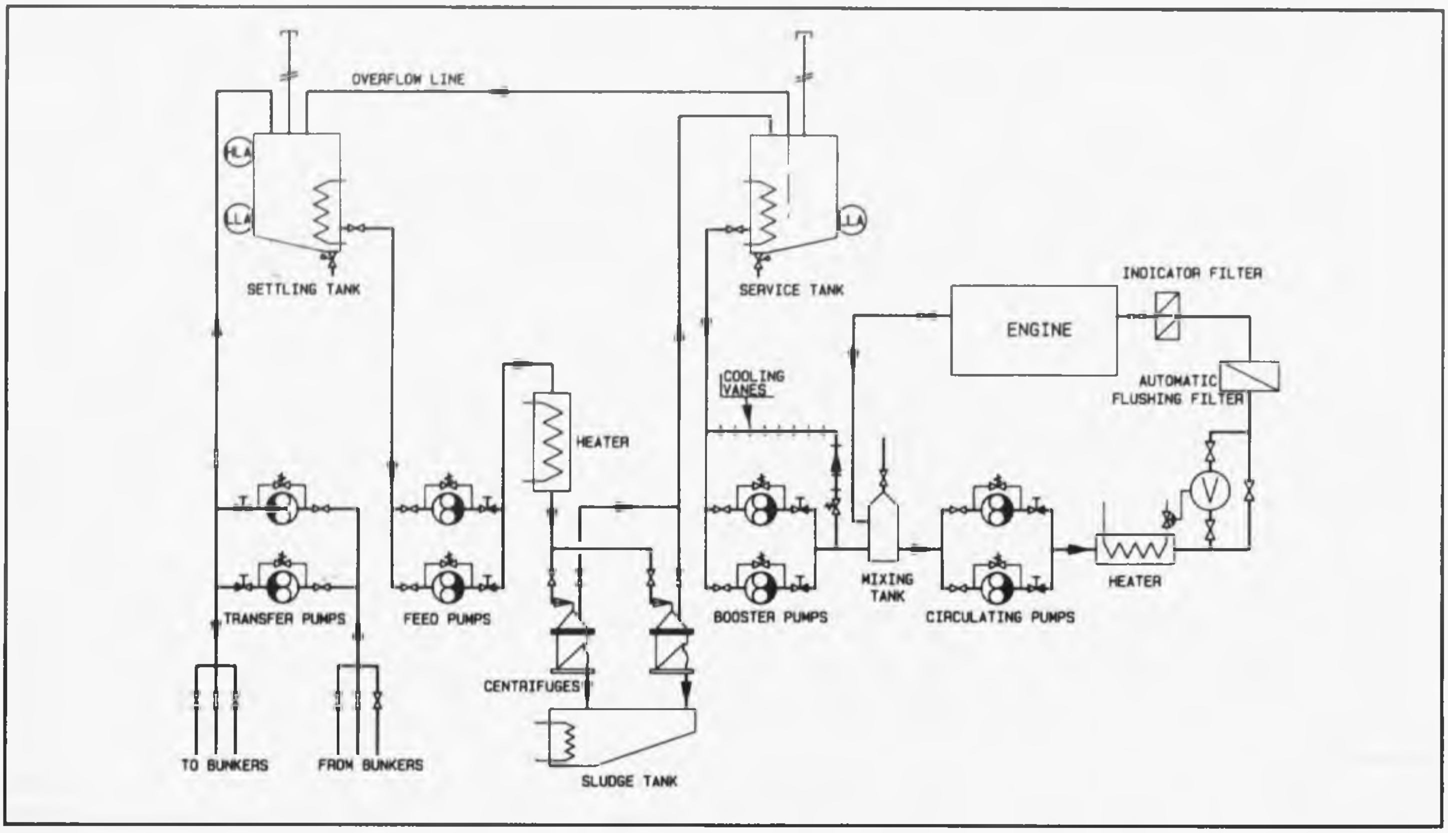


Fig. 1. Simplified diagram of the heavy fuel treatment installation.

are in a better position, but, when ships are sold for other types of operation, they can still encounter trouble. Operators of power stations are faced with other restrictions.

Altogether, it appears to be justified to match the design of a fuel treatment installation to fuels which are much worse than a good standard specification in one or more respects.

At the other end of the system we know a little more. The problem is, however, that in practice samples are very seldom taken and analysed from the fuel after treatment. Consequently, there is insufficient statistical information regarding the relation between the quality of the treated fuel and the behaviour of the engine.

In a discussion between engine builders it was roughly estimated that the limit for catalyst fines should be about 5 or 10 ppm if most particles are very small (the experience is based on certrifuged fuel, from which, in particular, the larger particles have been removed).

Fresh water in the fuel does no harm (and can even give some improvement) if it is in the fuel as a fine emulsion. Mostly, however, it concerns seawater. High seawater contents can lead to turbocharger fouling and sometimes to salt deposits in the combustion space. It is estimated that this does not occur if the seawater content is below about 0.5%. Another risk, however, is corrosion, particularly of the fuel injection system. It is believed that corrosion during stand-still can already occur at a seawater content of as little as 0.2%. Therefore, 0.2% is aimed at, although it is known that it is often about 0.5% in reality.

In conclusion, the fuel treatment installation may receive fuels with catalyst fine contents that should correspond to 30 ppm Aluminium but which may be much more and with seawater contents that should be maximum 1% but which also may be more. The installation should deliver fuel with a catalyst fines content resulting in not more than 5-10 ppm Al and a seawater content of not more than 0.2%. It must perform this task with fuel densities up to 1010 kg/m^3 and, to a certain extent, maintain its performance with incompatible fuels or, even worse, with inherently unstable fuels.

Basic Conception of the System

Some of the main features of fuel treatment have crystallised into a rather definite pattern, as is presented in a simple way in Fig. 1.

There generally is a settling tank, which receives fuel by means of a transfer pump from one of the main bunkers. It contains a quantity of fuel of a constant temperature and it allows some of the abrasives, sludge and water to settle down and be removed. From here a feed pump and a heater bring the right quantity of fuel at the right temperature (about 98 °C) to the centrifuge. In modern systems this is a separator without gravity disc, generally running in parallel with the required spare separator. At this stage, most of the water, sludge and abrasives should be removed.

The clean fuel is collected in a day tank or service tank, allowing cotinuous engine service if separator operation is interrupted.

From the day tank the fuel is brought to a higher pressure to enter the pressurised booster system. Here fuel is circulated through a heater to obtain the right viscosity.

Generally, the main filter, acting as a safeguard to collect any abrasive particles that escaped the centrifuge, is installed in the booster system, but it may, instead, be installed after the service tank. Finally, there should be a safety filter immediately before the engine.

Gradually, more frequent use is being made of a homogeniser, for which several locations are possible, but the most appropriate location is before the main filter.

In the following chapters all types of equipment will be discussed roughly in the sequence in which the fuel passes through this basic system. Where new developments lead to refinements, these are shown in separate diagrams.

TANKS

Settling tanks

The conventional settling tank is designed to allow part of the water, the sludge and the abrasives to settle out due to gravity. It is therefore provided with a sloped bottom and a heated drain. The fuel supply line is introduced in such a way as to prevent too much fuel movement. The size is relatively large, e.g. corresponding to 24 hours' fuel consumption. The fuel outlet is in the lower part of the tank but at some distance from the bottom to prevent collected water, sludge etc. from escaping.

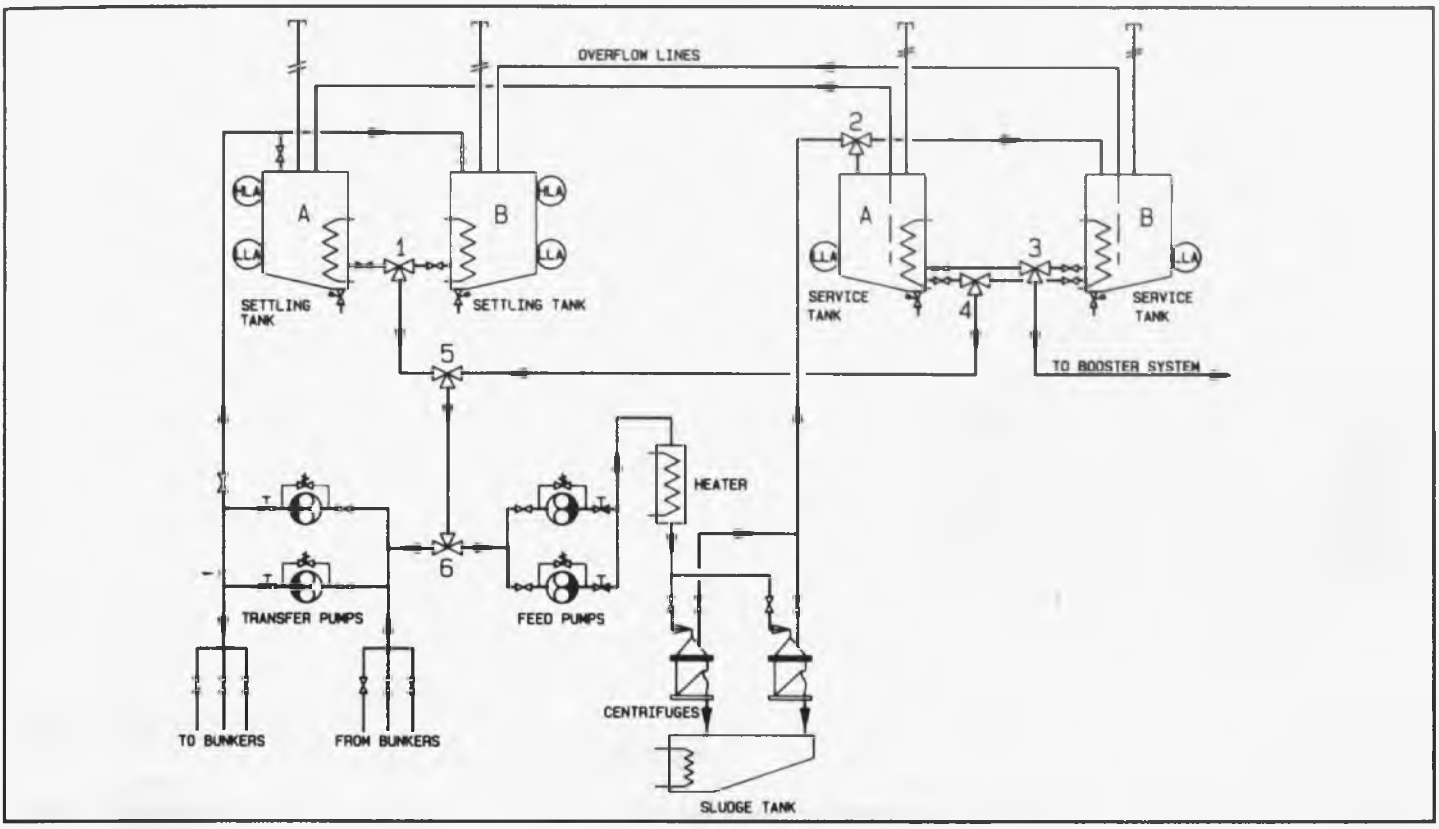


Fig. 2 Primary part of the fuel treatment system with double tanks and pump-back facilities.

Settling tanks are always provided with a heating coil arranged near the bottom to obtain an even temperature distribution. The surface should be relatively large to prevent local overheating of fuel, which could cause fouling due to fuel deterioration. The recommended temperature should be in the area between 50 °C and 70 °C, which is a compromise between a high temperature and a low temperature in order to promote settling, on the one hand, and prevent aging, on the other.

New ideas about settling tanks arise out of the observation that in modern fuels much of the water is in the form of a fine emulsion. Moreover, more and more fuels with high densities are being used. Altogether, only a small part of the water settles out, whereas the amount of sludge and abrasives removed by settling is also only a small part of that removed by the separator. Therefore it is just as well to supply a smaller settling tank; for good mixing of hot recirculating fuel from the centrifuge with fresh fuel from the bunkers a certain minimum capacity (e.g. for 10 hours' consumption) is required.

There have been cases of ships in which a large amount of abrasives has been stirred up from the bottom of bunker tanks when sailing in a seaway, leading to overloading of centrifuges and filters. The wish to counter this effect is a second reason for avoiding the use of too small a settling tank. Another case observed is that of unstable or incompatible fuel, involving the risk that the excessive sludge quantity will reduce the possible fuel supply and, hence, the available engine power. By using another tank for another fuel, the problem of incompatibilty can be prevented and, in the case of severe instability, switching to another fuel is possible. Therefore, it would be a good idea to apply double settling tanks.

A completely new idea has emerged. If the significance of settling tanks has become so much less, why not forget about settling and introduce a certain amount of fuel movement on purpose? This would break up possible slugs of water and prevent the accumulation of concentrations of abrasives and sludge so that the centrifuge can handle both more easily. This idea has not yet been tested in practice but seems worth trying.

Service tanks

Design features regarding the heating and regarding the drain and the fuel outlet similar to those mentioned for settling tanks apply to service tanks. The required temperature would be max. 70°C but during operation fuel is heated before centrifuging and may cause the temperature to be higher than 70°C.

This is an important reason for considering a smaller-size tank than one with the conventional 24-hour capacity (which originally led to the creation of the name 'day tank') so as to reduce the risk of fuel aging. The use of a smaller tank has been made possible by the increased reliability of centrifuges without gravity disc, the more so because the spare centrifuge generally runs in parallel, so that the throughput in each is at half the required value.

The next possible step, however, is to duplicate not only the settling tanks but also the service tanks. Cases of severe sludge formation may already be observed during centrifuging and so be covered by the use of double settling tanks. In many other possible cases, however (if filter clogging occurs first or if ignition trouble shows up in the engine), we will want to switch immediately to another fuel, and this is only possible if double service tanks are used. Of course, here too, the individual tanks can be relatively small, the total capacity of the tanks normally being available as clean fuel. Individual tanks may have a capacity of 10 hours or even less, down to a few hours, particularly in the case of double tanks.

In the case of double tanks a frequent change-over from the one tank to the other is required to prevent aging of the fuel in the 'sleeping' tank. This risk can be reduced even further by applying one tank of normal capacity and a very simple, small tank as a spare. With such a system, in the case of centrifuge problems, the larger service tank allows some time for maintenance or repair and, in the case of filter clogging or engine problems, the parallel system, including another settling tank and the small spare service tank, can be put into operation.

A diagram has been drawn of this part of the system so that the consequences of double settling and service tanks can be studied (Fig. 2). Here the alternative tanks are of similar size and it is assumed that both systems are used alternately with a frequent change-over (e.g. once a day).

It is also assumed that a newly bunkered fuel is tried as soon as possible. Otherwise,

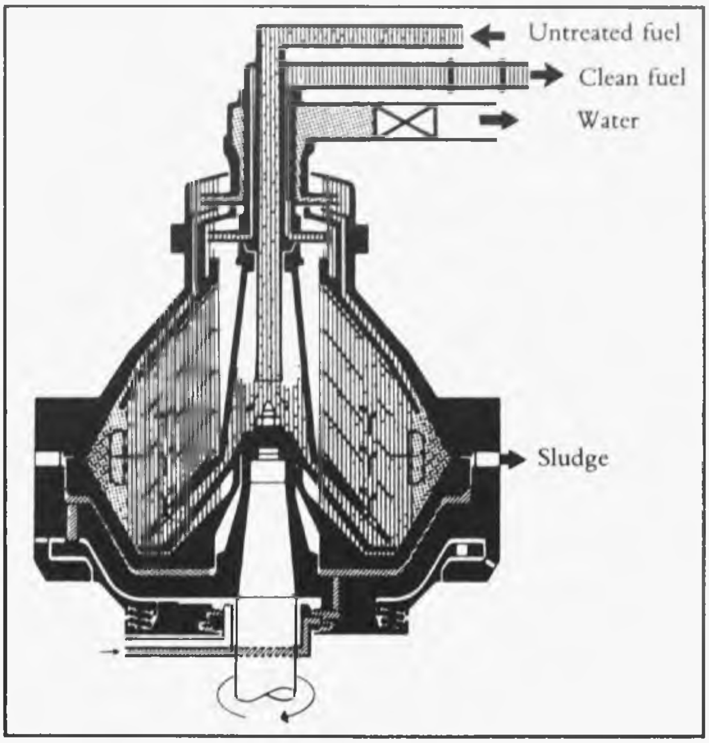


Fig. 3. Alfa Laval 'Alcap' separator.

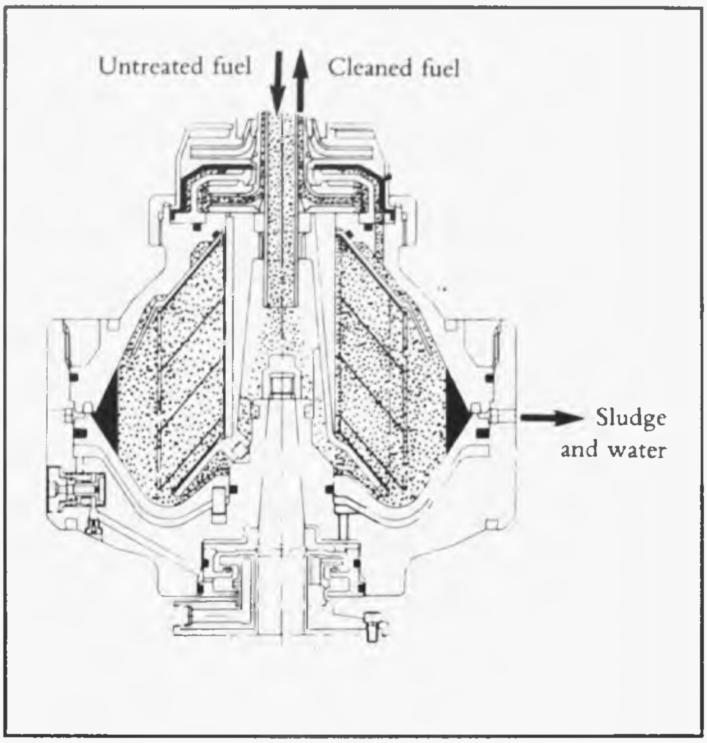


Fig. 5. Mitsubishi 'Hidens' separator.

all the good-quality fuel may have been consumed by the time that it is discovered that the other fuel is not of good quality. To fulfil its requirements, the double tank system must have provisions for emptying one service tank and one settling tank back into the bunker where it came from, while the other is being used.
Another provision illustrated in the diagram is the facility to repeat centrifuging of the contents of the service tank. The outlet for the fuel in this mode of operation is at a lower location than the regular outlet but at a higher one than the drain.

Centrifuges

In the introduction we have already stated that *centrifugal separators are the key element in a good heavy fuel treatment installation.* They remove water better, the larger the droplets, and let it pass if it is present in the form of a fine emulsion. Moreover, they remove abrasives better, the larger the particles, and remove inorganic particles in preference to organic because the latter are heavier. Hence, they have a natural bias towards those impurities that are most harmful to the engine.
The *conventional* system consists of a purifier and a clarifier. The purifier is equipped with a continuous quantity of water in the periphery, excess water flowing off freely. Its function depends very much on the radial position of the interface between fuel and water, and this position can be right only if the right 'gravity ring' is chosen to determine the difference between the radius of the fuel and that of the water outlet. The size required depends on the fuel density, fuel throughput and temperature. In consequence, several risks are present that can impair the optimum separating efficiency. This is the main reason for putting a clarifier in series after the purifier. Although not provided with a separate water outlet, the clarifier can remove dangerous abrasives that may possibly have passed the purifier. The sensitivity to the right way to operate the conventional system and the fact that above fuel densities of 991 kg/m^3 it is increasingly difficult to maintain an interface between fuel and water led to the creation of a new generation of centrifuges. A common feature of these *modern* centrifuges is that they are basically clarifiers equipped with special means to handle not only sludge but also water. They are equipped with devices that monitor the separating effect and automatically set the frequency at which sludge and/or water is released. The density limit of this new class of machine for effective water removal depends not on design but plainly on physical laws. At 98°C fresh water and seawater can still be removed from fuels with a density of up to 1010 kg/m^3 and up to 1030 kg/m^3 respectively. Fresh water generally does no harm but mixtures in every ratio can occur and can cause corrosion. It is therefore safe to maintain a fuel density limit of 1010 kg/m^3, according to the new CIMAC 'Recommendation for Heavy Fuel Requirements'.
There are three larger manufacturers supplying centrifuges according to this principle. We will briefly discuss the differences between them.

The Alfa Laval machine, which is marketed under the name of 'Alcap', has the normal desludging facility of a clarifier at the periphery of the bowl. In addition, water can flow upwards along the wall of the bowl, as happens in a purifier (see Fig. 3). At the location where the gravity disc is fitted into the purifier the clarifier has a closed disc. In the Alcap one small hole has been drilled into this disc. The space behind the disc is connected by a pipe to a valve. By opening this valve, water can be drained, the flow being controlled by the size of the hole in the disc.
In the clean fuel line the water content is monitored by means of a capacity measurement instrument based on the principle that the dielectric constant of water is much higher than that of fuel. In consequence, emulsified water is also measured. On the other hand, the system sets its own minimum water level based on the water content after water has been released, and, hence, reacts mainly to free water. If the water content increases become more frequent, the system first raises the frequency of sludge and water discharges at the periphery of the bowl and then adds water released through the separate water outlet. The sludge and water released at the periphery always constitute a partial discharge, being equivalent to 70% of the volume of water and sludge.

Westfalia Separators market their 'Unitrol' machine for the same purpose (Fig. 4). Here too, sludge and water are discharged regularly at the periphery of the bowl. The separate water outlet passes through a pump which is running continuously. As long as there is not much water in the bowl, fuel emerges and is pumped into the feed line of the centrifuge. As soon as the water in the bowl reaches the disc stack, water enters instead of fuel and is discharged through a separate line.
In this case, measurement of the water content is based on conductivity, thus

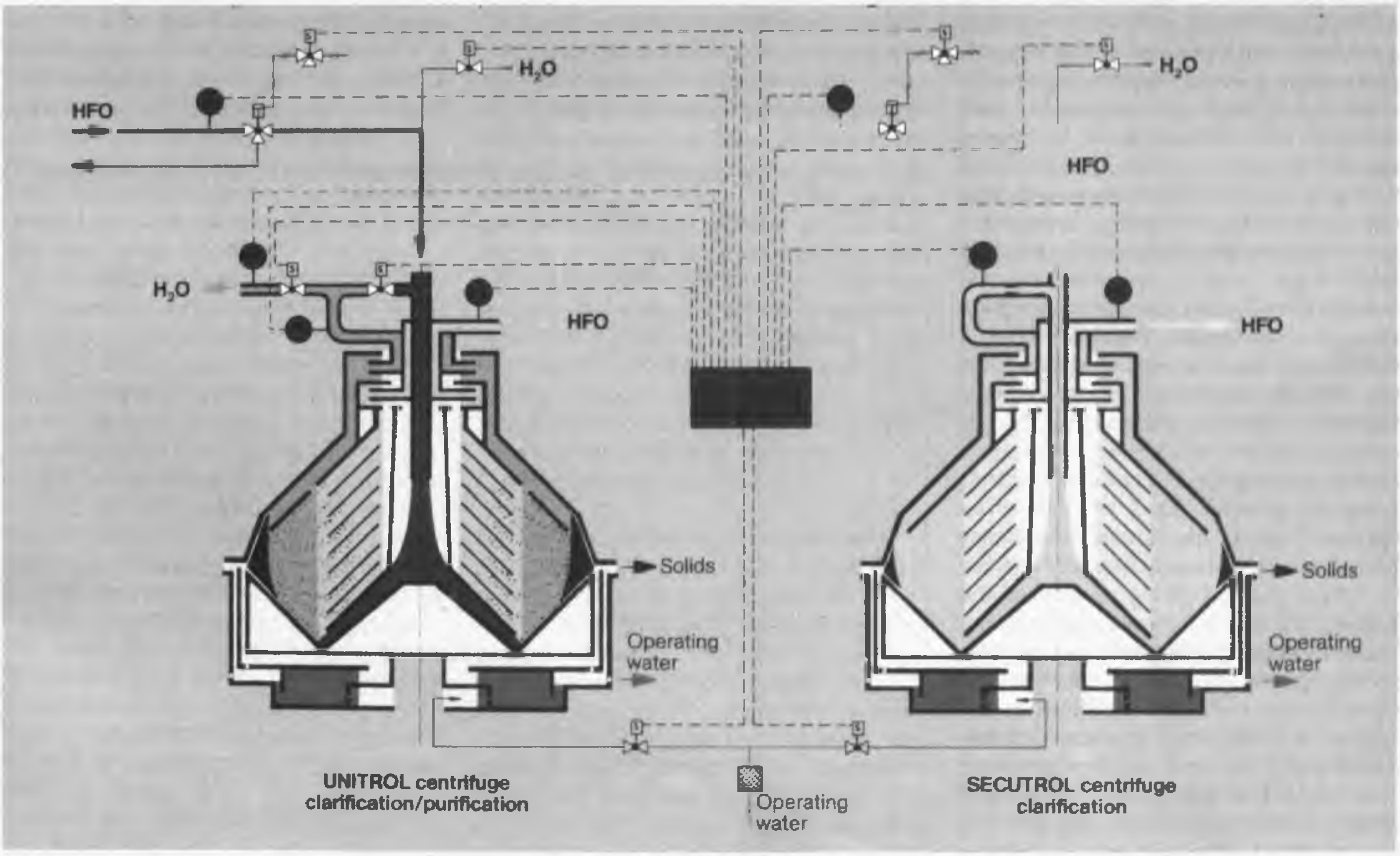
automatically disregarding any emulsified water.

Mitsubishi also have a centrifuge without gravity disc. This is the 'Hidens' series which operates on the 'Selfjector' principle (Fig. 5). In this case water and sludge are discharged only at the periphery of the bowl. Here again, the discharge frequency is automatically controlled by the water content of the clean fuel. Desludging for most of the time takes the form of partial discharge but at longer intervals total discharge takes place, the purpose being to prevent internal clogging.

Apart from differences between design details of the machines, different habits govern their application.
Alfa Laval promoted their Alcap as a machine that could do the work alone. The general experience is that the cleaning effect is good. Perhaps the effect of a purifier and a clarifier in series *can be even better* but can be more easily spoiled.
Westfalia separators claim that the 'Unitrol' centrifuge can do the work alone just as well as the Alcap and there is no technical reason why this would not be the case. They bowed, however, to market demands for a'Secutrol' clarifier installed in series and developed the combination into a complete system. The main feature is that the clarifier is provided with automatic sludge monitoring equipment, which is used to match discharge frequency to sludge production and to give an alarm if the frequency is too high. Hence, the crew is informed if the fuel has an uncommonly high solids content. Fig. 4 shows the arrangement of both machines.
Mitsubishi, again, propose to apply the centrifuge in a system without the addition of a clarifier.
However, they market a so-called 'decanter', which is a slow-running horizontal centrifuge capable of removing large quantities of sludge and abrasives. Applied in the treatment system before conventional centrifuges, decanters have been shown to increase the cleaning intervals of purifiers. Customers also seem to specify a decanter in the fuel system together with the modern centrifuge without gravity disc.
The three designs discussed above all present promising, and some of them proven, means for obtaining a fuel treatment system which allows higher fuel densities and is less vulnerable to lack of human skill than conventional systems. The marine engineering world is waiting with keen interest to see whether all designs are successful to the same extent or whether differences will subsequently emerge in practice on the longer term.
The following conditions ensuring good operation of the centrifuge should be mentioned:
- The spare centrifuge, which is generally required, should preferably be in operation, working parallel to the other one.
- The fuel should be supplied by a positive displacement pump, preferably a screw spindle pump, to obtain gentle treatment and, hence, prevent water emulsification. A constant flow rate should be maintained.
- The feed pump capacity should match the maximum expected engine power plus a small margin. Too high a capacity causes excessive fuel circulation, involving a higher risk of asphaltene coagulation.
- The clean fuel outlet should have a constant resistance. This can be achieved by taking the outlet direct to the service tank; otherwise, special provisions should be made.
- The sludge discharge pipe should offer no resistance and therefore be of a large diameter as short as possible and, preferably, in a vertical position. Effective de-aeration is also required.

Booster System
Since fuel is circulating through the fuel injection pumps, we have a return line from the engine and, hence, a point where hot circulating fuel meets fresh fuel from the service tank. At this point it is normal practice to install a mixing tank. In the conventional atmospheric mixing tank air and volatiles are allowed to escape through a heated duct to the service tank.
In the case of high viscosity fuels the higher temperature required can lead to the formation of a large quantity of volatiles. Moreover, the pressure drop of the regu-

Fig. 4. Westfalia fuel treatment system, comprising a 'Unitrol' separator (left) and a 'Secutrol' clarifier (right).



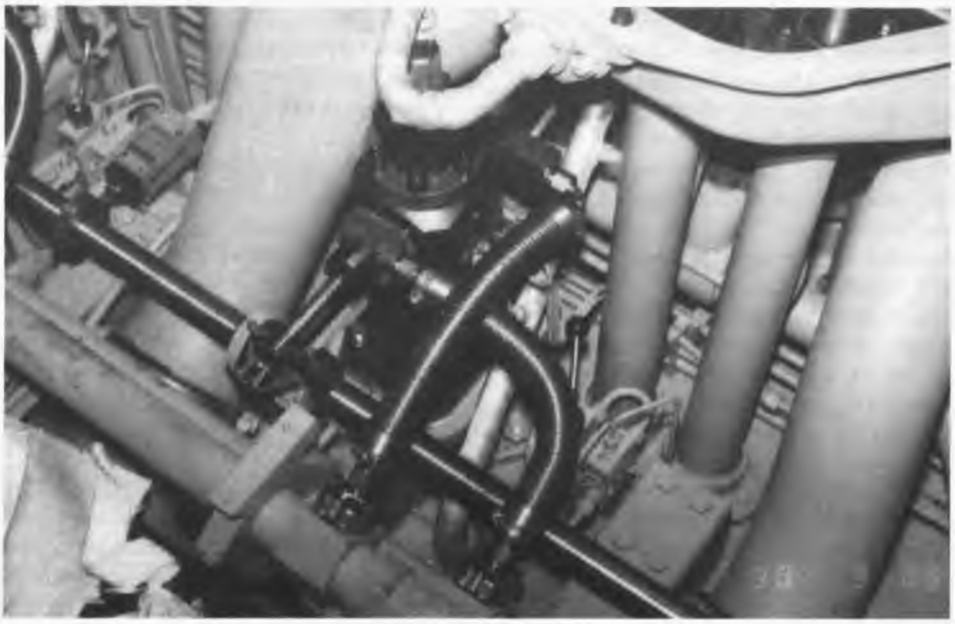


Fig. 6. Flexible tubes in the engine part of the booster system (TM410).

lating valve after the engine can, at this high temperature level, promote the coagulation of asphaltenes, leading to more frequent clogging of filters. For these reasons the pressurised booster system has been introduced. In this system de-aeration remains important, because steep pressure drops in the injection system can create air bubbles, which, in spite of the higher pressure, do not go back into solution and can impair the fuel injection process. De-aeration is most effective if carried out just before the circulating pump and, hence, can easily be combined with the mixing tank. To prevent problems in the case of incompatible fuels, the mixing tank should be as small as possible. If it is omitted or is very small, a thermal shock can lead to a seizure of the fuel injection plungers, particularly when shifting from hot heavy fuel to cold distillate fuel. Therefore, it is recommended to apply a minimum capacity of 0.03 l per installed kWh. Nevertheless, it is also recommended to change fuels with a great viscosity difference at a low engine load.

In the pressurised booster system we need two sets of pumps, one, the booster pump, for the fuel supply from the service tank and one, the circulating pump, to obtain a fuel flow of roughly three times the fuel consumption in the booster system. It is normal practice for the booster pump to bring the pressure to 3 to 4 bar. The secondary part of the booster system may be operated at a pressure level of 6 to 9 bar by means of a regulating valve after the engine. We could, however, allocate the whole pressure increase to the booster pump, avoiding any pressure decrease that could promote coagulation, omitting the regulating valve, which is a simplification, and reducing the total required power.

The diagram of the booster system has already been presented in a simple way as part of Fig. 1. The part of the booster system fitted direct to the engine has not been detailed, because this can be considered to be part of the engine rather than part of the fuel treatment installation. It may, however, have some impact on other parts, because high-pressure waves caused by pressure release in the fuel injection pumps can cause vibrations and damage at some distance from the engine. After testing several types of dampers, SWDiesel have found that on the TM410 modern flexible tubes give a higher reduction at less of a risk than many other devices. Fig. 6 shows these flexible tubes.

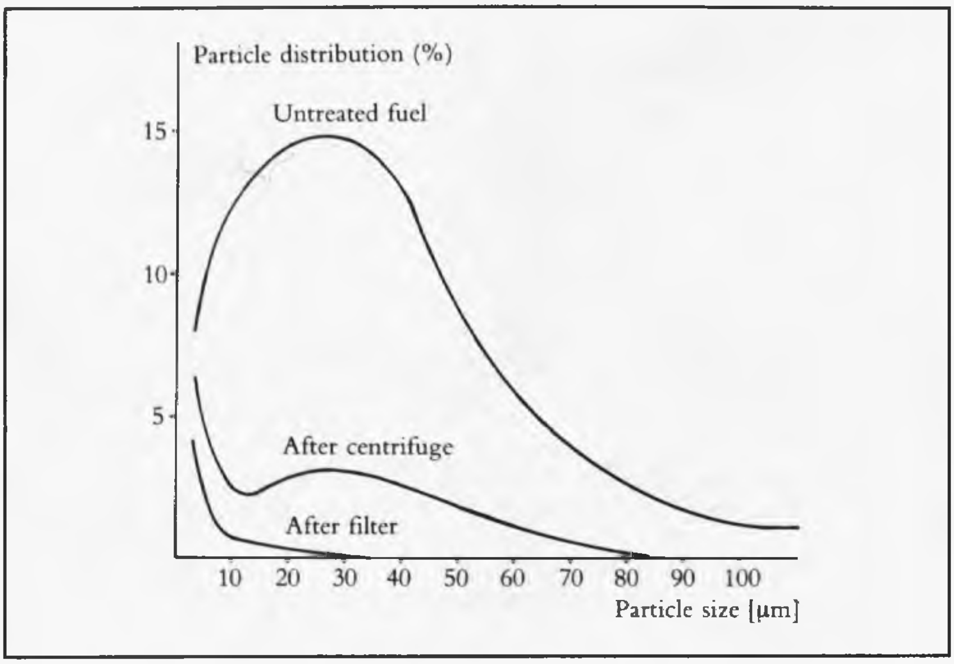
Filters

Together with the centrifuge, a filter is an essential step in the fuel treatment process. In the first place, centrifuges remove large quantities of dirt, but a part of it escapes. Practice has shown that even a few large particles generally pass through the centrifuge. If these are hard abrasives, they can be very harmful to the engine. *The filter*, by imposing a size limit on contaminants, *is therefore a logical complementary step to the centrifuges.* Fig. 7 shows the specific influence on the size distribution of particles in heavy fuel of a modern centrifuge and a 25 µm absolute mesh size filter. In the second place, the filter provides the centrifuges with an indicating element. Insufficient removal of abrasives at this stage of the treatment will show up, because the filter will collect more dirt.

There is always a main filter, which is able to collect rather large quantities of dirt, but it is very important to install a second filter as safety or indicator filter directly before the engine. Its main task is to monitor the function of the main filter but it also collects any dirt that entered the system after the main filter.

There are several possible filter designs. Historically, *'depth' filters* with disposable elements were the common design. They still exist and for service on heavy fuel use synthetic felt as the collecting material. They impose no sharp limits on the size of collected particles. This can be considered an advantage; if filters are compared on the basis of 'nominal' filter fineness depth filters can be said also to collect many smaller particles. If severe clogging occurs, operation will never be made impossible as a result of filter cleaning problems. We simply change the elements, although the handling of new and used cartridges can then become a problem. It may be a handicap that they are impossible to automatise. A well known supplier of this type of filter is Vokes, Guildford, UK. Kanagawa Kiki Kogyo recommend the use of Vokes-

Fig. 7. Particle size distribution: effect of a modern centrifuge and a 25 µm (abs.) mesh size filter.



licensed depth filters as safety filters.
Another filtering principle is *surface filtration*, which has the advantage that the elements can be cleaned and so be used permanently. This cleaning demands much attention, however. It can be performed by hand, using a duplex type or automatically. In both cases the pressure drop over the filter is used as an indication. It may be wise, however, to apply a time-based cleaning schedule at a minimum frequency for the additional reason that after a shorter time the dirt is softer and so is easier to remove thoroughly.
For filter element cleaning the back-flush principle is employed. It is recommendable to flush with fuel under air pressure to obtain high back-flush velocities. In automatic filters, the design is generally such that different elements are being cleaned one by one, whereas the flow passes through the other elements, thus achieving a continuous fuel flow through the filter as a whole. As a general remedy against clogging, the fuel flow during filtration should be as low as possible.
SWDiesel specify a maximum value for the filter 'load', which is 1.5 l/cm^2h.
Well known suppliers of automatic back-flush filters for heavy fuel systems are:
Boll & Kirch, Kerpen – West Germany,
Moatti, Saint Cyr – France,
Kanagawa Kiki Kogyo,
Yokohama – Japan.
There should always be a warning system against excessive quantities of dirt. If the cleaning depends on the pressure difference, the required cleaning frequency is an indication. If fixed cleaning intervals are used, the pressure difference can be used as an indication.
The filter elements are generally of stainless steel wire. There are designs in which the section of the wire is rectangular, presenting a large flat area to the dirty fuel side. This reduces the chance of dirt becoming trapped between the wires and makes the elements easier to clean.
The selected mesh size depends on the requirements of the engine builder but is gradually getting smaller. A mesh size of 25μm is already quite common, 10μm is being introduced at an increasing pace and 5 μm is already proposed and being incidentally applied. SWDiesel at present specify a 10 μm mesh size. In combination with modern centrifuges without gravity disc, thus leading to less frequent malfunctioning of the centrifuging process, this mesh size has become feasible without involving unacceptable dimensions.
The mesh size of the safety or indicator filter should be larger than that of the main filter, because under the prevailing conditions of temperature and sheer effects the amount of insolubles can increase largely due to coagulation of asphaltenes. SWDiesel specify a mesh size of 25 μm for this filter. Because the safety filter will generally collect much less dirt than the main filter, the need for automation is less. Conventional duplex filters may be used, either the surface type with back-flush cleaning by hand or a depth-type filter with disposable elements.
All sizes mentioned refer to the nominal mesh size, which is the size of the particles of which 90% is trapped. Sometimes the absolute size is used, which is the diameter of the largest spherical particle that will pass. Because after some build-up of dirt many passages become smaller, the nominal mesh size is smaller than the absolute size. The difference increases, the finer the mesh being used. At the nominal mesh size of 25 μm specified by SWDiesel, the absolute mesh size is 10 μm.
The location of the filter in the system has been the subject of several discussions. The most common approach is to install the filter rather close to the engine so as to obtain the best possible safety. This entails a location in the booster system after the viscosity control and the heater and thus also guards against any possible risk caused by maintenance work on the latter equipment.
Filter problems due to high temperatures in the booster system lead to an increasing tendency to install the main filter after the booster pump and before the booster system. Here the oil flow is about 1/3 of the flow in the booster system, so that with a given filter surface area the fuel passes the mesh with a lower velocity, reducing the tendency of clogging. On the other hand, the pressure drop over the filter is higher because the difference in viscosity due to the lower temperature is much more than a factor of 3, unless a separate heater is installed before the filter.
A third possible location, after the centrifuge, has sometimes been applied as an immediate warning function for malfunctioning centrifuges. This is less important with centrifuges without gravity disc. Moreover, at this location the filter requires a separate buffer tank and a separate pump, and the main filter no longer protects the engine from possible dirt from the service tank. This location therefore is not very popular.
SWDiesel have not yet seen any reason to recommend another location than that in the booster system.

Combined Filter – Homogenisers

A handicap of the filter is that it can also collect sludge. In normal practice filters mainly collect abrasive particles and the sludge content is low. Even in cases of excessive dirt in the filters most often it concerns catalyst fines or other abrasives. Sometimes, however, the fuel is so unstable that in the part of the fuel treatment installation between the centrifuges and the filter asphaltenes coagulate, forming new sludge. Filter elements are then clogged up very quickly with sticky and tough asphaltene compounds and are difficult to clean by the normal back-flush cleaning process.
This problem can be avoided by breaking down the coagulated asphaltenes before or in the filter. There are filter designs that apply a very fine mesh size, which makes the elements even more sensitive to clogging and, consequently, integrates some kind of homogenising effect into the filtration equipment.
One make, the Japanese 'Marisave' filter developed by Sanko Steamship Co, applies ultrasonic vibrations directed on to a rotating cylindrical filter element with a filtration 'rating' of 5 μm. The effect is a kind of ultrasonic cleaning of the layered filtration mesh structure which prevents clogging. It seems that coagulated asphaltenes are also broken down, which allows them to pass. Other filter manufacturers are also engaged in developing filters in combination with some kind of homogeniser.

Homogenisers

There are several reasons for stirring the fuel very thoroughly at a certain stage before is enters the engine. If the stirring effect is of moderate magnitude (e.g. if the fuel is pumped through a static device creating turbulence), any water present in the fuel will emulsify. This will eliminate the irregular combustion which could otherwise occur and the risk of corrosion (if it is seawater) is reduced.
Much more agitation is required to break down coagulated asphaltenes. The benefit of this process for the engine should not be exaggerated as the pressure and velocities occurring in the fuel injection system also have a homogenising effect. The possible benefit of homogenising for filtration, however, is evident.
Several design principles are applied in fuel homogenising, most of which were originally intended for other applications. The Manton-Gaulin homogeniser supplied by APV Gaulin presses the fuel through a valve (Fig. 8), causing a combination of sheer, turbulence, vibration and cavitation. The relative contribution of these effects is not known, but, togehter, they break down coagulated asphaltenes. The size of these particles is difficult to detect, the size of water droplets generally being used as a yardstick. Water droplets in fuel homogenised by this machine are of the order of 1 μm in diameter.
Vickers supply a machine comprising mechanical rollers running on the inside of a cylindrical tyre (Fig. 9). Though invented to crush soft solid materials, the rollers do not crack catalyst fines particles, so that these can still be trapped by the filter. Organic particles are all smaller than 5 μm.
A third concept comes from the paint industry. This is the colloid mill, applying

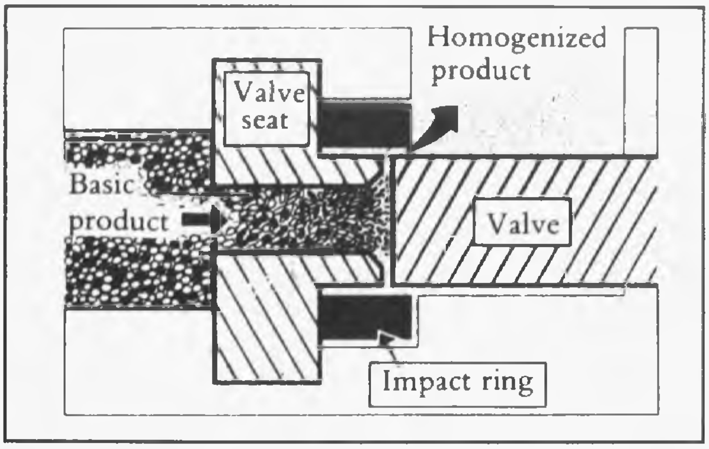


Fig. 8. Heart of the APV-Gaulin homogeniser.

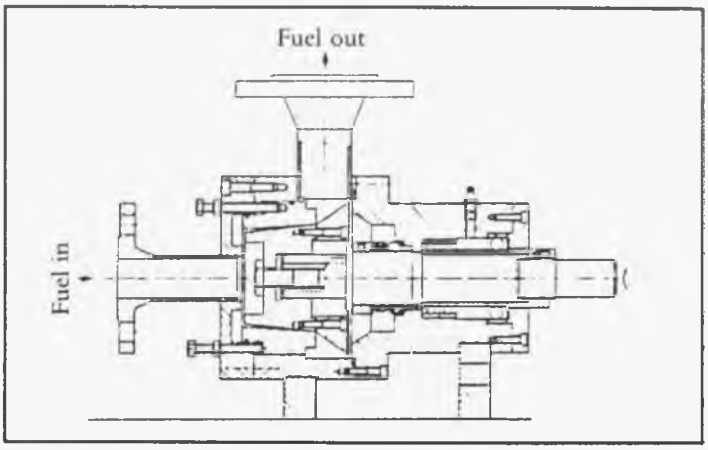


Fig. 10. The Tech-Mar fuel mill.

two conical teethed surfaces that pass each other with a small clearance decreasing in the direction of the fuel flow down to about 4 μm (Fig. 10). The high turbulence and sheer forces result in particle sizes in the range of 2-20 μm. Homogenisers of this type can be supplied by Tech-Mar, Hamburg, West Germany, but there are more machines of this type available which are not always marketed for heavy fuel purposes.

If the fuel is really unstable, the coagulation of asphaltenes proceeds very quickly. Therefore, a homogeniser should never be installed before a tank, but, rather, just before the place where the homogenising is desired. Therefore, *the most appropriate location is before the main filter.* The required type depends on the mesh size. For a mesh size of 5-10 μm the APV Gaulin or Vickers homogeniser may make sense. Probably for a mesh size of 25 μm and certainly for larger mesh sizes we believe that a homogeniser of the colloid mill type may be appropriate.

A reason to install the homogeniser before the booster system is the smaller fuel flow. In the case of this location, however, there is more reason to apply a 'strong' homogeniser to compensate for the asphaltene particle growth between homogeniser and filter.

Consideration could even be given to applying a second colloid mill type homogeniser before the safety filter, thus making it possible to apply a mesh size closer to that of the main filter.

The question as to whether or not to install a homogeniser is difficult to answer. We do not believe it generally to be necessary, as the number of cases of very unstable fuels is rather small. On the other hand, when there is trouble, this can be so severe that installation of a homogeniser may be regarded as a well spent insurance premium.

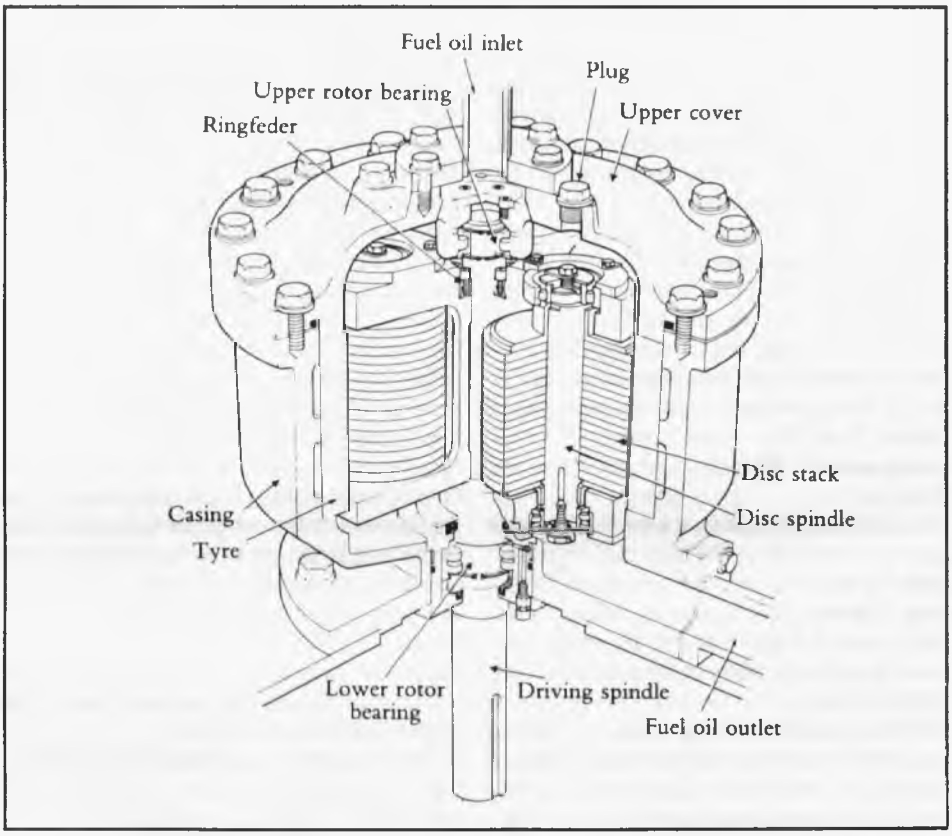


Fig. 9. Vickers homogeniser.

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THE SIMULATION OF THE DYNAMIC PRESSURE VARIATIONS INSIDE SNORKELING SUBMARINES

A report from the Laboratory of Marine Engineering of the Royal Netherlands Naval College at Den Helder.

*by Prof. dr. ir. E. van den Pol, DIC**

Fig. 1 The first submarine of the R. Neth. Navy (Foto R. Neth. N.)

Fig. 2 H. Neth. M. submarine '016'/1936 (Foto R. Neth. N.)

Introduction

A veritable specialism of the Netherlands shipbuilding industry has always been – and still is! – the construction of submarines of own, sometimes extremely, advanced design and more often than not provided with intriguing innovations. Already in 1904 the Koninlijke Maatschappij 'De Schelde' built as a private venture the first submarine in the Netherlands, later this boat was sold to the Royal Netherlands Navy and commissioned as H.Neth.M.S.'01' (fig. 1).

In the submarine '016' (fig. 2) nearly half of all the riveting was replaced by welded connections and that was in 1934!

In 1939 the submarine-minelayers '019' and '020' were the first operational submarines in the world equipped with a purposely designed, complete snorkelsystem, that even to-day does not make a very outmoded impression (fig. 3 & 4).

At the end of the fifties the highly successful 'Dolfijn' class of triple-hull configuration was introduced (fig. 5), while the present new-construction 'Walrus' class seems to possess everything to become the latest word on 'conventional', oceangoing submarines (fig. 6).

As already has been stated the submarine snort- or snorkelsystem is a Netherlands invention, therefore it is not entirely out of place when in this periodical attention is drawn to a problem, which presents itself during the design and construction phase of a new submarine.

The problem at that stage is that it is very difficult to assess the dynamic influence and performance of a diesel-engine under snorting conditions, because it is imperative to be familiar with the occurring pressure-differences, but these are caused part-

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Fig. 3 H. Neth. M. submarine '020' brandnew and still in the hands of the yard for trials in 1939 (Foto R. Neth. N.)

Fig. 4 A Netherlands submarine snorkeling before World War II (Foto R. Neth. N.)

Fig. 5 Triple-hull at sea: H. Neth. M. S. submarine 'Dolfijn' in 1960 (Foto R. Neth. N.)

ly by the engine itself and consequently not well known beforehand.
Of course, one can erect a shore test-facility, with which one is able to test the diesel-engine together with the snort-exhaust system and moreover optimize the starting and stopping procedures.

But a true and firm insight of a diesel-engine under snorkeling conditions necessitates the variations in time of the pressure-difference across the diesel, i.e. the exhaust-backpressure and the pressure at the compressor-intake, the latter is a.o. a function of the direct and indirect effective boatvolume, which of course in this stage of design or construction is just not available. To tackle this problem one could contemplate to simulate the pressure in the boat as a function of an 'open' and 'close' sequence of the top-valve of the snort-induction mast by the use of a computer.
Moreover it provides the possibility of a systematic parameter-variation in order to achieve the optimum solution, which can be of great benefit during the design-phase of a new submarine.

The computer model

For a first approach of the problem the real situation (fig. 7) is replaced by a greatly simplified one (fig. 8).
Next the (air) mass balance in volume V is considered while the topvalve is in 'open' position:

Incoming mass-flow $= \rho_1 . \phi_{v,1}$ $[^{kg}/_s]$

Outgoing mass-flow $= \rho_2 . \phi_{v,2}$ $[^{kg}/_s]$

Mass-increase in volume V during dt seconds =
$$(\rho_1 . \phi_{v,1} - \rho_2 . \phi_{v,2})\ dt\ [kg] \qquad (I)$$

If instead ρ_1 and ρ_2 an average value is used, then the increase of the number of Moles in volume V during dt seconds:

$$\frac{dN}{dt} = \frac{\rho . (\phi_{v,1} - \phi_{v,2})}{M_1} \qquad (II);$$

M_1 = Molar mass of air $[^{kg}/_{Mole}]$

Because of the low pressures (< 1 bar) the use of the well-known equation of state seems adequatly justified, so:
$p.\ V = N.R.T.$
differentiation:
$pdV + Vdp = R\ (TdN + NdT)$
For a submarine pressure hull it seems in this respect obvious to consider:
$dV = o$

$$\text{or: } \frac{dp}{dt} = \frac{R}{V}\left[T\frac{dN}{dt} + N\frac{dT}{dt}\right] \qquad (III)$$
(II) in (III):

$$\frac{dp}{dt} = \frac{R}{V}\left[\frac{T\,\rho\,(\phi_{v,1} - \phi_{v,2})}{M_l} + N\,\frac{dT}{dt}\right] \quad (IV)$$

Although there is a slight temperature change during the pressure-variations, this effect will be ignored.
For 1 kg air:

$$\frac{p}{\rho} = B_l \,.\, T = \frac{R}{M_l}\,T;$$

R = Universal gas constant
B_l = Specific gas constant for air

$$T = +\frac{p.M_l}{R} \quad (V)$$

(V) in (IV):

$$\frac{dp}{dt} = \frac{p\,(\phi_{v,1} - \phi_{v,2})}{V} \quad (VI);$$

For the volume-flow, leaving the snort-induction mast, can be written:

$$\phi_{v,1} = A\,.v_1 \quad (VII)$$

In relation with steady flow it can be shown:

$$\frac{v_1^2}{2} = \frac{k}{k-1}\left|\frac{p_0}{\rho_0} - \frac{p_1}{\rho}\right|; \quad k = \frac{c_p}{c_v}$$

Again using an average value for the density:

$$\frac{v_1^2}{2} = \frac{k}{k-1}\cdot\frac{1}{\rho}\,[p_0 - p_1]$$

$$\text{or:} \quad v_1 = \sqrt{\frac{2k}{k-1}} \cdot \sqrt{\frac{1}{\rho}} \cdot \sqrt{\Delta p}$$

insertion of this expression in (VII) gives:

$$\phi_{v,1} = A\,.\,\sqrt{\frac{2k}{k-1}} \cdot \sqrt{\frac{1}{\rho}} \cdot \sqrt{\Delta p}$$

Fig. 6 The new submarine 'Walrus' just after launching in 1985 (Foto R. Neth. N.)

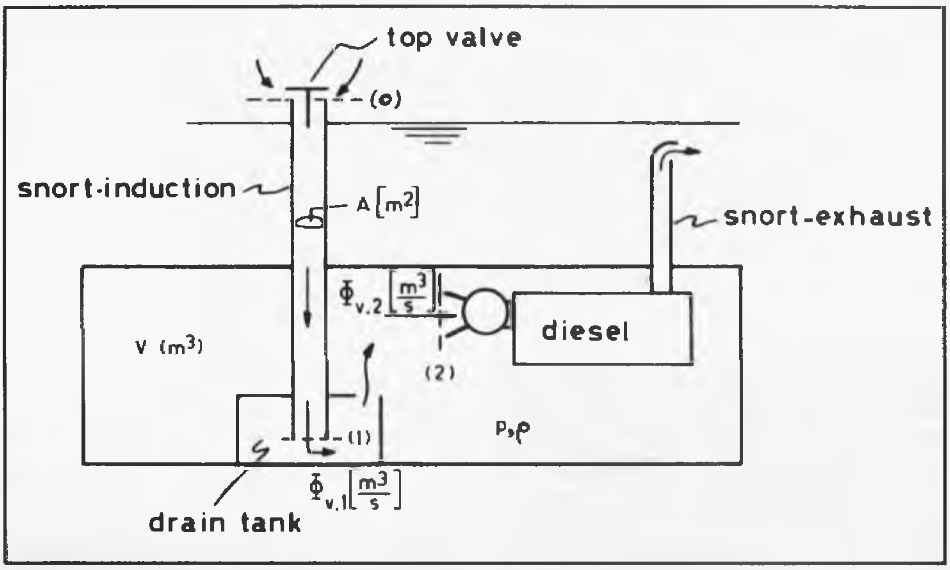
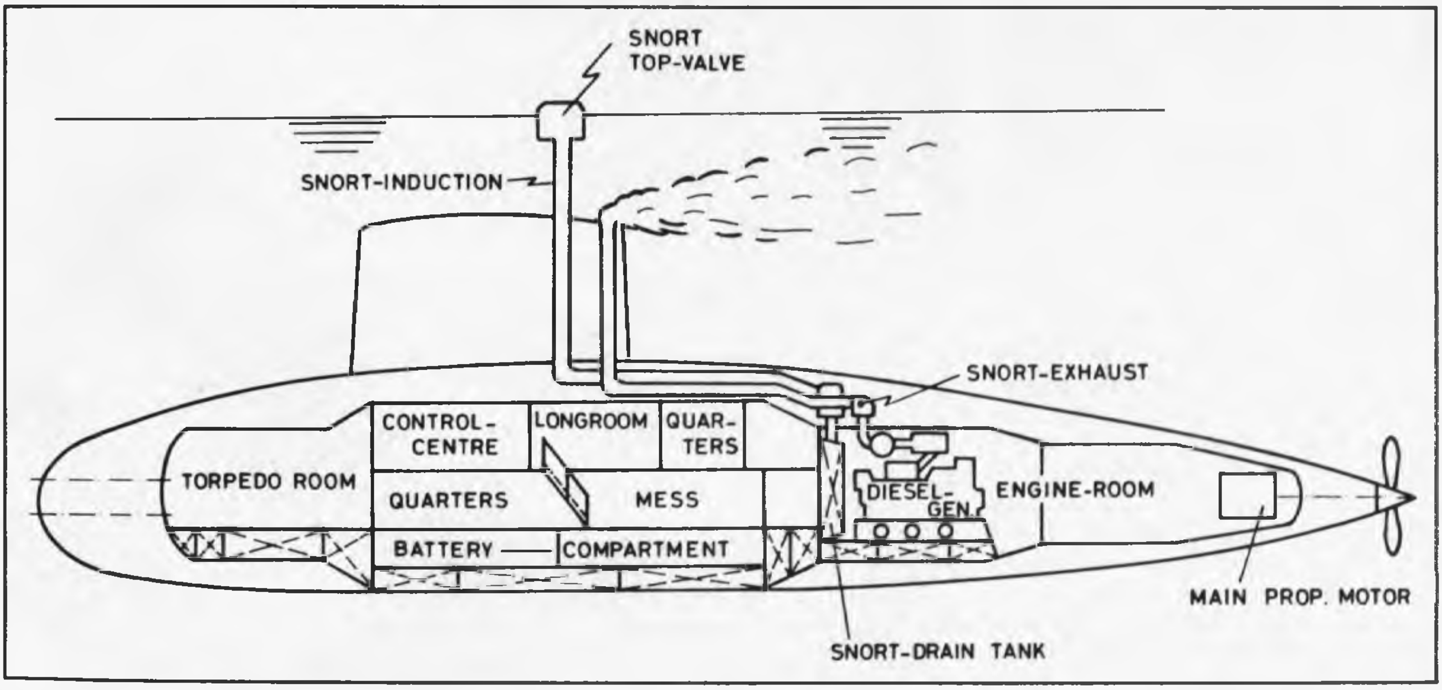


Fig. 8 Schematic arrangement for the computer-model

Fig. 7 General arrangement modern Dutch submarine



In order to accommodate the influence of certain flow-phenomena as e.g. the friction between the air and the inside of the snort-induction mast or in general to reconcile flow-theory and reality a coefficient K – which numerically has to be determined empirically – is introduced:

$$\text{or: } \phi_{v,1} = K \cdot \sqrt{\frac{1}{\rho}} \cdot \sqrt{\Delta p} \quad \text{(VIII)}$$

It should be realised that Δp is in fact the pressure-difference along the snort-induction mast.

Note: when the topvalve is closed $v_1 = 0$ and consequently eq. (VI) reduces to:

$$\frac{dp}{dt} = \frac{-p \cdot \phi_{v,2}}{V} \quad \text{(IX)}$$

In the case that $\phi_{v,2}$ is a known function in time, equation (VI) together with (VIII) can be solved numerically by using very small steps in time, e.g. 1/16 sec. (The same applies to the solution of eq. (IX)).
A special case presents itself when $\phi_{v,2}$ = constant, which is valid in the case of a *mechanically supercharged diesel-engine* as long as it is operating inside the bracket of air-excess.
In this respect it is very instructive to consider the pressure inside the vaolume V when also $\phi_{v,1}$ = constant, because then a direct analytical solution of (VI) is possible:

$$p = p_{start} e^{\frac{\phi_{v,1} - \phi_{v,2}}{V} t} \quad \text{(X)}$$

With closed top-valve this reduces to:

$$p = p_{start} e^{\frac{-\phi_{v,2}}{V} t} \quad \text{(XI)}$$

From (X) and (XI) it can be seen quite clearly that the pressure variation is controlled by the air-demand ($= \phi_{v,2}$) and the - inflow ($= \phi_{v,1}$), while the (boat-)volume V defines a rate-regulating value.
With regard to the boatvolume V some further observations should be made. In the first place this volume is subdivided in several compartments, which are connected to each other by watertightdoors and ventilation systems.

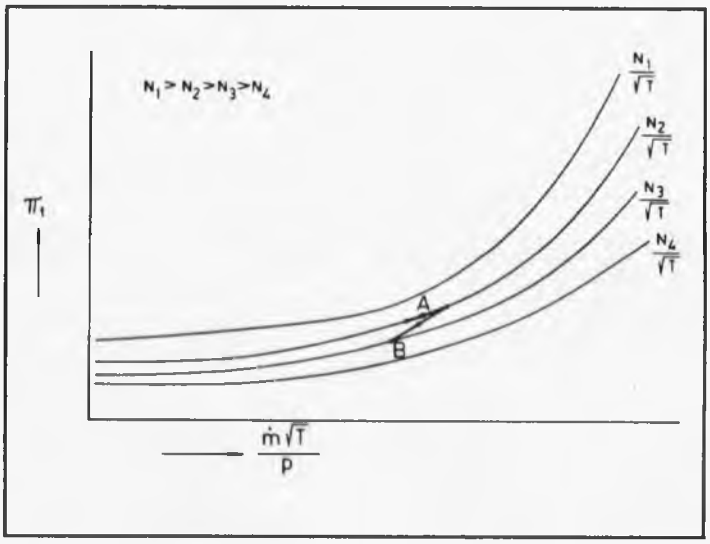


Fig. 9a Sub- & backpressure influence on turbo-characteristics

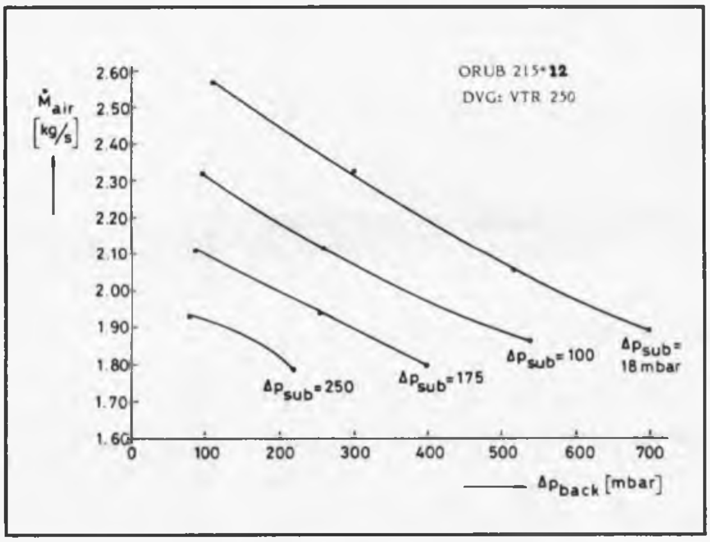


Fig. 10a Mass-flow versus backpressure

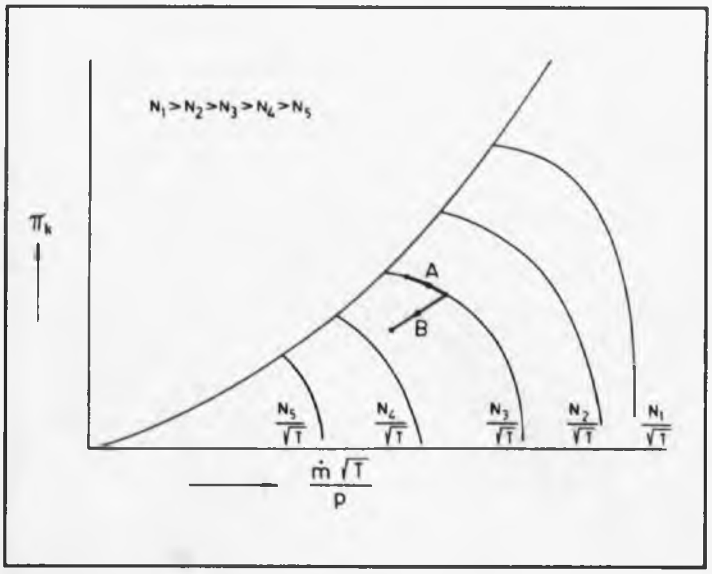


Fig. 9b Sub- & backpressure influence on compressor-characteristics

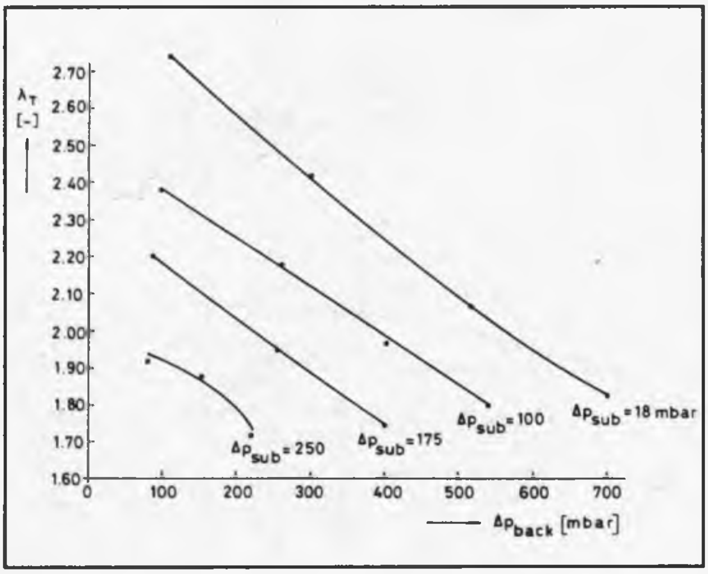


Fig. 10b Air excess factor versus backpressure

Especially the latter can influence the pressure-equalization throughout the boat during snorkeling. Furthermore a large part of the air is enclosed inside all kinds of casings, partly filled tanks etc. which are all part of V, but *present itself in a rather delayed way.*

For a realistic simulation – during snorkeling – of the pressure inside a submarine and dependent on the compartment of interest all these effects should be taken into consideration.

In fact this boils down to a mass-balance analysis for every submarine-compartment, which gives rise to a number of interconnected equations of which eq. (VI) is a demonstrative example.

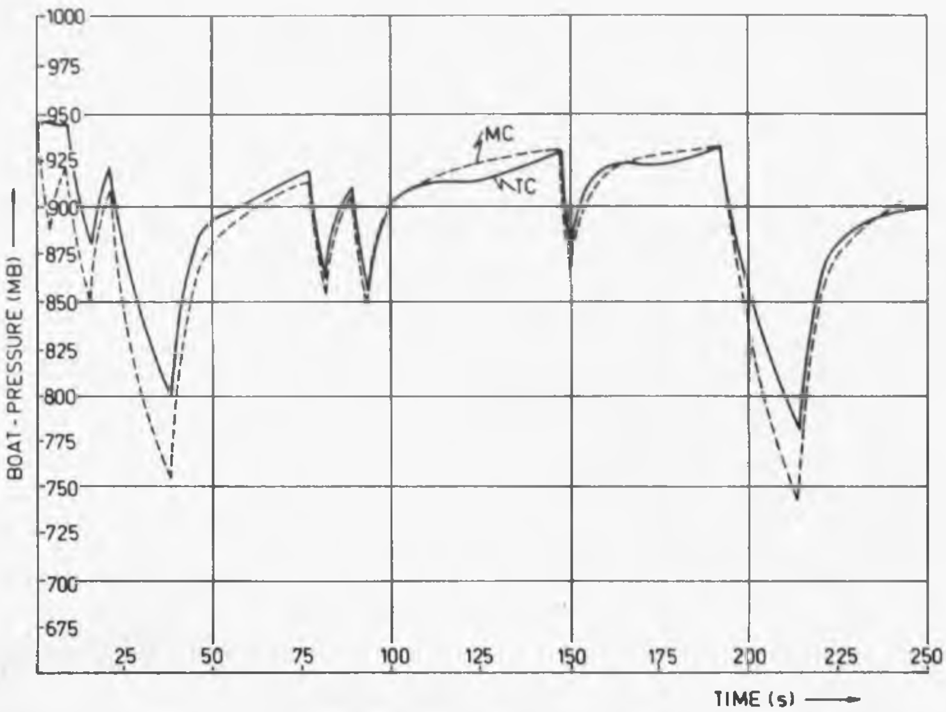


Fig. 12 Simulated comparison of same submarine while snorkeling with: 3 turbocharged diesels (TC) or 3 mechanically supercharged diesels (MC)

The influence of Sub- and Backpressure

The somewhat simplified analysis given above is more or less direct applicable in the case of a *mechanically* supercharged diesel-engine.

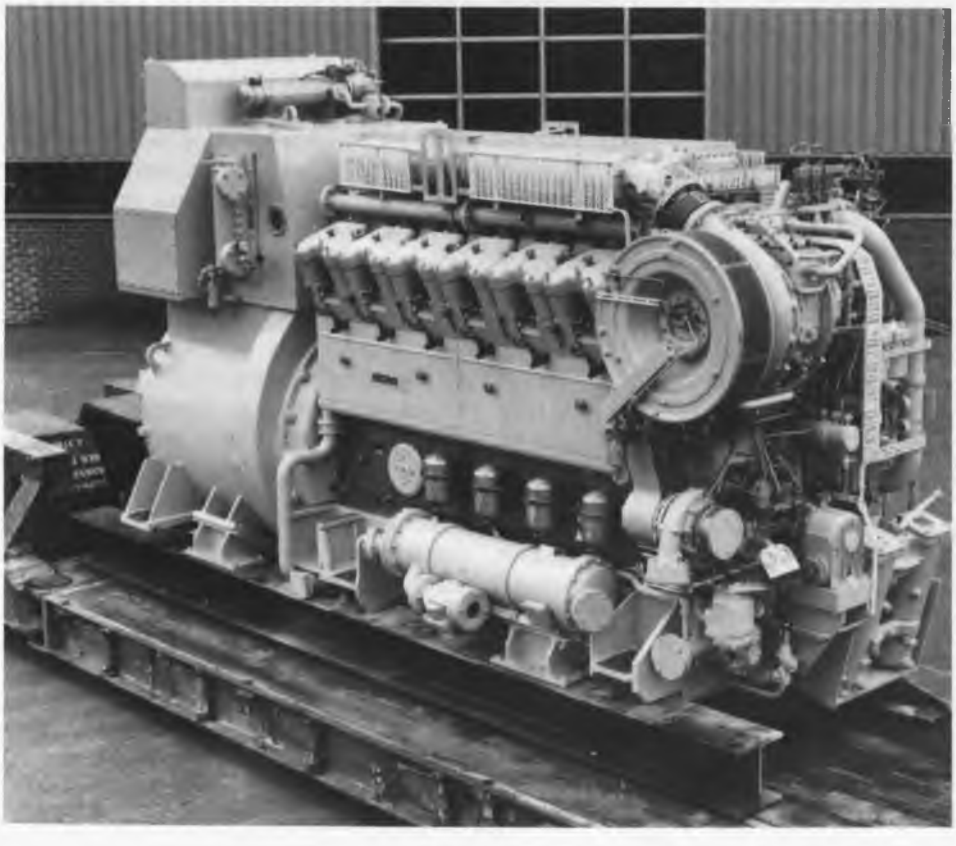
The application, however, of *(exhaustgas) turbocharged diesel-engines* presents a more complicated problem as the behaviour of the turbocharger is much more sensitive to pressure-variations than its mechanically-driven counterpart.

In order to elucidate this statement suppose the exhaust-backpressure remains constant while the pressure inside the boat drops, this will cause a linear decrease in air-density, hence the mass-flow through the compressor goes down. This will lessen the power demand of the compressor, while the pressure ratio will remain about the same. As the mass-flow through exhaust-turbine nearly equals the mass-flow through the compressor the generated power of the turbine decreases with the same magnitude as the compressor power demand.

Therefore, as long as the diesel possesses a certain air excess – neglecting secondary influences – the number of revolutions of the turbocharger will remain more or less the same, A in (fig. 9a and 9b).

On the other hand if it is assumed that the pressure at the compressor-inlet remains constant, then a rise in exhaust-backpressure causes a decrease in revolutions of the turbocharger and consequently also a smaller mass-flow through the engine and therefore a further decline in turbocharger performance.

Fig. 11 The BRONS-INDUSTRIE ORUB 215 × 12 turbocharged diesel-engine for submarine application (Foto BRONS-INDUSTRIE)



If under these circumstances continued stable operation of the diesel-engine can be preserved depends now – above all – on the air excess factor as a function of the engine-load, B in (fig. 9a and 9b).

During actual snorkeling a combination of the two described phenomena is occurring, making the behaviour of the turbocharged diesel rather complex and not direct accessible in a simple, straightforward way to a computer simulation.

To meet this problem there are some conceiveable ways out, but probably the most direct is to perform some careful tests with which the air-consumption (expressed as mass-flow and/or air-excess) of the diesel can be obtained as a function of the exhaust-backpressure, with the boat-pressure as parameter.

Fig. 10a and 10b give evidence of such a test, done by BRONS-INDUSTRIE in relation with their ORUB 215-12 cylinder turbocharged diesel for submarine application (fig. 11).

The information, represented by these graphs, can be packed together in matrix-form containing the necessary diesel characteristics, i.e. supplying the computer-program for every combination of boat-pressure and exhaust-backpressure the

corresponding air-consumption of the diesel (= $\rho \cdot \phi_{v,2}$ in eq. II).
Backpressure-values are derived from the water column above the diesel-snort-exhaust, and are a function of the wave-pattern, the latter forms 'the' fundamental input-data, while it commands the 'open'- and 'close' sequence of the top-induction valve.
Based on a computer-program, developed at the R. Neth. Naval College, fig. 12* gives evidence of a comparison of a mechanically and a turbo supercharged diesel-engine with the same generator output, applied alternately in the same submarine, i.e. the same boat volume, the same compartment-division, the same ventilation system and ventilators etc.
Because of obvious reasons a comparison of a computer simulation with actual pressure variations measured during snorkeling cannot be published here. Let it be suffcient to state that the results encourage further refinement.
A typical phenomenon is depicted in the last figure by the upward bend at the end of the pressure-recovery of the turbocharged diesel.
After opening of the top-valve the pressure inside the boat rises fast, while simultaneously the back-pressure drops, causing an increase in turbocharger speed, which will level off the pressure-recovery.
Then, although the top-induction valve is still open, the snortmasts move already into the next wave, which will mean an increase in backpressure and consequently a decrease in turbo-speed giving the boat-pressure a momentary slight rise. As can be expected, the turbocharged diesel is more economical in its air demand – also in fuel consumption – and consequently causes less subpressure, which makes snorkeling during bad sea-states longer possible, which is of great operational advantage.
Although the choice between mechanically or turbocharged diesel-engines is especially dependent on the snorkelspecification – o.a. the desired snorkeldepth –, due to the continuing development of turbochargers, the application of turbocharged diesel-engines in future advanced submarine-designs needs no longer to be of any problem.

* The boat-pressure, shown in fig. 12, is here in fact the pressure in the engine-room.

H.Neth.M.S. 'ZIERIKZEE'

On May 7th the Mine Counter Measures (MCM) vessel 'Zierikzee' was delivered to her owners the Royal Netherlands Navy by her builders Van der Giessen-de Noord in Alblasserdam (The Netherlands).
The schip is the 13th in a series of 15 MCM-vessels which are build by Van der Giesen-de Noord in a 'Tripartite' project with France and Belgium.
The ships hull is made of Glass Reinforced Polyester. The ships are equipped with very modern electronic devices for the detection of underwater objects. They can also be used as diving support vessels. The ships are designed as a defensive weapon for detection and destruction of mines and other explosives. In peacetime they have a useful tasks as command ships in case of maritime calamities, such as collisions etc. They are also used for the detection of ship- and aircraftwrecks on the seabottom, diving reconnaissance operations and hydrographic survey.
'Sit Mare Securum' (for a safe sea) is the device of of the MCM service of the Royal Netherlands Navy, which celebrates its 80th anniversary this year.
The main particulars are: Length o.a. 51,50 m; length b.p. 47,10 m.; breadth 8,90 m., depth 2,45 m., displacement 510 tonness. The propulsion unit is a Brons Werkspoor Diesel engine, type A-RUB 215 of 1400 kW for a speed of 15 knots. The ships have two rudderpropellers of 88 kW each. They have accommodation for a crew of 45 persons.
The first ship of this so called 'Alkmaar' class MCM vessels was delivered in 1982. The Van der Giessen-de Noord yard has an exportorder for 2 of these ships for Indonesia.

P. A. L.

LITERATUUROVERZICHT

Deze rubriek is samengesteld door het Maritiem Informatie Centrum van de Stichting Coördinatie Maritiem Onderzoek (MIC/CMO) uit de artikelen gepubliceerd in de internationale literatuur op het gebied van de Maritieme en Offshore Techniek.

SW87-05-01
Wave group effects on offshore structures
Chen, B. Y. H.; Milburn, D. A. Oceans (75800), 8609, 5, pg-1386, nrpg-5, gr-3, drw-1, ENG.
The effect of wave groups and an associated forced second-order wave system on a fixed offshore structure is examined analytically. Based on the modified Morison's equation approach, the dynamic response of a single degree of freedom, fixed offshore structure is investigated using a primary wave system with and without the second-order wave system. By comparing the results, it is found that the second-order wave system can significantly affect structural response. This is particularly true of structures in shallow water. 0630219

SW87-05-02
Considerations for the selection and operation of marine equipment for the support of offshore construction operations Walker R. M. Underwater Technology (01498), 8612, 12/4, pg-4, nrpg-7, tab-4, ph-6, ENG
The purpose of this paper is to provide a general introduction to the subject of offshore marine operations. It starts with an outline of the various types of vessels available for the support of offshore/underwater construction and suggests factors to be taken into account when selecting appropriate vessels for transportation, towage, installation and construction support offshore. The paper then discusses the principal marine operations interfaces followed by environmental, engineering and safety considerations, and ends with the recommendations that vessel selection should be made early in an offshore construction project and that the engineering aspects of marine operations should be integrated into the overall engineering of the project, 0630900.

SW87-05-03
Data-acquisition system aids preventive maintenance
Parks, G. E.
Oil & Gas Jrnl (02387), 8702, 85/7, pg-66, nrpg-5, gr-3, drw-5, ENG
Use of data-acquisition (DAC)systems in conjunction with condition-based preventive maintenance programs can lower operating and repair costs on rotating equipment. Such equipment includes turbine, reciprocating, or electric-motor-driven gas compressors, oil or water pumps, and generators. Operators of this equipment in today's oil and gas industry face a difficult challenge: maintaining production while reducing operating costs. New equipment costs and complexity continue to increase, and greater demand have been placed on older equipment to perform reliably beyond normal lifetimes. 0630513.

SW87-05-04
Global and local ice loads including dynamic effects
Allyn, N. F. B.
Ice/Structure Interaction (17306), 8606, /1, pg-1, nrpg-36, gr-8, tab-1, drw-3, ph-1, ENG
In arctic and sub-arctic environments ice loads are the dominant design criteria. This paper discusses the philosophy of calculating ice loads over varying areas, as well as the effect of dynamics and loading rate. 1400101; 0620115.

SW87-05-05
A design method of predicting second order wave diffraction caused by large offshore structures
Rahman, M.
Ocean Eng. (02350), 8702, 14/1, pg-1, nrpg-18, gr-14, ENG
A practical method has been formulated to predict the second order wave loads on large offshore structures. In this study, Lighthill's technique for deep water waves has been extended to shallow water waves. Particular attention has been paid to evaluate the overturning moments, and the theory has been applied to large circular cylinders and square caissons. The theoretical predictions have been compared with the experimental measurements and the comparison shows good agreement. 0630219.

SW87-05-06
Towards rational stability criteria for semi-submersibles, a pilot study
Chen, H. H.: Shin, Y. S: Wilson, J. L.
Stability of ships and ocean vehicles (78575), 8609, 2, pg-61, nrpg-8, gr-10, tab-1, drw-2, ENG
This paper summarizes the findings of the pilot study on the intact stability of twin-hull semisubmersibles, mobile offshore drilling units (MODU's) that the American Bureau of Shipping (ABS) has undertaken in the past two years. It first presents that static stability of three typical semisubmersibles of 4-, 6- and 8-column units considered in the pilot study. Then, a brief discussion on the correlation of computed motions with model test results is given. Findings from calculations using a time-domain simulation are highlighted. Suggestions on some areas needed to be further studied are also included. 0630210.

SW87-05-07
Corrosion fatigue behaviour of high strength steel for offshore structures
Ebara, R.; Yamada, Y.; Fujishima, K.; Nawata, T.; Soya, T.
Intern. Offshore Mechanics and Arctic Engineering (76225), 8604, 2, pg-288, nrpg-5, gr-5, tab-1, drw-4, ph-6, ENG
In this paper it is mainly described on the cathodic protection effect on corrosion fatigue crack initiation and propagation behaviour of high strength steels for offshore structure in 4°C sea water. The proper cathodic protection was prominently effective for retardation of crack initiation of the T type welded joints of HT 80. The proper cathodic protection was also effective for deceleration of crack propagation rate of the base metal of HT 60 and HT 80 in the intermediate crack propagation range. On the contrary, crack propagation rate of the HAZ was accelerated by proper cathodic protection. The fracture surfaces of the fully cathodic protected specimen showed almost the same fracture surface appearances as those in air. 0630217.

SW87-05-08
Brittle fracture risks in tubular joints
Gibstein, M.; Moe, E.T.
Intern. Offshore Mechanics and Arctic Engineering (76225), 8604, 2 pg-144, nrpg-9, gr-12, tab-4, drw-7, ENG
This paper presents the results for four carefully controlled tubular joint brittle fracture tests. These were recently carried out at Veritas laboratories in Oslo, Norway. They are part of an international joint industry sponsored research project which

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commenced in 1980. The aim of the project is to establish through tests and theoretical studies, the true brittle fracture risk in tubular joints of various geometries and different material toughness properties. 0630216.

SW87-05-09
The service record of concrete offshore platforms in the North Sea
Hoff, G. C.
Marine Concrete (74926), 8609, pg-131, nrpg-12, tab-1, ENG
The overall general performance of the 16 North Sea offshore concrete platforms presently in service is reviewed with respect to damage caused by unexpected loading problems and environmental related problems. Unexpected loading problems include loss of differential pressure, dropped objects, anchor chain damage, ship collisions, fire and geotechnical problems. Environmental related problems include freeze and thaw damage, agressive fluid attack, reïnforcement corrosion and marine growth. Although these structures only have a combined service life in the sea of approximately 165 years, the overall performance has been exceptional and indications are that it is expected to continue in that manner in the future. 0630113.

SW87-05-10
Some aspects of revisions to the UK guidance notes for offshore concrete structures
Burdall, A. C; Sharp, J. V.
Marine Concrete (74926), 8609, pg-37, nrpg-12, gr-3, tab-3, drw-2, ENG
Offshore installations in the UK sector of the North Sea are required to be certified as fit for their purpose. The Guidance Notes, published by the Department of Energy, indicate the procedures to be followed and technical standards to be achieved whereby installations are certified as being fit for their purpose. Because of the evolving technology, guidance is continuously being revised and updated; this paper discusses recent revisions proposed to the Guidance Notes for concrete structures. 0630113.

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NEDERLANDSE VERENIGING VAN TECHNICI OP SCHEEPVAARTGEBIED

(Netherlands Society of Marine Technologists)

NIEUWSBERICHTEN

Agenda

Nationale Vlootdagen
De Koninklijke marine organiseert op 26, 27 en 28 juni a.s. de Nationale Vlootdagen.
Deze manifestatie dient om het Nederlandse publiek een indruk te geven over de wijze waarop de Koninklijke marine de haar opgedragen taken uitvoert.
Gedurende deze drie dagen zullen de poorten van het Nieuwe Haventerrein te Den Helder open staan om elke geïnteresseerde de gelegenheid te geven kennis te maken met de Koninklijke marine.
Het organiserend comité verwacht dit jaar weer zo'n 125.000 bezoekers op de Nieuwe Haven te Den Helder.
Interessant voor het publiek is dat men onderzeeboten, fregatten, mijnenvegers en opnemingsvaartuigen, zowel van binnen als van buiten kan bezichtigen.
Met landingsvaartuigen en sleepboten kan men rondvaarten maken door de marinehaven. Evenals in voorgaande jaren zijn ook nu weer een aantal buitenlandse schepen present en voor bezichtiging opengesteld.
De marineluchtvaartdienst verzorgt demonstraties met het lange afstandspatrouillevliegtuig van het type Orion, alsmede met helicopters van het type Lynx. De Britse Royal Navy zal participeren in de airdisplays met een Sea-Harriër (een straalvliegtuig dat stil kan hangen in de lucht en vertikaal kan landen), een Nimrod patrouille vliegtuig, een Seaking-helicopter en een Wessex-helicopter begeleid door haar Royal Marines; de Britse evenknie van ons korps mariniers.
KLM-helicopters zullen, alhoewel tegen betaling, het publiek de mogelijkheid verschaffen het gevoel van 'airborne' te zijn ook daadwerkelijk te ervaren.
Voorts zijn er brandblus- en reddingdemonstraties, waarbij schepen en helicopters zijn betrokken en die tweemaal per dag worden gehouden. Een grote expositieruimte herbergt een statische show, ingericht door de diverse diensten van de Koninklijke marine.

Offshore Europe 87
Sixteen countries will be represented as exhibitors at Offshore Europe 87 – the eighth event in the Aberdeen-based oil technology series which will be opened by the Secretary of State for Energy on 8 September.
The four day event is held under the patronage of the United Kingdom Offshore Operators Association and the sponsorship of the Society of Petroleum Engineers.
Full information on Offshore Europe 87, being held from 8-11 September '87 at the Aberdeen Exhibition and Conference Centre – including the preliminary conference programme, an exhibitors list, registration details and a pre-registration form – is now available from Spearhead Exhibitions Ltd, Rowe House, 55/59 Fife Road, Kingston upon Thames, Surrey, KT1 1TA, U.K. Tel: 01-549 5831.

MariChem 87
MariChem 87, the Seventh International conference and exhibition on the Marine Transportation, Handling and storage of Bulk Chemicals, will be held in the Congress Centrum Hamburg, Germany, from October 20-22 this year. The programme for the Conference has now been published and it is immediately apparent that this reflects the industrywide concern with the impact of Annex II to MARPOL 73/78. Both Session 1 of the meeting, Legislation and Regulation and Session 2, Operations and Safety will be largely concerned with Annex II matters and delegates will hear from legislators and regulatory agencies, ship and terminal operators and others directly affected by the piecemeal application of implementation. Forceful views are certain to be expressed by many in the Bulk Chemicals industry.
Many other subjects will be discussed at MariChem 87, including Tank Containers.

This is a highly active part of the business and to reflect its growing importance the Tank Containers session at MariChem 87 will be extended to an all-day session for the first time. The MariChem 87 Conference programme will include a quite detailed review of some significant items of equipment in the session on Technical Developments, a regular feature in which there will also be a discussion of shipowners'/operators' ideals for a ship satisfying both MARPOL requirements and commercial considerisations.
In the halls immediately adjacent to the MariChem conference room will be staged the largest-ever exhibition of technology and services for the bulk chemicals marine transportation, handling and storage industries.
More information from:
MariChem Secretariat, 2 Station Road Rickmansworth Herts WD3 IQP UK, Tel: (0923) 776363

1987 Advanced Petroleum Conference

The 1987 Advanced Petroleum Conference to be held in Stavanger from 17-18 november will focus on cost effectiveness in the offshore industry, reflecting the key challenges posed in the wake of last year's dramatic drop in prices.
Combined with great uncertainty about the timing and extent of any future price recovery, the price decline has created a new business environment for the offshore sector.
This in turn has necessitated changes in many areas, including the terms and conditions set by governments and the way the industry conducts its operations.
The two-day APC programme will address these issues, focusing attention on recent progress with cost effectiveness and the scope for further improvement.
Presentations will be made by executives and managers involved in the international petroleum industry, and cover a wide range of topics.
These include exploration and R & D strategies, regulatory issues, technological and economic risks, new development approaches and innovatory contracting concepts.
The afternoon of the second day has been devoted to a review of five offshore development projects with the emphasis on the cost effective aspects of these schemes.
Aimed at a broad cross-section of personnel in oilrelated industries, the conference will appeal to managers, planners and technical personnel involved in management of the offshore industry and related activities.
More information from:
ONS Advanced Petroleum Conference 1987.
P.O. Box 410, N-4001 Stavanger, Norway
Tel: +47 4 55 81 00.

Marintec China '87

Marintec China '87, the most important marine technology conference and exhibition in China, will be held at the Exhibition Centre, Shanghai, on December 7-11, 1987. This will be the fourth biennial presentation of this event, which incorporates Marintec Offshore China.
The Marintec conference will be organised by the maritime Journal, The Motor Ship, under the auspices of the Shanghai Society of Naval Architects and Marine Engineers (SSNAME), and in association with Cahners Exposition Group.
It provides a unique platform for the interchange of ideas, techniques, development strategies and potential opportunities between Western and Chinese engineers and managers. On the programme will be academic and technical presentations concerning new building, propulsion, design, offshore technology and related subjects, backed by workshop sessions and discussions. In conjunction with the Shanghai SNAME, The Motor Ship will also be arranging visits to yards and factories. In addition cultural and social events will be organised, to give delegates direct access to China's marine industry.
In the Marintec '87 exhibition, organised by Cahners Exposition Group, over 250 international suppliers are expected to participate, in product areas ranging from shipbuilding to offshore exploration, from cargo handling to marine research. This year, the event will also incorporate Navtec – China's first naval technology exhibition, featuring not only shipboard and dockside equipment but the vessels currently most in demand.
Delegates wishing to attend the conference, or experts prepared to present a paper there, should contact Fabian Acker, The Motor Ship, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS, England. Telephone 01-661 3368.

Proeftochten

'Atlantis'

Op 28 maart 1987 werd het m.s. 'Atlantis' door de bouwers, Scheepswerf Alblas te H.I. Ambacht, overgedragen aan de eigenaar, firma v.o.f. 'Atlantis' te Zwijndrecht.
Het betreft een binnenvaart tanker van type III/ADNR van de volgende afmetingen: lengte 108.00 m, breedte 10.45 m, holte 3.80 m.
De hoofdmotor is een Caterpillar 3512 DJ-TA van 941 kW bij 1600 omw/min.
Het schip wordt geclasseerd door Lloyd's Register of Shipping als: ✠ 100 A1, IWW, 'oil and chemical tanker', Type III in association with a 'list of defined cargoes', L.S. 'T', LMC.

'Jumbo'

Op 24 maart 1987 werd het m.s. 'Jumbo', door de bouwers, Bodewes' Scheepswerven B.V. te Hoogezand, overgedragen aan de eigenaren, Kustvaartbedrijf Moerman B.V. te Schiedam.
Het betreft een droge lading schip van 2000 GT dat werd gebouwd onder toezicht van Lloyd's Register of Shipping voor de klasse ✠ 100 AI, strengthened for Heavy Cargoes, Bottom strengthened for loading and unloading aground, Ice Class 1D, ✠ LMC.
Verder is dit schip gelijk aan m.s. 'PLUTO', gebouwd door E.J. Smit & Zoon's scheepswerven b.v. te Westerbroek, opgeleverd op 20 september 1986.
Voor verdere gegevens verwijzen wij naar S & W No. 3 van dit jaar.

Offshore

Miljoenenonderzoek naar weer op zee voor offshore

In opdracht van enkele oliemaatschappijen en onder andere Rijkswaterstaat zijn Europese wetenschappers sinds kort bezig met een groot maritiem-meteorlogisch onderzoek voor de offshore. Deze North European Storm Study (NESS) vergt ongeveer twee jaar. Het eindrapport wordt begin 1989 verwacht.
Dit miljoenen kostende onderzoek moet volgens ingewijden de basis leggen voor uniforme eisen aan offshoreinstallaties. De regeringen van diverse Europese landen stellen nu namelijk uiteenlopende eisen, die de oliemaatschappijen nogal eens voor – financiële – problemen stellen. De nadruk ligt daarbij vooral op de Noorse en Britse regering.
In NESS werken Deense, Duitse, Noorse, Britse en Nederlandse meteorologen samen. Hun onderzoeksgebied strekt zich uit van de Noorse- tot de Canadese kust en van Groenland tot Noord-Afrika. Over dat gebied ligt een meetnet met een maaswijdte van dertig kilometer. In de zuidelijke Noordzee ligt bovendien een nog fijner meetnet met een maaswijdte van tien kilometer. Tevens wordt in een deel van het net speciaal naar de gevolgen van stormen gekeken.
In het onderzoek worden de weergegevens van de winters van '61-'62 tot en met '85-'86, vijftig zomerstormen en drie volledige jaren meegenomen.
De kosten van het projekt bestaan voor een groot deel uit computertijd. 'Je kunt wel stellen, dat voor opslag en verwerking van alle gegevens een volledige computer wordt verbruikt', aldus een ingewijde.

Schuttevaer 2-5-'87

Offshore

Statoil wil investeren in gaspijpleiding naar Zeebrugge

De Noorse staatsoliemaatschappij Statoil wil het belang van vijftien procent van de Belgische staat in gasbedrijf Distrigaz overnemen. Ook wil Statoil deelnemen in de aanleg van de infrastructuur voor een gasterminal in Zeebrugge, die in de jaren negentig het aanvoerpunt moet worden voor Noorse gasleveranties aan een aantal Westeuropese landen.

De waarde van de Belgische staatsdeelneming van vijftien procent in Distrigaz wordt door financiële deskundigen geraamd op twee miljard frank (ongeveer 110 miljoen gulden). De staat heeft overigens via de financieringsmaatschappij NIM ook nog een indirect belang van 35 procent. De overige vijftig procent is in particuliere handen.

Bij de voorzieningen voor de terminal in Zeebrugge gaat het vooral om de aanleg van een onderzeese leiding van 830 kilometer die vanaf 1992 gas moet aanvoeren uit het Noorse noordzee-veld Troll, met een bewezen reserve van 1300 miljard kubieke meter het grootste buitengaatse gasveld ter wereld.

De kosten van deze pijpleiding worden geraamd op 2,8 miljard dollar. Distrigaz begint in 1992 met leveranties aan Frankrijk. Andere landen die willen worden aangesloten zijn Nederland, West-Duitsland en Spanje. In een later stadium zullen ook Italië en Oostenrijk gas uit Troll afnemen.

DS 5-5-'87

Britse Noordzee-olie levert minder op

De Britse oliereserve in de Noordzee bedroeg aan het einde van 1986 2,05 miljard ton (15,03 miljard vaten), zo blijkt uit het jaarlijkse rapport aan het parlement van het Britse ministerie van energie. Uit het rapport blijkt verder dat de verkoop van Britse Noordzee-olie vorig jaar 9,3 miljard pond sterling opleverde (tegen de huidige koers 31 miljard gulden) tegen 19,7 miljard pond (66 miljard gulden) in 1985. De gasproduktie bedroeg afgelopen jaar 45 miljoen kubieke meter.

ED 11-5-'87

Promising oil find off south coast of Norway

A petroleum find of a size at least equivalent to the Ula field has been made south of the port of Egersund on the south coast of Norway. Tests recently concluded on block 9/2 for Statoil show that the find contains both oil and gas. Considerable interest attaches to what the discovery can mean for oil activity in the southernmost part of the North Sea. The Ula field, to which the find has been compared, is expected to yield at most 75000 barrels of oil a day, about one tenth to the production on Statfjord, the North Sea's biggest field.

The Petroleum Directorate describes the find as interesting. The test rig had drilled to a depth of 3 727 metres and there are several other structures in the neighbourhood where new finds may well be made. The find is also interesting in the context of the surrounding infrastructure. The distance to land is short as is the distance to the Statpipe pipeline network. Further, water depths here are only 98 metres which means that a field development would be comparatively reasonable to undertake.

The 9/2 block was awarded in 1985. Statoil has the largest ownership share at 50%, Saga Petroleum and Shell have 15% each while Norsk Occidental and Deminex have a 10% share each.

(norinform)

Norway wants more even tempo in oil production

In conjunction with a recently submitted white paper on oil, the Minister of Petroleum and Energy says that tax reforms and the expectations of higher oil prices have created optimism among the oil companies. If the plans of the various companies are added up, investments will reach a record high of about 5.7 thousand million USD in 1991, and drop sharply after that. By way of comparison investments reached 3.5 thousand million USD in 1986. The Norwegian government plans to keep investments at this level in coming years, said the Minister, who indicated that he may introduce a queue system for the development of the various projects.

In the white paper the oil compagnies prognoses indicate an aggregate Norwegian oil production of 2 million barrels a day in 1994. This is almost twice the present production. Although the Ministry of Petroleum and Energy has made a more moderate calculation: it is improbable that production will be less than 1.6 million barrels a day.

While the gas reserves of Norway's continental shelf are sufficient for 100 year's production at present levels, the known oil reserves will be reduced gradually through the 1990s. The aim is therefore to find more oil and sell more gas. Speaking of the possibility of delivering more gas the Minister pins his chief hopes on Great Britain and Sweden as customers.

(norinform)

De Amsterdamse haven

In het eerste kwartaal van dit jaar heeft de haven van Amsterdam 11 procent meer goederen overgeslagen dan in hetzelfde kwartaal van vorig jaar; in totaal 7,7 miljoen ton. De groei deed zich met name voor in de vloeibaar-massagoedsector (stookolie, benzine, eetbare oliën en dergelijke). Deze sector groeide met 24 procent tot in totaal 3,7 miljoen ton. Dit blijkt uit cijfers van het Gemeentelijk Havenbedrijf Amsterdam. De adjunct-directeur van het havenbedrijf verwacht dat de haven eind dit jaar 'behoudens onvoorziene omstandigheden', dertig miljoen ton zal hebben overgeslagen.

ED. 8-5-'87

Diversen

Jaarverslag Nederlandse Scheepvaartinspectie

Er waren vorig jaar 77 Nederlandse zeeschepen betrokken bij ongevallen tegenover 80 in 1985, zo meldt de Nederlandse Scheepvaartinspectie in haar jaarverslag. Het ging daarbij in 32 gevallen om aanvaringen, terwijl stranden, aan de grond lopen en stoten met 13 de tweede belangrijkste ongevallencategorie was, zij het dat de post 'diverse ongevallen' daar nog boven staat met 19 incidenten.

Brand aan boord kwam in negen van de 77 gevallen voor, en in totaal elf opvarenden van Nederlandse schepen verloren in 1986 bij ongevallen het leven, zo meldt de Scheepvaartinspectie. 33 van de 77 in 1986 bij een ongeval betrokken Nederlandse zeeschepen waren vissersvaartuigen, gevolgd door 32 stoom- en motorschepen.

De dienst keurde in 1986 de tekeningen van in totaal 92 nieuwbouw- of verbouwingsschepen, waarbij de visserij met 57 stuks de boventoon voerde, gevolgd door tien vrachtschepen, zes aannemingsvaartuigen, vijf suppliers, vier pontons, drie tankers, drie reefers, twee duikmoederschepen en twee sleepboten. De dienst keurde verder de tekeningen van 32 tweedehands aangekochte schepen. Aannemingsvaartuigen (8), slepers (6) en suppliers (4) waren daarbij in de numerieke meerderheid, gevolgd door een drietal vrachtschepen.

Inclusief buitenlandse zeeschepen onderzocht de Scheepvaartinspectie in 1986 in totaal 110 ongevallen, tegenover 108 in 1985. Aanvaringen waren met 59 ongevallen in de meerderheid, gevolgd door 20 niet rubriceerbare ongevallen en 15 strandingen.

In de vaart der volkeren neemt Nederland ondanks een groei van de koopvaardijvloot met 23.000 Gross Tons, een 23e plaats in met in totaal 4,324 mln GT. Na de BRD heeft Nederland wel de jongste vloot ter wereld, met 64 pct jonger dan 10 jaar, gevolgd door Brazilië met 62 en Hong Kong met 60 pct.

DS 8-5-'87.

Diversen

Computernetwerk TU Delft in gebruik genomen

Internationaal worden steeds grotere computernetwerken in gebruik genomen. Zo kunnen met behulp van het European Academic and Research Network, EARN, computers o.a. uit Haifa, New York, Oslo, Delft, Groningen en Reykjavik met elkaar in contact treden. Daarbij is het echter ook noodzakelijk dat computers die dichter bij elkaar staan, zoals die van de Technische Universiteit Delft met elkaar kunnen samenwerken en aangesloten kunnen worden op de nationale en internationale computernetwerken. Daartoe werd door de hele TU wijk in Delft een 7,5 km lange breedband computernetwerk, het Delftse Universiteits Netwerk, DUnet, aangelegd. De bekabeling van dit net werd daarbij hoofdzakelijk door de ondergrondse centraleverwarmings-tunnels geleid. Op 27 april j.l. werd dit DUnet feestelijk in gebruik genomen, zodat nu de vele grote en kleine TU computers van de faculteiten Wiskunde, Informatica, Civiele Techniek, Electrotechniek, Technische Natuurkunde en het Rekencentrum onderling verbonden kunnen worden en toegang hebben gekregen tot het PTT-telefoonnet, het EARN-computernet, DATANET-1 en het SURFnet. Door dit netwerk is het ook mogelijk geworden dat TUD medewerkers 's avonds via de telefoon met de TUD computers werken. Een groot voordeel omdat de meeste gebouwen van de TUD na 6 uur 's avonds gesloten zijn. De resterende faculteiten zullen worden aangesloten zodra ook binnen de betreffende gebouwen de voor de computercommunicatie benodigde netwerken zijn aangelegd. Zo valt te verwachten dat ook de computers van de Faculteit der Maritieme Techniek binnen een jaar of twee met alle computers van de grote Europese en Amerikaanse Maritieme centra in contact kunnen treden.

K.J.S.

Opening CAD-Centrum T.N.O.

Dr. R. W. de Korte, de Minister van Economische Zaken, opende op 28 april j.l. het CAD-Centrum TNO. Dit Centrum is een samenwerkingsverband tussen het Produktcentrum TNO (Instituut voor Produktontwikkeling), het CIAD (Vereniging voor Computertoepassingen in de Ingenieurspraktijk) te Zoetermeer en de Faculteit van het Industrieel Ontwerpen en het CAD Trainings Centre van de Technische Universiteit Delft. Computer Aided Design (CAD), het ontwerpen met behulp van een computer, vraagt steeds meer aandacht, omdat door de snelle ontwikkelingen de mogelijkheden steeds groter worden. Hierdoor is er behoefte aan duidelijke informatie en opleiding. Vandaar dat voorlichting, demonstratie, scholing en training de basis van het nieuwe centrum vormen. Vooral in de begin periode zal men zich richten op drie typen cursussen n.l. cursussen en seminars voor het hoger kader die betrokken zijn bij de keuze en de invoering van CAD/CAM systemen, cursussen voor de projectleiders, zij die de invoering van CAD/CAM systemen begeleiden, en cursussen voor de gebruikers, de ontwerpers en constructeurs die hun werk voor een belangrijk deel met deze systemen zullen moeten gaan verrichten. Naast de cursussen wordt aan bedrijven de mogelijkheid tot experimenteren met de systemen geboden. Ook zal men trachten op bescheiden schaal tot koppeling van CAD en CAM te komen.

K.J.S.

Westduitse werven in moeilijkheden

Drie scheepswerven in Neder-Saksen hebben de deelstaatsregering in Hannover om financiële hulp gevraagd. In alle drie gevallen gaat het om zekerstelling van de eindfinanciering van in aanbouw zijnde schepen.
De betreffende scheepswerven zijn Martin Jansen in Leer, Heinrich Brand in Oldenburg en het van Detlef Hegemann overgenomen scheepsbedrijf in Berne bij Oldenburg, dat vroeger Schürenstedt heette.
De financiële problemen lijken vooral ernstig te zijn bij Martin Jansen, omdat men bij eerdere nieuwbouw van schepen de aandeelhouders belasting-afschrijvingsmogelijkheden van 200 procent verzekerd had, terwijl de belastinginspectie deze slechts tot 150 procent toestond. De werf financierde het verschil vervolgens met kredieten. Op dezelfde manier raakte de Sleeswijk-Holsteinse werf Nobis-Krug eerder al in grote moeilijkheden.
De deelstaatregeling in Hannover wilde nog niets zeggen over de hoogte van de waarborgsommen die de drie werven nodig hebben. Men maakte zich zorgen of deze bedragen de algehele zwakte in de Westduitse scheepsbouwindustrie kunnen doorstaan. Verwacht wordt dat het produktievolume in de nieuwbouw van schepen in 1987 zal dalen rond de drie miljard over 1986 tot ten minste 1,8 miljard Dmark.
De Westduitse rederijen, die in het voorjaar nog voor twee miljoen mark schepen afnamen van Westduitse werven, zullen dit jaar op zijn hoogst nog voor een totaalbedrag van een half miljard mark schepen kopen.

ED 29-4-'87

Hydro 88: Call for papers

The Hydrographic Society is to hold its sixth biennial international hydrographic symposium, Hydro 88, at the RAI Congress Centre, Amsterdam from 15-17 November 1988. Organised by The Society's Netherlands Branch, the event is being cosponsored by the International Federation of Surveyors (FIG) and Lloyd's List.
Symposium themes will be wide-ranging and deal with hydrographic surveys for engineering, mineral exploration and navigational applications. Specific topics will include electronic charts, positioning, seabed investigation, bathymetry, tidal instrumentation and legal aspects. Proceedings are being supported by an exhibition of equipment and services.
Original papers are now invited for presentation. Abstracts of between 200 and 300 words are required for submission by 1 January 1988. They should be forwarded to the Organising Committee, Hydro 88, c/o Organisatie Bureau Amsterdam bv, Europaplein 12, 1078 GZ Amsterdam, from whom further general information is available.

Nieuwe uitgaven

GUIDE TO OFFSHORE SUPPORT VESSELS

Dayton's Guide to Offshore Support Vessels has been published by Oilfield Publications Limited (OPL).
The new 1000 page book, the first to be published by the company under their 'Dayton's' banner includes specifications, GA drawings and illustrations on 861 vessels.
Every category of support vessel relevant to exploration, production or construction phases of operations is covered. Separate chapters provide data on derrick barges, pipe/cable lay vessels, saturation diving support ships, air diving/ROV support vessels, seismic/survey vessels, safety/standby vessels and anchor handling/tug/supply vessels.
The main text is supported by an alphabetical index of vessels by category and an alphabetical vessel/capability index providing quick access to any multi-function operating abilities.
Also included is a complete directory of owners and operators for all the tonnage included in the book.
Dayton's Guide to Offshore Support Vessels is available from Oilfield Publications Limited, PO Box 11, Ledbury, Herefordshire. HR8 1BN, England. Price £ 70.00 (postage extra).