MARITIME
REPORTER
AND
ENGINEERING NEWS

Pemex 652

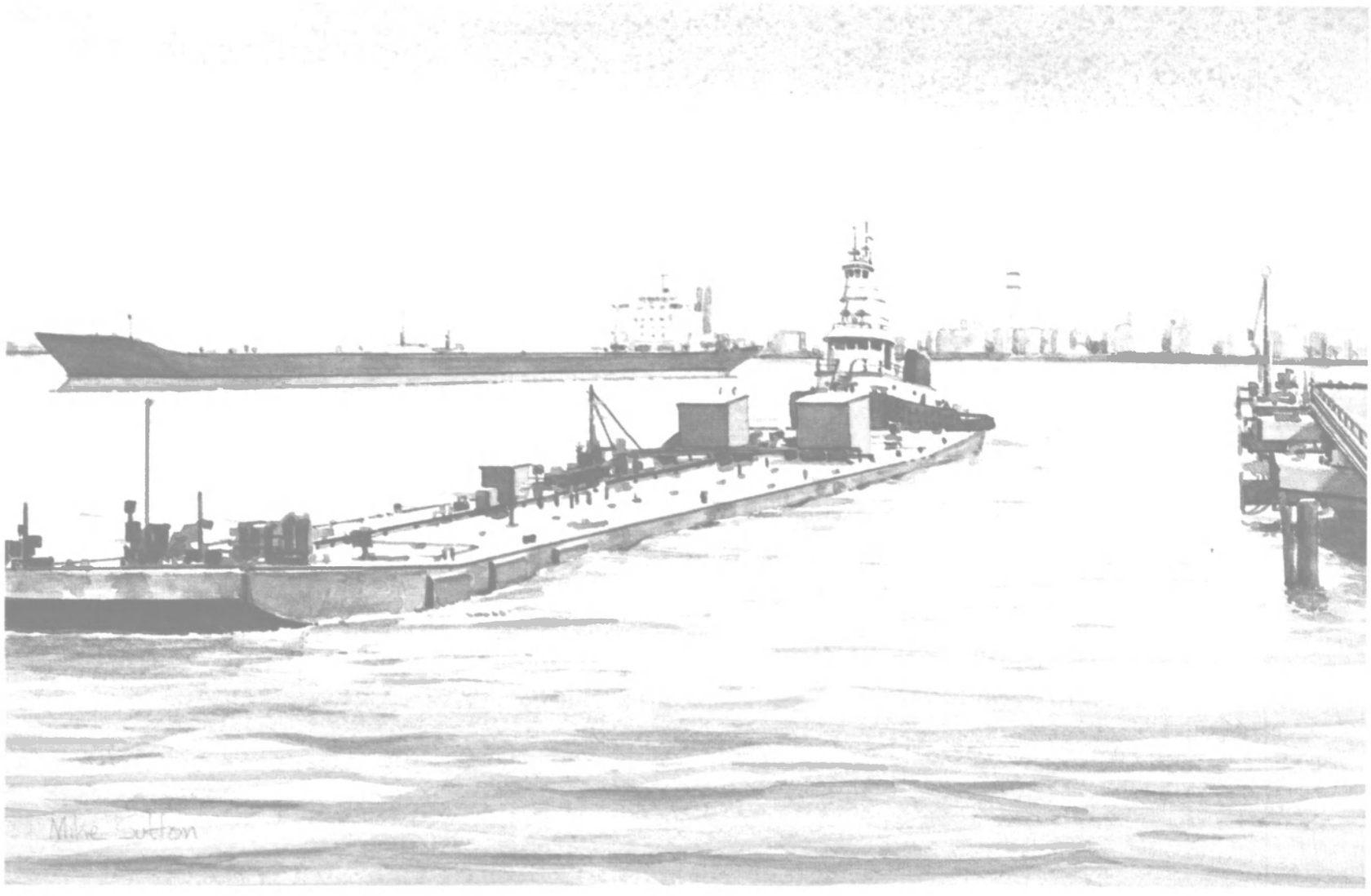
First Of Two New Design Fireships For Pemex

(SEE PAGE 4)

DIESEL POWER REVIEW

(SEE PAGE 4)

JULY 15, 1983



Our sales department sees your problems from this angle.

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We specialize in offshore tank barging and towing operations. We solve problems in tanker lightering, bunker deliveries, gathering from offshore platforms, and the offshore transportation of bulk petroleum. We can save you money in these and other marine-related services, designed to meet your changing needs.

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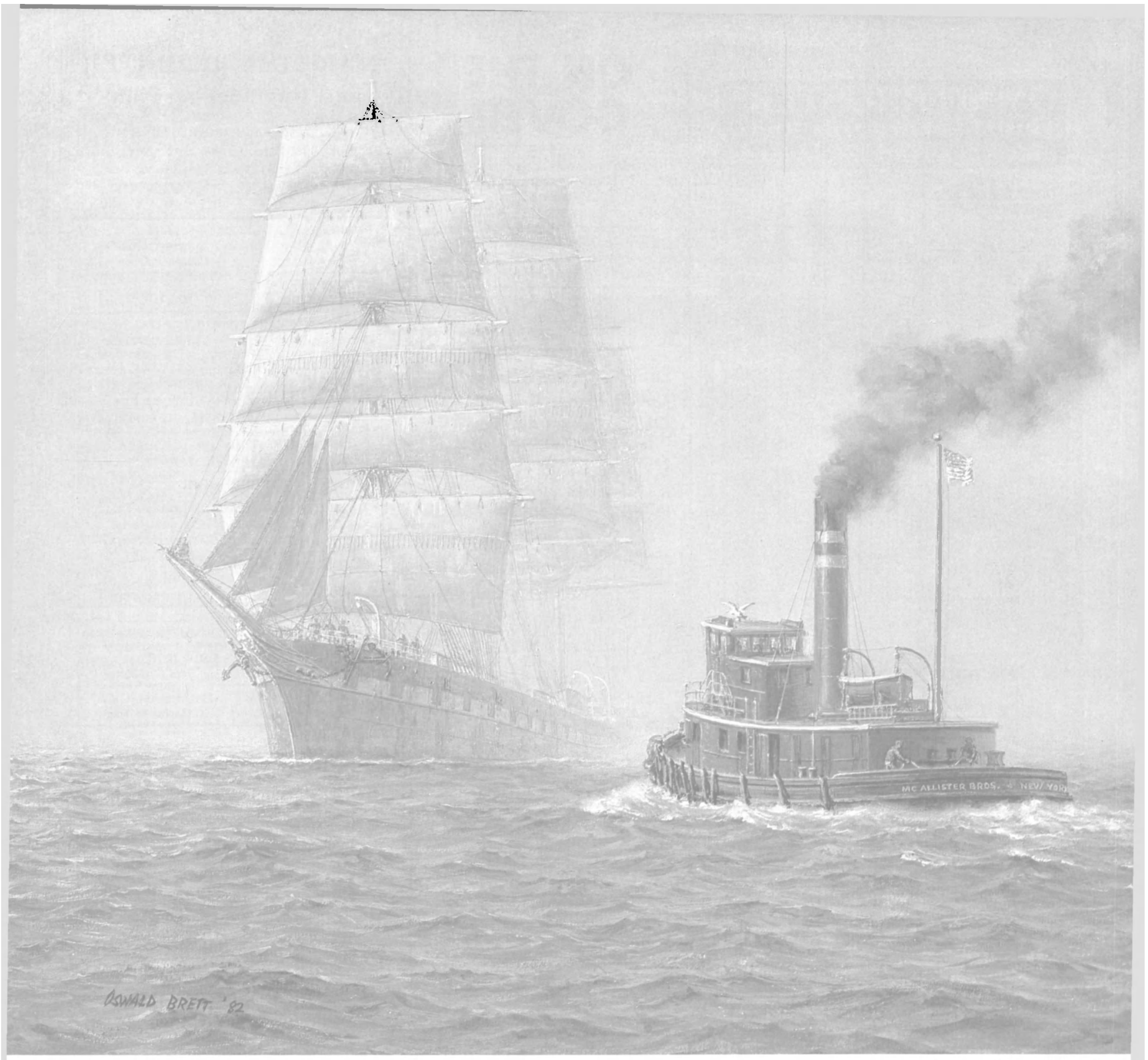

Painting courtesy Norman Kjeldsen, Esq.

Bear a hand for the Wavertree.

In 1895, the Wavertree arrived at New York under sail. This painting by Oswald Brett depicts the historic event. While we cannot say for certain, the Wavertree may have been met by one of the McAllister tugs which have served New York Harbor since 1864. Legends are made of such moments. The Wavertree and her sister ships, in their day, were our responsibility.

We at McAllister take pride in being part of the history and lore of New York Harbor. The Wavertree is now at the South Street Seaport Museum and we support her restoration in order to keep maritime and nautical traditions alive for future generations. Bear a hand. Send your donation to: Ship Trust, c/o National Maritime Historical Society, 15 State Street, New York, N.Y. 10004.

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Polar Sea (WAGB 11)

Future Requirements Of Coast Guard Vessels

by Admiral James S. Gracey
Commandant, U.S. Coast Guard

"The problem is change and how to cope with it. I have learned that 90 percent of problem solving is realizing that you have a problem," stated Adm. **James S. Gracey,** Commandant, U.S. Coast Guard, at the 1983 Society of Naval Architects and Marine Engineers' Spring Meeting/STAR Symposium in Washington, D.C.

The Steering Committee for the Spring Meeting had asked Admiral **Gracey** to speak on: (1) what are the major changes affecting the Coast Guard, (2) what will be the impact of these changes on marine engineering, and (3) what are the likely Coast Guard requirements for the U.S. marine industries over the next 10 years.

The speaker found these questions to be most apropos for the Coast Guard, stating: "With the Coast Guard, you have certainly come to the right organization to talk about 'change' . . . if there is any institution that understands the meaning of the word, it is the Coast Guard. Over the years, we have grown from a single-mission service, the revenue cutter service created back in 1790 to enforce the revenue against smugglers bent on avoiding taxes, into a multi-mission armed force of the United States with tasks ranging from search and rescue to military readiness to environmental protection. We have expanded and contracted, fought in every armed conflict of this nation, changed departments and coped with a number of considerably different political philosophies along the way."

Referring to the economy and the federal budget, Admiral **Gracey** spoke of the effect of inflation, the cost of people (wages) and the procurement of equipment. While cutting personnel expenditures is a major problem, according to the Admiral, he feels that the Coast

Adm. James S. Gracey

Guard is being funded reasonably well to procure equipment.

His solution to these problems is: "One way we can compensate for that lack of people is to take full advantage of state-of-the-art technology—computers, electronics and sensors—the whole range of ways to work smarter, not harder. Fortunately, the high technological industries are rapidly increasing in both availability and capability, while at the same time costs are going down. We have to implant that technological innovation in our ship design and operation. The COMDAC equipment on our 270-foot Bear Class cutters is a good example. We have probably reduced the crew of these ships by one-third through computerizing navigation, communications, engineering and weapons control capability."

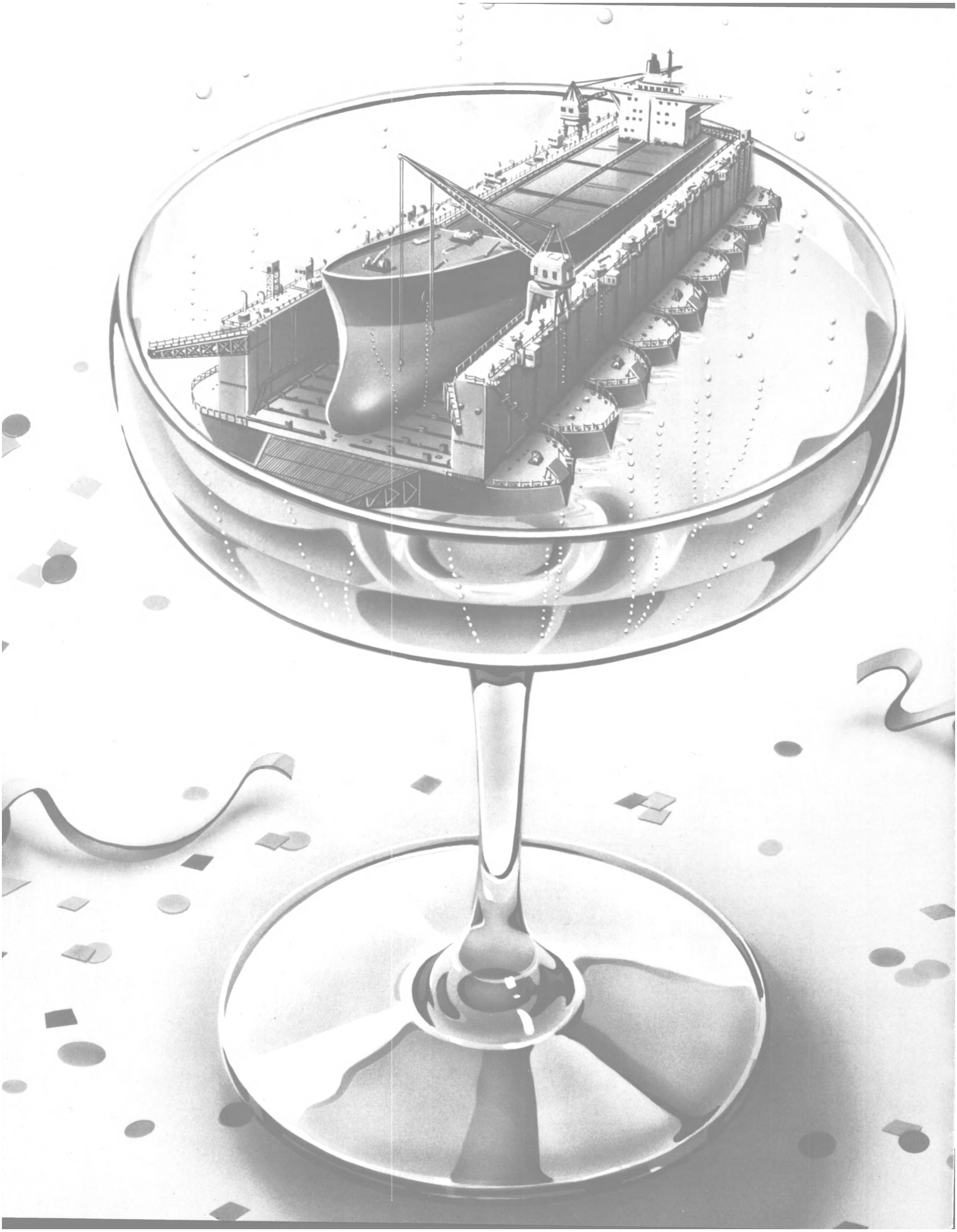
Admiral **Gracey** pointed out that increasing the use of technology does not necessarily increase capability but it does increase efficiency. When you reduce crew size, he advised, every component on the ship can be reduced—evaporators, galley, berthing, heating—resulting in savings in raw materials for initial construction and energy savings during operation. These savings can compensate for being "people-poor" in the future.

The Coast Guard's aim, according to Admiral **Gracey,** is to assure its officers and enlisted men that they "will be operating the best equipment—the best boats and best cutters available. That means quality construction; it means people-oriented vessels that are safe and comfortable. And that is why we are looking at innovative hull designs such as SWATH and SES—ships that will operate at good speed, comfortably, in all kinds of weather. Not only must our ships have the legs to go the distance but our people must be able to man them at peak efficiency when the going gets rough. We already have two Bell-Halter SES's operating in the Caribbean and a third will be delivered later this year. Also, we are designing a mid-size cutter, somewhere between our 210-foot cutters and the 82/95-foot patrol boats that will be a SWATH vessel."

The speaker pointed out that the government expects the Coast Guard to keep its ships operating forever and this requires reliability and maintainability. To meet this expectation, the Admiral said: "It has to be built-in at the design stage and requires quality construction. We generally build for a ship life of 30 years. But experience shows our cutters have to last much longer. We are currently doing a ship-life extension program on our 180-foot buoy tenders (built in the '40s) to carry them on

(continued on page 10)

Adm. **James S. Gracey** has been Commandant of the U.S. Coast Guard since May 27, 1982. He was nominated for this position by President **Reagan** while serving in the dual role of Commander, Atlantic Area, and Commander, Third Coast Guard District, in New York City. He was graduated from the U.S. Coast Guard Academy, New London, CT, in 1949, and received a Master of Business Administration degree from Harvard Graduate School of Business Administration in 1956. During his career with the Coast Guard he has served in increasingly responsible posts onboard vessels and shore stations on the West Coast, Great Lakes and the East Coast and at Coast Guard Headquarters in Washington, D.C.



Soon we'll be the toast of the East Coast.

The biggest launch in the 100-year history of Bath Iron Works Corporation will soon take place—the opening of the new BIW Portland conversion and repair facility.

Scheduled to be operational in November 1983, BIW Portland will be a leader in naval and commercial repair. By combining superb repair personnel with complete and modern facilities, our ship repair yard promises to be the finest of its size on the East Coast.

Located in the center of the deep water port of Portland, Maine, our new conversion and repair facility is a fully equipped, self-contained unit just 40 minutes from the Bath Iron Works main shipyard. All of the necessary repair services and production shops are available, including:

1,000-foot and 600-foot piers

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With 70,000 square feet outside storage and 25,000 square feet inside storage, the facility is serviced by rail, water, highway and air transportation.

BIW Portland offers modern office accommodations for owners, agencies and the U.S. Navy. And, of course, the best ship repair people in the world.

"Bath-built" has been a hallmark of distinction for nearly a century—earned through a proven reputation for aggressive management, precision planning and scheduling, superior quality and competitive pricing. These same values will be extended to BIW Portland in order that "Bath-rebuilt" immediately achieves the same distinction.

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US COAST GUARD

(continued from page 7)

into the 21st century, a mid-life maintenance overhaul of our 210 footers—replacing and standardizing equipment that is simply no longer maintainable, and we are getting started on the FRAM of our 378-foot cutters that have been around since the '60s."

Speaking of the future, Admiral **Gracey,** stated: "In this era of rapidly changing mission requirements, the Coast Guard needs multi-mission cutters and boats capable of a wide variety of operations. We must assess our needs carefully (including DOD input) and then get on with it—using off-the-shelf vessels and contract designs where appropriate. Design considerations must emphasize maintainability and reliability to cover long-term support needs. Tradeoffs will probably be necessary between speed and endurance—above a certain point speed becomes very expensive, requiring more vessel than we need or can afford. Aircraft can provide the speed and coverage we may sacrifice on the surface and sensor-equipped aircraft will do even more. Helicopter landing capability on any cutter is essential. We want vessels capable of reasonable speed in all weather operations."

In conclusion the speaker said that "with long-term people costs a high consideration in federal government, we must increase our use of high-technology applications and design cutters that provide hospitable conditions for both people and equipment. Innovative designs such as SES and SWATH meet these conditions and we are moving in that direction."

Admiral **Gracey** presented the speech abstracted here at the 1983 SNAME Spring Meeting and STAR Symposium in Washington, D.C.

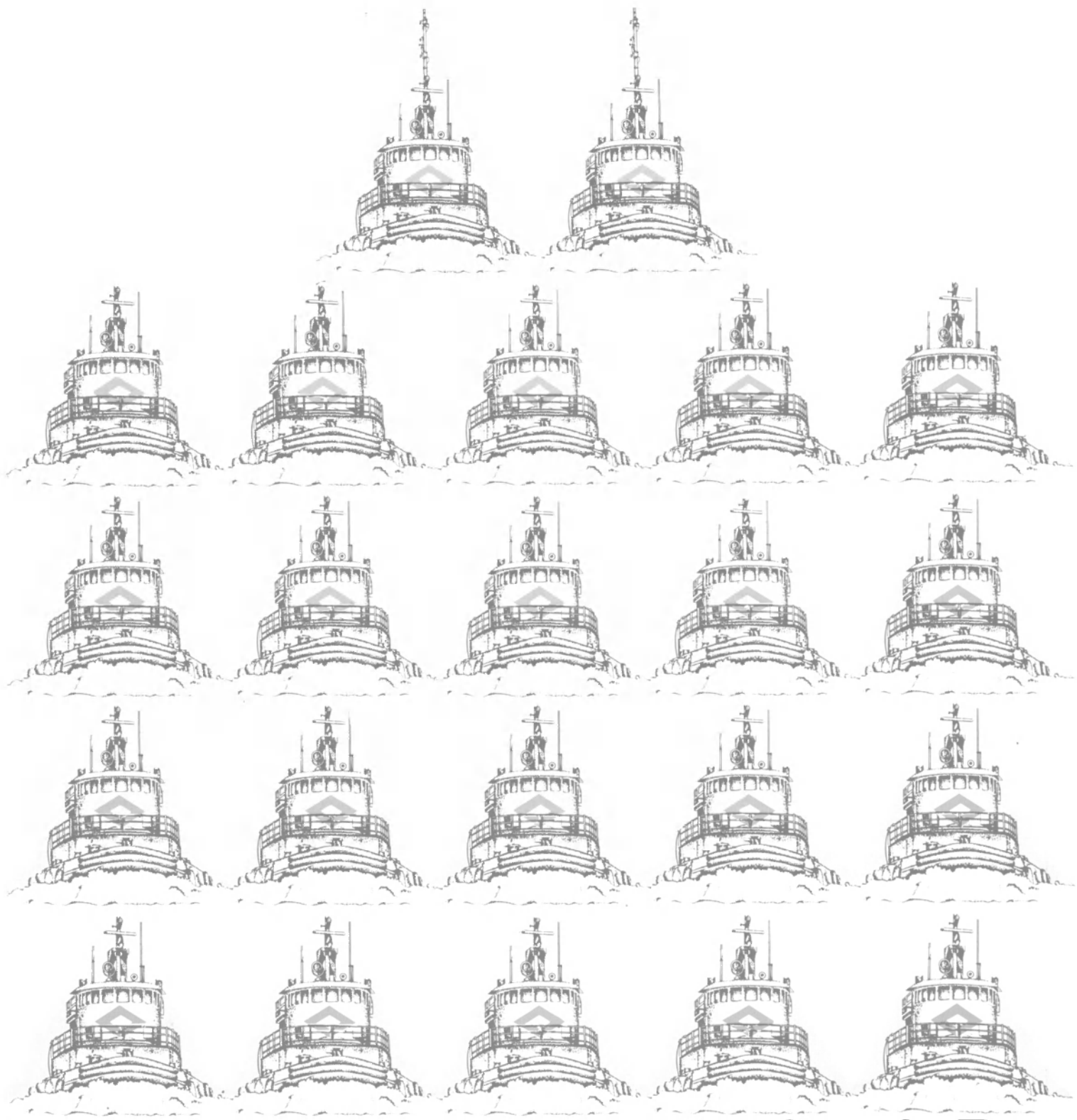
Dravo Awarded Navy Contract To Rehabilitate Crane At Portsmouth Yard

Dravo Wellman Company, a unit of Dravo Corporation of Pittsburgh, Pa., which provides bulk materials-handling equipment, systems and engineering, has received a contract for an extensive crane rehabilitation project at the U.S. Naval Shipyard in Portsmouth, Va.

Awarded to Dravo Wellman by the U.S. Naval Facility Command in Norfolk, Va., the contract calls for the rehabilitation of Crane #27 at the Navy's Portsmouth shipyard. Originally built by the Wellman Company of Cleveland in 1942, the crane is equipped with a 75-ton main hoist and a 25-ton auxiliary hoist.

Upon completion of the rehabilitation project, the crane will be fully modernized and capable of state-of-the-art crane operations. Work to be done on the crane includes the installation of a new operator's cab and new electrical panels and controls; a new 300-kw engine generator; structural and mechanical rehabilitation, and repainting. Being directed by Dravo Wellman's service group located in Cleveland, Ohio, the work is already underway, and is expected to take approximately 10 months to complete.

Valued at more than $1.5 million, the project represents the continuation of an ongoing crane rehabilitation program begun by Dravo Wellman at Portsmouth several years ago. Two cranes similar to Crane #27 have already been rehabilitated under the program, one in 1981, and another in 1982. Dravo Wellman is also involved in crane rehabilitation work at U.S. Navy shipyards in Philadelphia and Mare Island, Calif.



Twenty-two reasons why Curtis Bay is the towing choice in three major East Coast ports.

Twenty-two tugs make a powerful difference. And with over 70 years of experience plus trained, expert crews, you can be sure of time-saving (and cost-saving) efficiencies. Perhaps that's why more marine managers are saying, "When you go with Curtis Bay Towing, you have more on your side."

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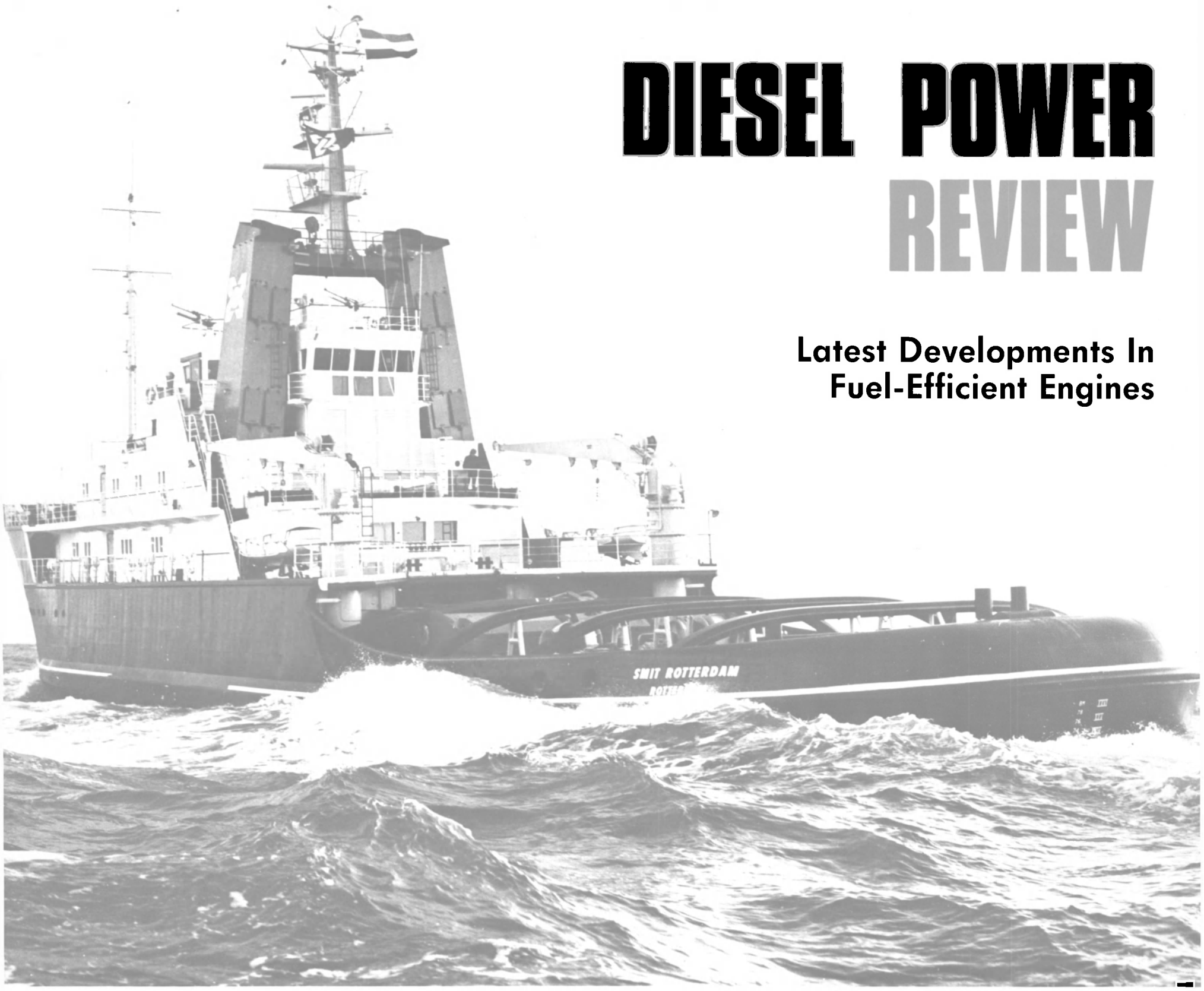


DIESEL POWER REVIEW

Latest Developments In Fuel-Efficient Engines

High fuel costs and lower grades of marine fuel continue to dominate the thinking of diesel engine manufacturers as well as vessel owners and designers.

Engine designs reflect these concerns as diesel manufacturers produce new and modified models capable of burning less fuel, of lower quality, much more efficiently.

MARITIME REPORTER *asked diesel manufacturers to provide details on the latest developments and designs in fuel-efficient diesels.*

The following review is based on the replies we received at press time..

Brochures, product literature and technical reports are available, at no cost, on all of the diesel engines surveyed in this article.

FOR MORE INFORMATION

If you wish to receive additional information on any particular products in the following review, write the corresponding reader service card number(s) on the reader service card in the back of this issue.

If you wish to receive information from all the manufacturers and suppliers of diesel engines and systems included in this review,

Write 40 on Reader Service Card

AKASAKA

Write 41 on Reader Service Card

Akasaka Diesels Limited of Japan, a privately owned diesel manufacturing company, has been building diesels for over 70 years. In that time it has built engines totaling six million horsepower.

Akasaka has been developing and marketing a new "A" series of engines which bring all the advantages of large bore slow speed down to the 1,500-hp to 3,300-hp per engine range. These engines turn from 303 rpm to 218 rpm at continuous service output, and reach fuel efficiencies below .300 lbs/shp in the larger sizes.

The Akasaka "A" series are all four-cycle long-stroke engines with the single exhaust valve on each cylinder built in a cage so it can be removed and replaced without removing the cylinder head. The low rpm makes them ideal for propulsion. They can be purchased with direct reversing, and require no reverse reduction gear.

Even when used as a generator engine—with a relatively high cost generator at such slow speed—the fact that the engines can burn 1500 to 3500 seconds Redwood fuel at 100 degrees Fahrenheit can offset the higher capital cost in two or three years of operation.

ALCO POWER

Write 42 on Reader Service Card

Alco Power Inc. has gained valuable experience in the past year with operation on 400 SR1 blended fuel using six of their 16-cylinder 251 engines in river push-boat service on the Lower Mississippi. Due to the lower cost of this fuel compared with normal diesel fuel, considerable reductions in operating costs can be realized.

These engines are rated 240 bmep at 900 and 1,000 rpm. One of these engines has reached the 9,000 hour mark in this operation. Although it is too early to give an accurate analysis of increased maintenance necessitated by using the blend, preliminary indications are, for example, that valves will need replacing at 5,000 hours and rings at 10,000 hours. Alco has recently released a publication (2F-1500-1/83) outlining the operation of its 251 engines on intermediate fuel and the fuel-handling system. The publication outlines some of the items that are to be considered in the handling and treatment of the fuel to avoid excessive engine wear.

In May of this year, Alco began testing the spark-ignited natural gas version of its new 270 series engine. The 12-cylinder engine is rated 2,650 bhp at 1,000 rpm. The ability to test these and newer models up to 8,000 hp was recently accomplished with the completion of a new $2.8-million production test facility in Auburn, N.Y. This facility will also be able to test diesel engines.

Engines will be loaded by a micro-processor controlled fluid friction dynamometer connected to the engine by a universal shaft. Three cooling towers cool the dynamometers and engine fluid heat exchangers.

The new facility incorporates state-of-the-art instrumentation for testing both the 251 and 270 diesels and the 270 spark-ignited gas engine. Most engine parameters can be measured remotely in the control room. This expansion provides greater on-site testing efficiency for Alco. Write the number above on the Reader Service Card for additional information on the Alco engines and a copy of the 2F-1500-1/83 report.

AMERICAN LOHMANN

Write 43 on Reader Service Card

Next year, Lohmann & Stolterfoht, the power transmission specialist headquartered in West Germany, will celebrate its 100th birthday. American Lohmann, its U.S. Subsidiary, is located in Hillside, N.J.

In the beginning, the development and production of in-motion engaging and disengaging clutch-couplings constituted the firm's main activity. Later, L&S began the production of complete transmission lines with gearboxes, couplings, clutches, and shaft bearings particularly for the shipbuilding industry.

Included in the extensive marine power transmission line from L&S are the following products.

Navilus Marine Gearboxes

GUU reverse reduction gear units, with a power range from 110 hp to 910 hp, are designed for small fishing and workboats as well as yachts and patrol craft. Lightweight and compact design make the units particularly suited for high-speed craft. GUS type gear units have the same basic design features with a power range from 500 hp to 1960 hp.

GW gear units are designed for high power transmission especially under heavy service conditions and are available in a variety of configurations, i.e. reverse reduction and plain reduction, coaxial, vertical offset and horizontal offset. The GCS/H, GUC/H and GUO types are reduction gearboxes and cover the complete application range of medium-speed direct-reversible diesel engines with a power range from 1,500 hp to 65,000 hp. Combining two or more engines to drive a single propeller shaft may be accomplished with L&S compound gear GVA or GVG units with a power range of 1,800 hp to 60,000 hp and more per input line.

A wide selection of specially designed gearboxes such as alternator gear units, dredger transmissions, i.e. cutter head drives, gear units for sand pumps, electric generators, and winch drives are also available.

Couplings, Clutches and Bearings

The exitations of diesel power

(continued on page 14)

American Lohmann

(continued from page 13)

transmissions call for torsionally flexible couplings and clutches which eliminate excessive vibration and stress in the propulsion system. The Spiroflex is a highly elastic coupling with a torque capacity up to 140,000 kNm. The pneumaflex is a torsionally flexible clutch, pneumatically actuated which may transmit up to 50,000 hp.

The torsionally rigid Pneumastar clutch is a pneumatically operated dry friction clutch with tapered friction surface, which is free of backlash and able to transmit power up to 95,000 hp. Radilus propeller shaft bearings and Axilus thrust bearings for shaft diameters between 4 and 34 inches are standard L&S production designs. In addition, in close cooperation with engine manufacturers, shipyards, and owners, L&S provides customers with reports on the latest studies and developments in the power transmission area as well as software including circuit diagrams, torsional vibration, and clutching heat dissipation calculations.

BERGEN DIESEL

Write 44 on Reader Service Card

The Bergen Diesel factory, or the BMV—Marine Engineering Plant, is located near Bergen, the second largest city in Norway. The company constructed this new and completely modern factory and moved into the facilities in 1971.

Bergen Diesel is represented in the U.S.A. by Bergen Diesel, Inc., of Kenner, Louisiana. The office is headed by **Tor Torgersen.**

Right after World War II, the Bergen Machine Works, then only a shipyard, started building diesel engines for propulsion for a series of new ships to be built to replace tonnage lost during the war. Production began with loop scavenged two-cycle engines.

The first four-stroke Bergen Diesel, the R-type, was introduced in 1953 and received great interest as an auxiliary engine. It was removed from the Bergen line in the mid-1960s.

In 1955, Bergen Diesel built a prime mover, designated the L-type (Locomotive), designed with a 250-mm (10-inch) bore; but with a shorter 300-mm (12-inch) stroke for higher speeds ranging from 720 to 900 rpm; and yielding 195 bhp (143 kw) per cylinder. This engine gained world-wide recognition as a reliable auxiliary engine for large vessels and as a propulsion engine for smaller vessels.

In the late 1960s, the demand for ever increasing output and the necessity to burn fuels of decreasing quality led Bergen Diesel to design the K-type engine. The 250-mm (10-inch) bore, 300-mm (12-inch) stroke, four-cycle engine is made in an in-line version with 3, 5, 6, 8 and 9 cylinders, and in a V-version with 12, 16 and 18 cylinders, covering an output range from 545 bhp (400 kw) to 4,300 bhp (3,200 kw). The K-engine is also made for auxiliary and for propulsion duty and is particularly well suited to run on intermediate fuels.

The first Bergen Diesel engines to be run on intermediate fuels ranging from 1F-30 (200 sec. RW1/100°F) to 1F-180 (1500 sec. RW1/100°F) were commissioned in 1963.

Even then, when the price difference between marine diesel fuel and intermediate fuel was around $10/ton, some shipowners used intermediate fuels on their Bergen Diesel auxiliary engines.

Since then the number of engines equipped for intermediate fuel operation has increased every year. Now, about 80 percent of the company's annual engine production is sold for intermediate fuel operation.

The mean effective pressure for these engines is limited to 16 bar (230 PSI), whereas the engines are released with a BMEP of 18 bar (260 PSI) for MDO-operation. The fuel viscosity has long been in the range of 30 to 180 cSt/50°C (200 to 1500 sRW1/100°F), but, since 1982,

IF-380 (3500 sRW1/100°F) installations have been in service.

The majority of the generating engines and a fairly large number of the propulsion engines in operation world-wide have to accept the wide variety of fuel qualities available.

Experience has shown that, provided the manufacturer's recommendations for fuel treatment, engine temperatures and load levels could be met, overhaul times and wear figures generally do not change significantly as compared to MDO-operation.

The demand for higher ratings and increased fuel viscosity, together with the reduction of fuel quality, has prompted Bergen Diesel to undertake extensive development work in the following areas: engine components—including exhaust valves, pistons and rings; turbocharger matching; nozzle cooling/heating arrangement/start and shut-down on IFO; injection and combustion performance; part load performance; heat transfer; and fuel oil preparation.

A free, 70-page technical report on Bergen Diesel engines operating on intermediate fuels is available on request.

CATERPILLAR

Write 45 on Reader Service Card

Caterpillar Engine Division offers complete, matched propulsion package with ratings from 85 hp (63 kw) to 1,600 hp (1,194 kw) and marine auxiliary generator sets with ratings from 55 kw (69 kv - a). Caterpillar reports all engines have rugged four-cycle design with medium operating speeds which result in proven reliability and long service life. Their compact design allows easy installation and servicing when machinery space is limited. Their low fuel consumption reduces engine owning and operating costs.

Factory matched engines and transmissions are factory assembled and tested. Design compatibility allows concurrent scheduling of major overhauls, reducing repair time and expense. Caterpillar 7200 series of marine transmissions match applications ranging from 300 hp (224 kw) to 1,600 hp (1,194 kw) and a full range of attachments (power takeoffs, protection devices, mechanical control systems, duplex fuel and oil filters, etc.) facilitate specific application requirements.

Service and product support is available from a worldwide network of 232 full-line Caterpillar dealers in more than 1,100 locations in more than 140 countries. Caterpillar dealers conduct sea trials to audit your system's performance, including air intake subsystems, exhaust, cooling and lubrication to ensure optimum engine performance and life.

Caterpillar offers a complete marine auxiliary generator set package. Cat auxiliaries provide essential ship services and emergency power for lighting, communications, powering winches, operating compressors, pumping water and operating bow and stern thrusters. The entire generator package is factory warranted with Caterpillar dealers providing one source responsibility for parts and service.

COLT INDUSTRIES

Write 46 on Reader Service Card

Two new projects are underway at Colt Industries, Fairbanks Morse Engine Division in Beloit, Wis., which are of special importance to the U.S. maritime industry. Colt Industries has secured a licensing agreement with S.E.M.T. Pielstick of France to manufacture the Pielstick PC4.2V and PC2.6L diesel engines at its Wisconsin plant.

An $11.5-million transfer of technology program is underway with commitments already made on long lead time tooling for PC4.2V engines. Modifications to the Beloit facilities Colt-Pielstick assembly and test areas include the purchase of a 250-ton bridge crane, new railroad trackage, and modifications to the 30,000-hp dynamometer test cell to permit assembly and test of the Colt-Pielstick PC4.2V marine engine.

Ratings for the PC2.6L are between 4,500 hp and 6,750 hp. For the PC4.2V, the ratings are between 16,500 hp and 29,700 hp.

(continued on page 16)

Colt Industries

(continued from page 15)

With improved fuel economy and the ability to burn some of the poorest quality heavy fuels, these two Colt-Pielstick engines will be valuable assets to the marine industry.

Fairbanks Morse Engine Division continues to offer the Colt-Pielstick PC2.5V and the Fairbanks Morse opposed piston diesel engines. These two engines have been widely used by the maritime industry for many years. Four each of these two engines provide propulsion power and electric power for the U.S. Navy's LSD-41 Whidbey Island launched during June of 1983, with engines for LSD-42, 43, and 44 on order.

The Colt-Pielstick PC2, 2.3, and 2.5V engines are rated between 6,000 hp and 11,700 hp. Colt-Pielstick engine operation is readily adaptable to remote control and automatic monitoring. Fairbanks Morse engineers have designed systems meeting ASCG and ABS 1976 rules (ACCU requirements) for a "no-man" engine room watch. All Colt-Pielstick engines enjoy parts availability in major ports all over the world.

The Fairbanks Morse 38D8-1/8 series opposed piston diesel engines are available with ratings from 708 hp to 4,200 hp with both blower scavenged and turbocharged models. The two-cycle opposed piston configuration provides an improved power to weight ratio and reduced space requirements. It also results in fewer moving parts for increased reliability. This engine has been used in marine propulsion and power generation applications since the mid 1930s.

In addition to the U.S. Navy's Whidbey Island class LSDs, Fairbanks Morse opposed piston diesel engines provide power for secondary propulsion systems and emergency power for U.S. Navy submarines.

CUMMINS

Write 47 on Reader Service Card

Cummins Engine Company of Columbus, Ind., manufactures six series of marine propulsion engines. Designed for heavy-duty workboat and fishboat applications, the Cummins engines are rated at 170 to 1,250 hp (127 to 932 kw) for continuous, 24-hour-per-day propulsion service. Several reverse and reduction gears are available for each model.

The compact V series diesel engines are V8 configuration with "oversquare" cylinders in which the bore diameter is larger than the stroke. By allowing faster rpm without increasing internal stresses, an "oversquare" engine combines high horsepower, compact size, and light weight. The V-504-M is a naturally aspirated engine with a 504-cubic-inch (8.3 litre) displacement and is rated at 170 continuous hp at 2,800 rpm. The 555 series engines have a 555 cubic inch (9.1 litre) displacement and are naturally aspirated when rated for continuous duty at 185 hp at 2,800 rpm.

The V/VT/VTA-903 series marine diesels have the "oversquare" cylinder design and range in horsepower from 255 to 320, continuous duty. Today's 903 engines have proven their reliability and economy in over 40,000 marine and industrial applications. The V-903-M is naturally aspirated rated at 255 hp, the VT-903-M is turbocharged rated at 285 hp, and the VTA-903-M is both turbocharged and aftercooled rated at 320 hp. All are rated for continuous operation at 2,300 rpm and have a 903 cubic inch displacement (14.8 litres).

The Cummins N/NT/NTA-855-M series engines are Cummins' most proven marine diesel. For 50 years the 855 series and its predecessors, the 672 and 743 series, have been the standard for comparison of performance and economy in marine and other heavy-duty applications. These engines are six-cylinder in-line diesels with

a C.I.D. of 855 (14 litres) and operate at 1,800 rpm. The N-855-M is naturally aspirated and rated for continuous duty at 195 hp. The NT-855-M is turbocharged and rated at 270 or 240 hp. The NTA-855-M is both turbocharged and aftercooled and rated at 325 hp.

The KT/KTA-1150 series engines are in-line six-cylinder models and have become the standard for fishing boats in the U.S since their introduction in 1974. In the development of the K engines, Cummins applied the knowledge gained through over 60 years of heavy-duty diesel experience. The KT-1150-M is a turbocharged model rated 365 or 400 hp at 1,800 rpm and the KTA-1150-M is turbocharged and aftercooled and is rated 470 hp at 1,800 rpm. Displacement is 1,150 cubic inches (18.9 litres).

The VT/VTA-1710- series are 12-cylinder, V configuration diesels with a displacement of 1,710 cubic inches (28 litres). This series has established a reputation for exceptional reliability and durability in a wide variety of workboat and fishboat applications. The VT-1710-M is turbocharged, rated 490 hp at 1,800 rpm continuous, and the VTA-1710-M is turbocharged and aftercooled with continuous ratings of 545 or 620 hp at 1,800 rpm.

Introduced into the fish and workboat market in 1974 and 1980, respectively, the KT/KTA-2300-M and KTA-3067-M series complete the Cummins' product line with the high horsepower, reliability, durability, and fuel economy required for such engine applications. The 2300 series engines are 12-cylinder V configuration design with a displacement of 2,300 cubic inches (37.8 litres), and ratings of 800 hp at 1,800 rpm for the turbocharged KT, and 940 hp at 1,800 rpm for the turbocharged and aftercooled KTA. The turbocharged and aftercooled KTA-3067-M is a 16-cylinder model with a 3067-cubic-inch (50.3 litre) displacement and is rated 1,250 hp at 1,800 rpm.

DETROIT DIESEL

Write 48 on Reader Service Card

Detroit Diesel Allison has announced new advanced fuel economy models of its series 149 diesel engines. The turbocharged and intercooled engines are the most fuel efficient, heavy-duty diesels available in their power range, according to **David Merrion**, director of diesel engine sales.

The Detroit Diesel 149 engines in 12 and 16-cylinder, vee-block configurations are expected to show fuel economy improvements of about 3.5 percent over current engines at the same horsepower ratings, Mr. **Merrion** said. Twelve-cylinder models are available up to 894 bhp, 16-cylinder models to 1212 bhp, in turbocharged and intercooled versions for marine continuous applications.

The fuel economy improvements are the result of a number of engineering developments by Detroit Diesel Allison, including new turbochargers, unit fuel injectors, and a new airflow system, he said.

With the new system, the power required to drive the Roots type blower used in Detroit Diesel two-stroke cycle engines is significantly reduced as the engine reaches operating speeds. As that happens, the increased airflow from the turbochargers takes over the function of providing the intake air needed to maintain combustion and scavenging in the cylinders. A special valve takes the load off of the blower by equalizing the pressure on both sides of the rotors, reducing blower horsepower.

The new turbochargers and unit fuel injectors have been carefully tailored to match the needs of the new system for optimum fuel efficiency, Mr. **Merrion** explained.

Detroit Diesel series 149 engines have been popular with the commercial fishing industry for many years. Their high dependability and continuing improvements in fuel economy and durability have made them "a standard of the industry," according to Mr. **Merrion.**

(continued on page 18)

(continued from page 17)

ELECTRO-MOTIVE DIVISION—GM

Write 49 on Reader Service Card

A new, more fuel-efficient series 645 engine was introduced by Electro-Motive Division of General Motors this year. This new engine provides a 3 percent reduction in fuel consumption over previous models.

"This new model," said **T. J. Lehman,** EMD marine and industrial sales manager, "represents the latest step in our continuing efforts to provide our customers with the most fuel-efficient diesel, while maintaining our levels of reliability, interchangeability, and maintainability. We are very excited about this more fuel-efficient model. Further, we expect even more improvements in fuel efficiency in the future."

The new EC engine series combines innovative design features that ensure superior field performance, extended operating service, and enable the engine to withstand higher operating pressures with state-of-the-art turbocharger technology. The 645EC uses a 16:1 compression ratio piston. The increased compression ratio from 14.5:1 produces the same power output with less fuel. A newly designed impeller and compressor has been incorporated into the turbocharger.

EMD has also introduced, this year, a heavier crankcase option, the 645F engine. This engine, designed for high horsepower levels, is currently available in 16 and 20-cylinder models.

Later this year, results should be in on the next phase of EMD's blended fuels field testing program. The division will report on the findings.

A new multimillion-dollar blended fuels engine test facility is under construction at EMD. This is in addition to the 13 performance and durability test facilities EMD already has.

In addition to this investment, EMD has expanded its computerized design and manufacturing capabilities into an integrated system (CAD/CAM) which enables engineering designs to be communicated directly to the shop floor. The result is improved quality. Computer Aided Design/Computer Aided Manufacturing puts the factory of the future into EMD's operations today.

GENERAL ELECTRIC DIESEL

Write 50 on Reader Service Card

Rating increases of approximately 10 percent, resulting from a series of significant technological advances, have been announced by General Electric Diesel Power Products, Erie, Pa., for its line of diesel engines and power modules.

The recent advances have been completely laboratory and field tested and include a higher strength piston, modified exhaust valves and seats, 18-mm double helix fuel pump, enlarged parallel low-pressure fuel system, grooveless bearings, and turbocharger improvements.

As a result of the newly developed advances, General Electric is offering the following ratings:

	900 RPM	1050 RPM
Marine Propulsion		
7FDM16	3400	4000
7FMD12	2550	3000
7FDM8	1800	1525
Power Modules (marine & stationary)		
16-cylinder	2,400 kW	
12-cylinder	1,800 kW	
Power Modules (oil well drilling)		
16-cylinder		2650 kw
12-cylinder		2000 kw

In addition to product improvements, General Electric is offering its customers complete service and parts support and training capabilities.

For example, the new GE Actionline gets the parts required to repair an engine breakdown to the customer within 48 hours or less. And with the Actionline, parts for normal delivery are shipped by the end of the second working day.

General Electric's new multimillion-dollar Learning and Communications Center at its Erie,

(continued on page 20)

AN INVESTMENT IN LOWER LIFETIME COST

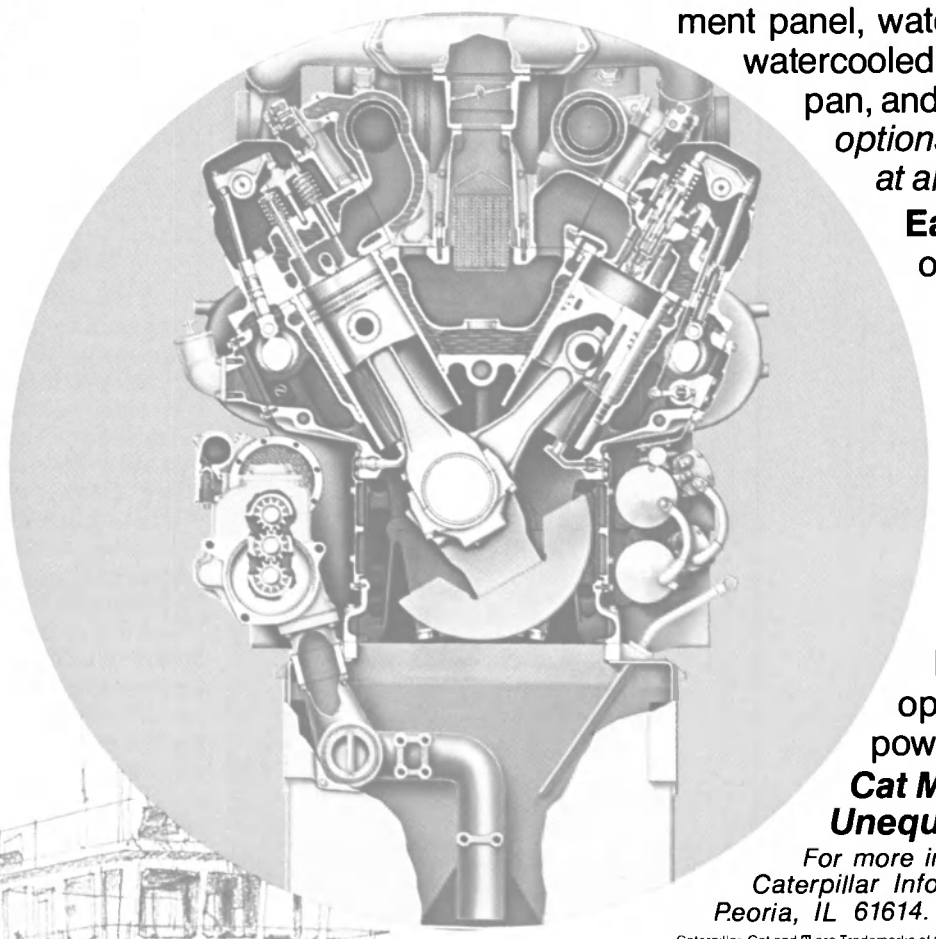
CAT 3500
SERIES MARINE ENGINES

565-1600 HP (421-1194 kW)

Cat 3500 Series Diesel Engines in V8, V12, and V16 configurations deliver the performance you demand plus...

Fuel Efficiency. Low friction three-ring pistons, 4-stroke cycle design, direct injection fuel system and turbocharging and aftercooling combine to meet today's need for high performance. *And at most ratings, they burn less fuel than comparably rated engines.*

No Cost Extras. Standard features include a 13-gauge instrument panel, watercooled turbochargers, air-shielded watercooled exhaust manifolds, deep sump oil pan, and more. *These are probably extra cost options on other make engines–if available at all.*

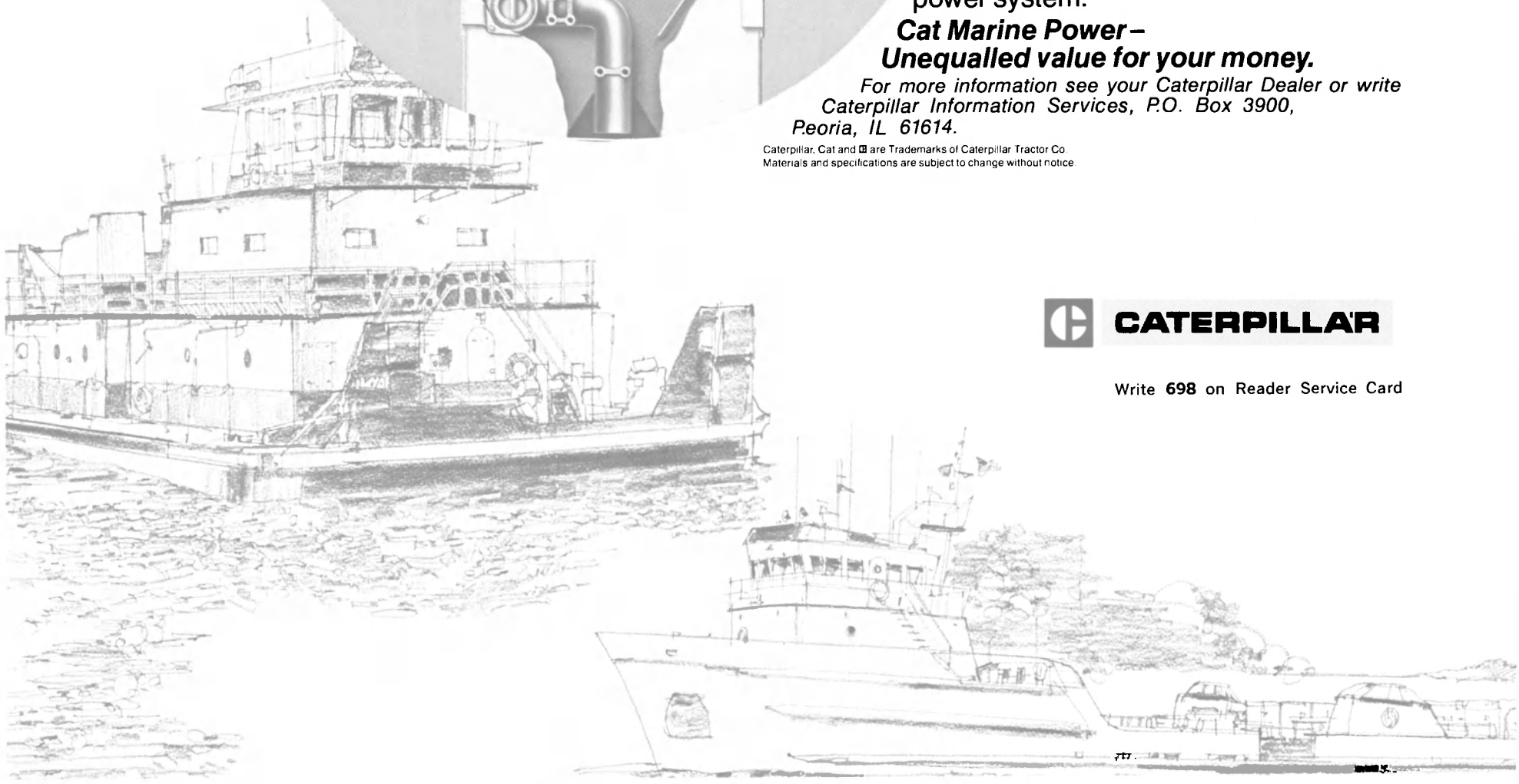


Easy Maintenance. Large inspection openings to internal components and center-mounted manifolds allow easy access to camshafts and connecting rods. And fuel filters, oil, and oil filters can be changed at the same time. *This reduces downtime and cost.*

Caterpillar 3500 Series Engines are sold and serviced by over 1,100 Cat Dealers worldwide who are in business to help you select, install, operate and maintain your marine power system.

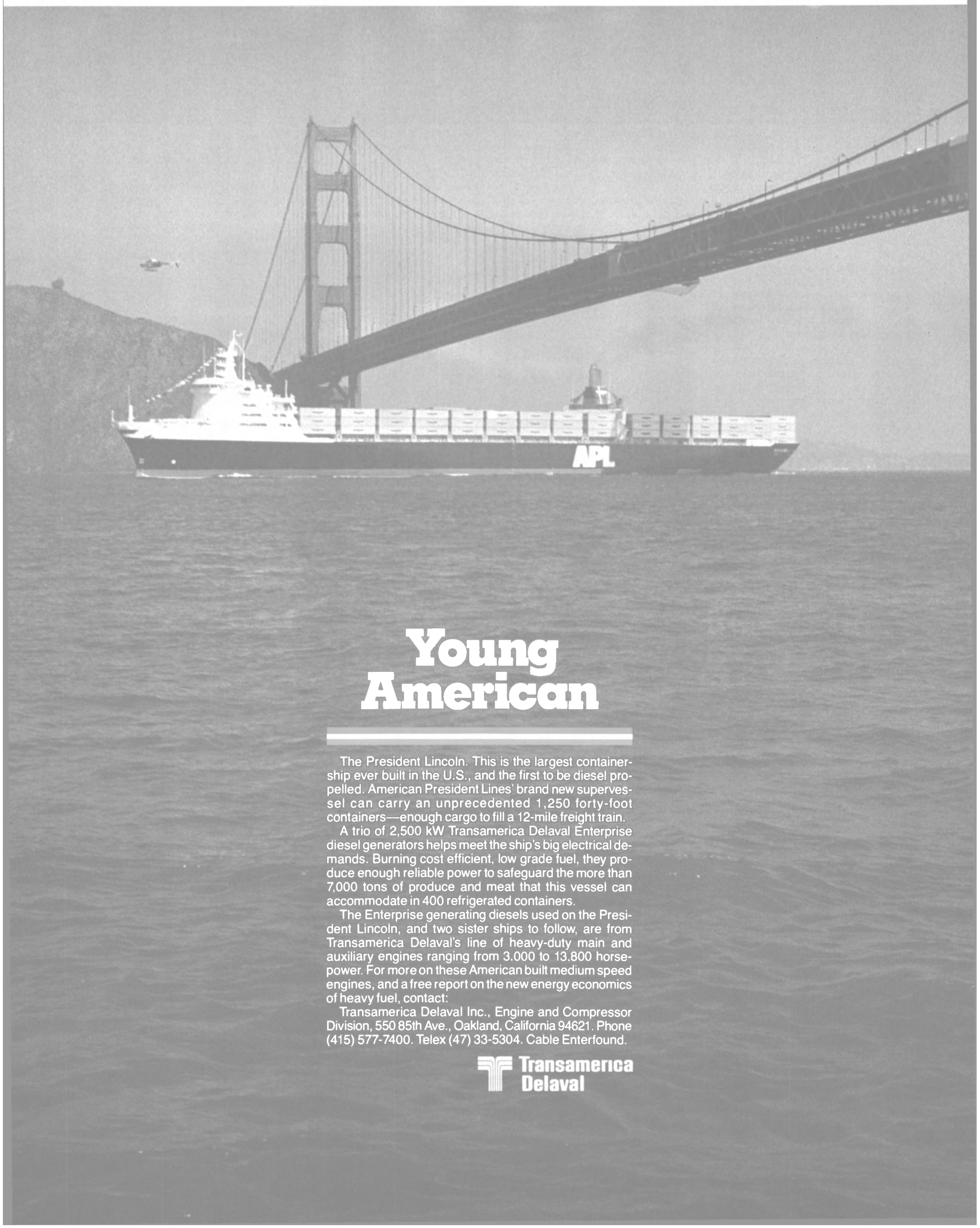
Cat Marine Power–
Unequalled value for your money.

For more information see your Caterpillar Dealer or write Caterpillar Information Services, P.O. Box 3900, Peoria, IL 61614.



CATERPILLAR

Write **698** on Reader Service Card



Young American

The President Lincoln. This is the largest containership ever built in the U.S., and the first to be diesel propelled. American President Lines' brand new supervessel can carry an unprecedented 1,250 forty-foot containers—enough cargo to fill a 12-mile freight train.

A trio of 2,500 kW Transamerica Delaval Enterprise diesel generators helps meet the ship's big electrical demands. Burning cost efficient, low grade fuel, they produce enough reliable power to safeguard the more than 7,000 tons of produce and meat that this vessel can accommodate in 400 refrigerated containers.

The Enterprise generating diesels used on the President Lincoln, and two sister ships to follow, are from Transamerica Delaval's line of heavy-duty main and auxiliary engines ranging from 3.000 to 13,800 horsepower. For more on these American built medium speed engines, and a free report on the new energy economics of heavy fuel, contact:

Transamerica Delaval Inc., Engine and Compressor Division, 550 85th Ave., Oakland, California 94621. Phone (415) 577-7400. Telex (47) 33-5304. Cable Enterfound.

Transamerica Delaval

KHD Deutz

(continued from page 21)

As far as safe starting is concerned, Deutz benefitted from the existence of an optional starting system on the 816 using compressed air piped direct to the cylinders. This avoids the need to flameproof starter motors and avoids the risk of sparks from gear teeth. There is the added advantage that an inert gas such as nitrogen, which is commonly found in pressure cylinders on oil rigs, will perform the starting functions.

Deutz is offering a 24-page full-color brochure on its series B/AM 816 diesel engines. The brochure includes color photographs, cutaway and sectional drawings of the engines which are offered in both in-line and "V" configurations.

Deutz maintains sales and service offices worldwide. The company is represented in the United States by Deutz Corporation of Atlanta, Ga., and Metairie, La.

KRUPP MaK DIESEL, INC.

Write 55 on Reader Service Card

Krupp MaK Diesel, Inc., a leading supplier of medium-speed, four stroke, heavy-oil engines, has relocated its North American headquarters from Rosemont to Glenview, Ill., to provide the latest state-of-the-art services to the U.S. and Canadian marine industries. The firm maintains 112 service centers worldwide and has sold more than 700 heavy fuel engines worldwide.

Since it was established in the fall of 1980, Krupp MaK Diesel, Inc., a subsidiary of Krupp MaK Maschinenbau GmbH, Kiel, West Germany, has placed more than 160 engines in operation throughout North America.

"Our heavy-oil technology has been developed over the past 15 years," explains MaK vice president, **Rainer Von Minden.** "And new designs continue to lead improved operation of MaK's four-stroke engines, especially when running on bunker fuels. The capability to burn heavy oil contributes considerably to the reduction of operating costs because of lower fuel costs and lower specific consumption.

"Although medium-speed, heavy-fuel engines are relatively new to North America, they have proven to be very successful. . . . Our need to expand after two years in business here suggests that MaK's engines have been accepted by the market and become a fixture in this continent's marine industry," Mr. **Von Minden** stated.

MaK manufactures (in West Germany) five series of medium-speed, four-stroke diesels with outputs from 1,000 hp–13,000 hp. The engine range includes the M 282/ M332, M 453, M35, M 551/M 552, and M 601. In-line engines are produced for the entire range, and V engines with 12 or 16-cylinders are available for very compact drive systems. All of MaK's engines have cast-iron crankcase housings. Engines with bores of 320 MM or more have multisectional engine blocks and are connected by continuous steel tension rods. High initial tension of the rods prevents tensile stress in the cast material. Engines with a 240-mm bore have a crankcase with an underslung crankshaft.

The M 552, widely used to power Great Lakes Ships, has an output from 4,000 hp–10,000 hp. The three-part arrangement consists of bedplate with embedded crankshaft, superimposed box frame with large power unit ports, and cylinder block. The pistons are designed to accommodate the heavy-oil operation, including a steel upper section, aluminum piston skirt, chromium-plated piston rings, and exhaust valves in separate cast steel housings with intensive valve seat cooling. The cylinder liners are a salt bath nitrided working surface and separate cylinder lubrication.

Low engine speed and low load values combined with solid design have enabled the M 552 to run on bunker fuel of 700 CST/50 degrees C. The M 552 is available in 6, 8, 9, or 12-cylinders. It has a 450-mm bore; 520-mm stroke, and a speed range of 425–514 rpm.

The M 601 is the largest in MaK's series, with an output range of 8,000–12,300 hp. It is used to power larger vessels or vessels with small space capacity where higher horsepower is required. Available with 6, 8, and 9-cylinders, the compact M 601 has an almost quadratic stroke bore ratio of 600 mm–580 mm and a speed range of 400–428 rpm. It is operating on bunker fuel grades up to 700 CST/50 degrees C.

The M 601 is designed with proven bedplate construction with embedded crankshaft, superimposed box frame and cylinder block.

Well suited for most types of ships and often used as a high output auxiliary engine, the compact M 453 powers propulsion systems. With the capacity to burn bunker fuels up to 700 CST, it is designed either as a direct reversible or as a undirectional engine. The M 453 is available in 6, 8, 9, 12 or 16-cylinder configurations. It has a 320-mm bore, 420-mm stroke, speed range of 500–600 rpm; and an output range of 2,200–6,530 hp. with heavy fuels with a viscosity above 180 CST/50 degrees C.

LUFKIN

Write 56 on Reader Service Card

Lufkin Industries, Inc., of Lufkin, Texas, has enjoyed an enviable reputation throughout the marine industry for many years because of the high quality and rugged design of their marine gear drives.

Lufkin states they build marine gear drives to last even under the most severe operating conditions. To provide vessel owners with an extra margin of protection, all Lufkin drives employ heavy, double helical gears mounted in rugged housings capable of absorbing unexpected shock loads. Clutches are mounted externally for better access and greater ease of maintenance.

The firm stated they can and have designed marine drives for any application. Since World War II, Lufkin has supplied a standard line of marine gear drives in vertical, horizontal and inline arrangements for 500 to 8,000 hp service. The company has custom-designed gears for much larger applications and worked with builders from design stages to installation.

Lufkin has an informative brochure available at no cost which completely describes their standard line of marine gear drives and the availability of custom-designed units for particular applications.

M.A.N. - B&W DIESEL

Write 57 on Reader Service Card

Ten years ago, improvements in specific fuel oil consumption was one of the least important design considerations for future generations of diesel engines. This situation changed radically during the 1970's and today, specific fuel oil consumption, propulsion efficiency, and operation on heavy fuel, outweigh all other considerations by a wide margin.

As a result, M.A.N.-B&W is now one of the leaders in the design of efficient engines as measured by the very low fuel oil consumptions confirmed on testbed. Actual engine sales, in percentage of the total world horsepower demand for marine propulsion and auxiliary generator units, is in excess of 42 percent, one of the largest in the world with the broadest range of low and medium-speed engines from 500 to over 56,000 hp.

The M.A.N.-B&W family of diesel engines of the latest design includes: 22 low-speed engines de-

(continued on page 24)

M.A.N.-B&W Diesel

(continued from page 23)

veloping from 2,340 bhp at 200 rpm to 56,160 bhp at 74 rpm, and 11 medium-speed engines developing from 545 bhp at 1,000 rpm to 18,990 bhp at 450 rpm. M.A.N.-B&W reports specific fuel oil consumption for medium & low speed engines as low as 0.26 lbs/bhp-hr at part load. The M.A.N.-B&W service organization consists of 29 service centers worldwide, 104 sales agents, and 74 authorized repair agents, which ensure that the operator of any M.A.N. or B&W designed engine has rapid access to spare parts, technical expertise, and qualified repair assistance. This service organization is backed by modern plants in both Germany and Denmark, plus a family of licensees who supply spares and maintain stocks in all major traffic centers. Immediate delivery of a wide range of important spare parts is available in any area of the world.

An additional service area development provides a range of maintenance management modules which are tailored to suit individual needs. This service includes a highly developed and computer supported Compex maintenance system. Based on M.A.N.-B&W's experience gained from more than 400 plant-years of operation, Compex enables operators to optimize maintenance schedules for maximum reduction in costs.

B&W ALPHA

Write 58 on Reader Service Card

B&W Alpha Division of B&W Diesel A/S is a company in the M.A.N.-B&W Diesel Group that designs, manufactures, markets, and services complete ship propulsion systems.

For 1983, Alpha Diesel has completed the integration of the in-line and V-version of the 20/27 M.A.N.-B&W Diesel engine and the in-line version of the 32/36 M.A.N.-B&W Diesel engine with already existing Alpha controllable-pitch propeller equipment and gearboxes. This results in four-cycle diesel propulsion systems developing as little as 680 hp at 1,000 rpm, which can burn heavy fuel oil to 2100 sec. Redwood 1 at 100 degrees F.

One of the new series being offered by Alpha Diesel is the new 20/27-VO propulsion system. While the engine itself is not new, it has been included in Alpha Diesel's complete propulsion system offerings. This propulsion system incorporates the new Alphatronic I and Alphatronic II remote controls—the company's latest electronic remote control systems.

Features of the new remote control systems include: a) reliable attainment of economical operation through the optimum combination of engine rev/minute and propeller pitch; b) simple controls requiring minimum attention of the navigator; c) simple installation (basically a single electrical cable connection from the wheelhouse control panel to the engine); d) easy maintenance (with as many functions as possible on easily replaceable printed circuit boards); and e) a clear, understandable display of essential information.

The Alphatronic I is intended for vessels operating under widely varying conditions (for example, harbor tugs, trawlers, etc.) or where the maintenance of a specific engine or take-off rev/min is a major factor in operation. The Alphatronic II is designed for use on ships where operating conditions are not dominated by a fixed engine speed requirement, allowing free choice in the combination of rev/min and propeller pitch. With either system, the navigator can always override the automatic system should special circumstances require a different pitch of rev/minute setting.

For more than 30 years, M.A.N. and B&W have been among the leaders in the development of four-stroke medium-speed diesel engines using heavy fuel. The L28/32 engine can provide maximum operating economy during both high and low load operations as well as idling by virtue of the fol-

(continued on page 26)

More Powerful Than A Locomotive

It cuts through the water with 8,000 horses, but the power from its engines is only a small part of the story. The decision to ship by this Tug and Barge was really made by the power of economics. The rails couldn't compete; that's why you chose the sea.

At Bulkfleet Marine, our heavy-oil engines reduce normal operating costs by 30%. At the same time, hi-tech engineering raises deliverable deadweight tonnage to rival the average payloads of road, rail and domestic tramp ship combined.

Lower costs and bigger payloads. When the decisions are made to move bulk commodities, Bulkfleet has the edge.

Bulkfleet Marine.
Where transportation begins.

BULKFLEET

Bulkfleet Marine Corporation
1800 West Loop South
Suite 1600
Houston, Texas 77027
(713) 840-1100
Telex: 792-049

Write 529 on Reader Service Card

M.A.N.-B&W Alpha

(continued from page 24)

lowing: low inertia fuel injection, high injection pressure, optimized valve timing, resistance in gas ways, and a carefully adapted high efficiency turbocharger which gives low fuel consumption and clean combustion when running on heavy fuel.

The L28/32 and V28/32, with their redesigned cylinder heads, offer better gas flows and improved fuel economy as well as heavy fuel burning characteristics. Research is continuing to further reduce fuel consumption in all engine models.

The Alpha Diesel product line now includes the following series: 20/27 which develops 136 hp per cylinder at 1,000 rpm; model 23L which develops 155 hp per cylinder at 825 rpm; 23/30 developing 170 hp per cylinder at 825 rpm; L28/32 developing 285 hp per cylinder at 775 rpm and L32/36 which develops 500 hp per cylinder at 750 rpm. Alpha Diesel can now offer more horsepower with fewer cylinders.

B&W HOLEBY

Write 59 on Reader Service Card

B&W Holeby manufactures four-stroke diesel engines ranging from 450 to 5,500 bhp. The company supplies diesel generator systems for shipboard electrical power and to power auxiliary equipment aboard ships.

In addition to diesel engines, production includes spare parts and components, such as crankshafts and connecting rods, for the licensees' production of four-stroke B&W diesel engines. Fuel oil mixing units and other auxiliary units are also manufactured.

As a result of recent development projects, all types of Holeby engines can now be supplied in uprated four-valve versions which operate efficiently on the same heavy oil used in the main engines. Holeby has termed this their Unifuel system.

MTU OF NORTH AMERICA

Write 60 on Reader Service Card

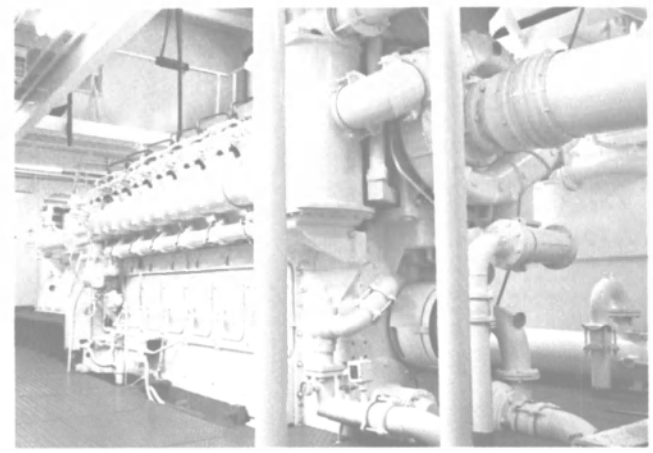
MTU of North America, Inc., Greenwich, Conn., is the American-based subsidiary of MTU-Friedrichshafen, West Germany, which is owned jointly by Daimler-Benz AG and Maschinenfabrik Augsburg-Nurnberg AG (MAN Corp). The company has devoted the past five years to building an organization in the U.S. which mirrors the high standards of the MTU organization worldwide. It has adopted a policy of matching proven MTU engineering technology to each important segment of the American market, backed by a commitment to providing the highest possible degree of service and technical support.

In addition to MTU-Friedrichshafen's worldwide service network, MTU of North America has established service centers for engine repair and overhaul and personnel training, as well as testing and warehouse facilities, at strategic locations throughout the U.S.

The MTU diesel line covers a power output range of 440 to 10,000 hp at rated speeds between 1,000 and 2,400 rpm. Basic design features common to the series are: V-configuration, water cooling, exhaust gas turbocharging and charge air cooling. All engines are the result of the collective experience gained by Maybach, Mercedes-Benz, and MAN in the development of cost-effective, high-performance diesel engines.

The model 20V 1163 TB 93 engine, introduced this year, is evidence of MTU's continued success in its engine development program. MTU states the program focuses on increasing engine power and power concentration to open new powering possibilities, reducing fuel consumption throughout the entire speed range, extending operating range through higher MEPs and improving partial-load characteristics and the use of poorer/heavier fuels with lower cetain numbers and higher impurity levels. MTU employs cylinder cut-out, cylinder charge transfer, and sequential turbocharging. All three

(continued on page 28)



"GE engines give the new M/V Eden Brent a $135,000 annual fuel advantage."

That's why Brent Towing Company made the decision to install twin General Electric 12-cylinder diesel engines in the new M/V Eden Brent.

According to Lea Brent, president, "This fuel economy advantage was projected based upon extensive motive power tests backed by the actual performance of similar General Electric engines in our repowered Senator Eastland."

In addition to inherent fuel economy, the two GE 4-cycle, turbocharged marine diesel engines provide numerous features designed for maximum reliability and minimum operating costs over a long service life. For maintenance simplicity, the engines allow easy accessibility and parts standardization.

The 2600-horsepower General Electric engines will provide cost-effective power for the 147-foot, 529-gross-ton Eden Brent, pushing commodity-laden barges on the Ohio and Mississippi Rivers and along the Intracoastal Waterway. For more information on this fuel efficient motor vessel and its General Electric power plant, contact Lea Brent.

Information on General Electric diesel power can also be obtained from your GE M&DFSO representative or Manager, Diesel Power Products, General Electric Company, 2901 East Lake Road, Erie, Pennsylvania, 16531, (814) 875-2319.

We bring good things to life.

GENERAL ELECTRIC

MTU of North America

(continued from page 26)

systems, which have been proven in service trials, will be employed in the engines in the 1983 sales program.

Power in the series 1163 has been increased from 349 to 496 bhp/cyl (corresponding to an increase in MEP from 305 for 426 psi). MTU's two-stage turbocharging is also employed for the first time in addition to other systems mentioned. This allows overall engine dimensions to be kept almost constant and results in a power-to-volume ratio of 11.7 bhp/cu ft and a weight-to-power ratio of 4.4 lbs/bhp with the 20V 1163 producing 9,920 bhp.

Output of the series 396 engines has also been increased. With a maximum rating of 2,570 bhp and a weight of 10,475 lbs, the 16V 396 penetrates a power range which could previously be served only by larger and heavier engines.

MTU's marine diesels are designed for a wide range of commercial and naval applications. These include continuous duty with a power range of 590 to 4,930 bhp, and a medium duty, with a power range of 640 to 5,425 bhp.

Light duty engines have a power range of up to 10,000 bhp. Some of the advantages of MTU's compact engines include light weight, low volume, and decreased noise levels. In addition, they are prepackaged with accessories for fast, inexpensive installation of the complete power plant.

Electronic monitoring and control systems for diesel engines, gas turbines, marine transmissions, and combined propulsion systems complement the MTU product line. MTU electronics include monitoring and control systems for unattended propulsion plants. Engine room control stands, bridge control posts, and control consoles are also available, as well as simulation systems for personnel training.

MTU of North America, Inc., currently has facilities in Greenwich, Conn., Sugar Land (Houston), Texas, Morgan City, La., Washington, D.C., and Seattle, Wash.

MWM-MURPHY

Write 61 on Reader Service Card

Earlier this year, MWM announced the expansion of its U.S. Large Bore Division for the express purpose of marketing the company's higher output engine series in North America. The MWM-Murphy Large Bore Division, headquartered in Houston, Texas, has been organized to market the company's 400 and 500 series multi-fuel engine families.

The 400 series is a four-stroke, direct-injection design engine family available in diesel, natural gas, dual fuel, intermediate, and heavy fuel versions. The 400 is divided into three basic model classifications, the 440, 441, and the new 444. The 440 and 441 are designed around a common bore (9.06 in.) and stroke (10.6 in.) and a swept volume of 684 in.^{3}/cylinder. The new 444 shares the same bore as the other family members, however the stroke of the 444 has been extended to 12.6 in., the displacement to 812 in.^{3}/cylinder.

The 440 and 441 are offered in both naturally aspirated and turbocharged-intercooled models. The 440 denotes the series inline engines, available in 6 and 8-cylinders, the 441 by contrast, designates the VEE type engines available in 12 and 16-cylinder engine models. The operating range for the 440 and 441 is between 600–1,000 rpm on diesel fuel and 750–1,000 rpm on alternative fuels. Outputs of course, vary based upon type of fuel consumed; however, maximum output on reference fuels may be said to be 71 hp/cylinder (diesel and dual fuel), and 69 hp/cylinder (natural gas), for the naturally aspirated versions, 128 hp/cylinder (natural gas and dual fuel), and 208 hp/cylinder (diesel) for the turbocharged-intercooled models.

The longer stroke 444 is available in inline 6 and 8-cylinder turbocharged-intercooled models and has an operating speed up to 750

◄ Write 722 on Reader Service Card

rpm. Released this year, the 444 was designed for optimized performance on lower grade and heavy fuels up to 3500 Redwood which may be the norm in years to come. A redesign of the internal cooling circuit and new generation turbochargers has increased the overall efficiency of the basic engine design allowing for the initial development output to be significantly greater than the 440, with no detrimental effects on fuel consumption. Output on diesel fuel at this time is 250 hp/cylinder at 750 rpm or 2,000 hp for the 8-cylinder model.

Basic design features of the 400 series include individual cylinder heads with four valves per head (2 inlet, 2 exhaust) in an overhead arrangement. Piston cooling on all turbocharged-intercooled models, all models both naturally aspirated and turbocharged-intercooled are oil cooled.

The 500 series, the largest of the MWM product line, is divided into two separate and distinct engine families; the 510B and the 501.

The 510B is comprised of four basic turbocharged-intercooled engines with a common bore (13 in.) and stroke (14.2 in.); two inline (6 and 8 cylinder) and two VEE type (12 and 16-cylinder). Like the 400 series, the 510B has been designed to operate on a variety of fuels with significant experience on the poorer grade fuels, even fuels with viscosity up to 3500 Sec. Redwood.

The design characteristics of this family allow operating speeds between 600 rpm and 750 rpm. The 510B has a swept volume of 1879 $in.^3$/cylinder and an output per cylinder of 525 hp, up to 8,400 hp on the 16-cylinder model (diesel fuel). Currently only the 6 and 8-cylinder models are available for operation on dual fuel and natural gas, output at 750 rpm is 1,890 hp for the 6-cylinder and 2,515 hp for the 8-cylinder.

The 501 in contrast to the 510B, is available in a turbocharged-intercooled inline 6 and 8-cylinder engine only. Each shares a bore of 14.2 in. and a stroke of 17.7 in., operating speed for the 501 is between 428 rpm and 514 rpm. The 501 has been designed specifically for operation on diesel and poorer grade fuels, operation on natural gas and dual fuel is not available. Output at 514 rpm for the 6-cylinder is 2,475 hp, 3,300 hp for the 8-cylinder model.

ONAN CORPORATION

Write 62 on Reader Service Card

The Onan Corporation, of Minneapolis, Minn., recently introduced the L317D-M and L423D-M Marine propulsion engines.

With ratings of 43.5-ph (32.5-kw) and 60-hp (4.8-kw) at 3,600-rpm and weights of 475-lb (215-kg) and 549-lb (249-kg), respectively, the new Onan engines are part of a family that will eventually offer diesels with ratings up to 150-hp (111.9 kw).

With a weight to hp ratio of about 11-lb/hp, the four-cycle L317D-M engine has a displacement of 1.7-L (105-in). The L423D-M has a weight/hp ratio of about 9-lb/hp with a displacement of 2.3L (140-in). Both engines have a common cylinder of bore: 89-mm (3.5-in), and stroke: 92-mm (3.62-in).

Onan Corporation, which designed and developed the new family of marine propulsion engines, has been a well-known supplier of marine equipment for more than 25 years. Such experience has resulted in a number of marine features and options on the propulsion engines, including a marine cooling system, marine gear, marine alternator, and mounting system.

SACM DIESEL

Write 63 on Reader Service Card

SACM of France manufactures medium and high-speed, four-stroke, direct injection diesel engines known for their low specific fuel consumption and compact size.

F. W. Donnelly Company of Houston, Texas represents SACM in the United States.

For the offshore drilling and (continued on page 32)

As any good engineer can plainly see, EMD is about

The computer is considering thousands of possible designs for the turbine blades and nozzle, the compressor impeller and diffuser.

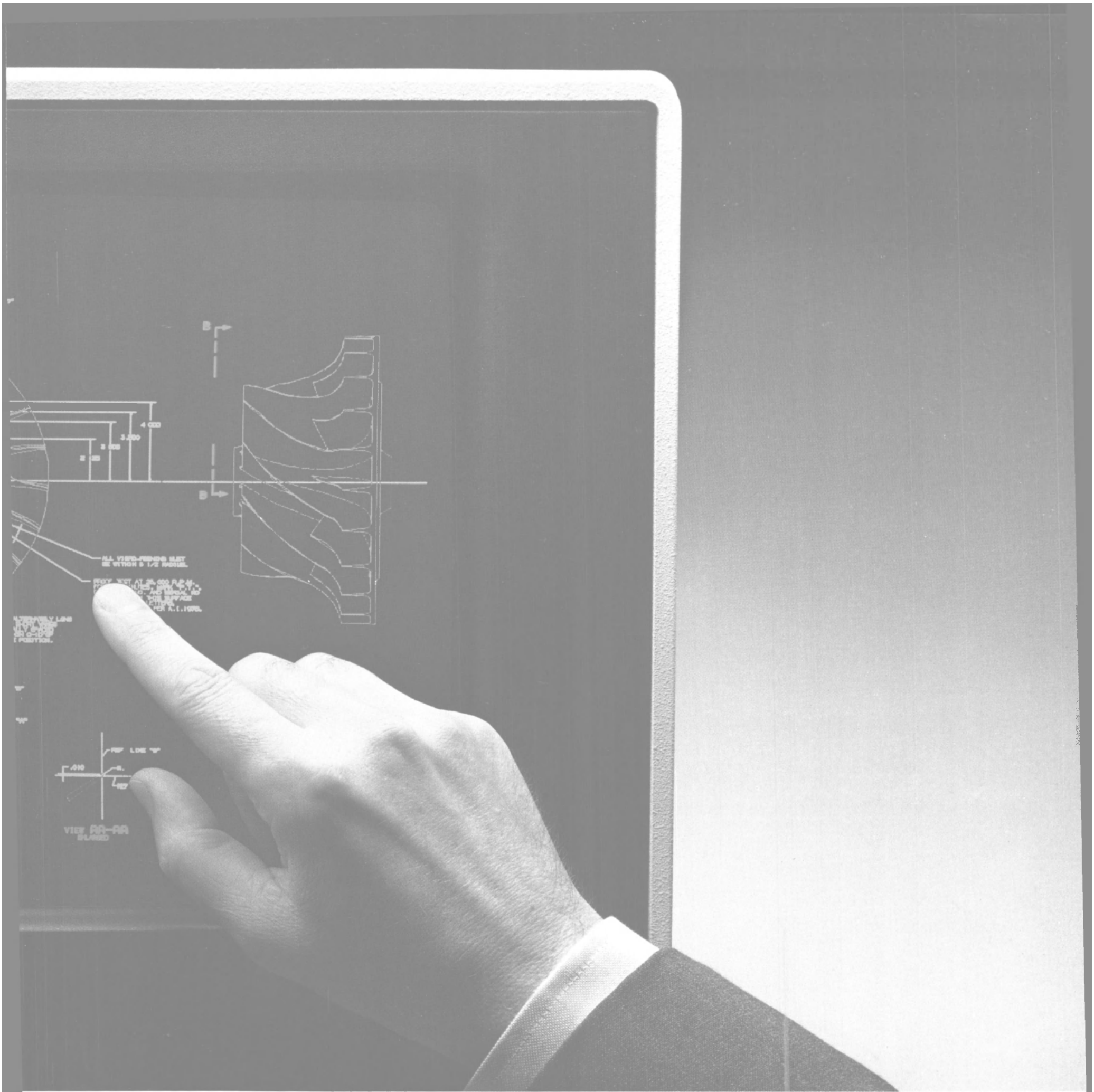
The goal is simple.

We want to make the turbocharger more efficient so that the EMD marine Diesel engine can operate on less fuel.

The engineers watching the turbines turn on the screen have already redesigned the piston to give the EMD diesel a more efficient power stroke, a higher compression ratio, and a more economical use of fuel.

They've already refined the unit fuel injector to make it burn more efficiently than ever before.

They've already developed a rocking piston pin that allows the engine to run at higher peak firing pressures



o make another breakthrough in fuel efficiency.

or more profit per gallon.

They've even changed the composition of some of the most basic engine parts to allow marine Diesel owners to use lower grade fuels.

And now they've even succeeded in redesigning the turbocharger.

You probably know that the EMD marine Diesel is the best-selling Diesel in its size range. So why are we bringing all this technology to bear on an engine that's already the acknowledged leader?

Simple. We plan to do all the things we have to do to stay number one for a long, long time.

To find out more, contact us at the Electro-Motive Division. Write us in La Grange, Illinois 60525.

ELECTRO-MOTIVE

Division of General Motors Corporation

SACM Diesel

(continued from page 29)

production industry, SACM is one of Europe's leading suppliers of diesel generator sets with continuous, 60-cycle set ratings from 100 kw to 4,000 kw. The compact diesel generator sets are in use on the world's largest semisubmersible, the Dyvi Delta, and on the largest production platforms, Statfjord B and Statfjord C.

SACM engines, from 100 hp to 8,400 hp, are in use throughout the world in a wide range of commercial and military high-speed vessels. These vessels include the well-known Bell Halter BH 110 SES, Westamarin Catamaran, and SAR 33. SACM is a leader in the development of Reduced Volumetric Ratio (RVR), Hyperbar, and two-stage turbocharged engines, providing excellent power/weight ratios. The SACM 520 V12 S3 (Hyperbar) engine has a peak rating for fast patrol boats of 1,400 hp / 2,500 rpm and a dry weight with accessories and gear of 7,480 pounds.

SACM is active in the development of crude and intermediate fuel burning capabilities for their medium and high-speed engines. This development is based on over 13 years of experience gained since the delivery of SACM's first crude and intermediate fuel burning engines. For marine propulsion, these engines range from 100 hp to 5,600 hp, while for generator sets ratings from 100 kw to 3,600 kw are available.

STORK-WERKSPOOR

Stork-Werkspoor Diesel (SWD) produces five models of heavy-duty four-stroke diesel engines from 320 hp to 22,000 hp. All of the engines are capable of operating on heavy fuel. Applications include ocean-going ships, naval vessels, coastal ships, supply and tug boats, fishing vessels, dredges, drill rigs and on-board auxiliary power.

In 1981, SWD introduced the SW280. The new engine covers the range from 2,000 bhp to 5,000 bhp with four-cylinder configurations, 6, 8, and 9 in-line and 12 cylinder V models. SWD has continued to conduct tests on all models for heavy fuel operation with special attention to low-load, low-speed (part-load) operation.

Further research and development on the TM 410 and TM 620 engines to reduce fuel consumption have been undertaken, leading to a number of modifications including: the application of high efficiency turboblowers, adopted valve timing, and the application of an injection system with higher injection pressures. Modifications to reduce maintenance costs and improve accessibility were also introduced. In January 1983, the 500th TM 410 engine produced in Amsterdam was delivered. Ten 18-cylinder TM 410 engines have been ordered by the Quincy Shipbuilding Division of General Dynamics for the five prepositioning ro/ro's being built for the U.S. Navy.

SWD's presence and activity in the United States have been intensified by the establishment of SWDiesel Gulf Incorporated in New Orleans, La. This company is headed by **A.L.S. van Heel,** formerly commercial director of SWDiesel head office in Amsterdam, the Netherlands.

SULZER

Write 67 on Reader Service Card

Sulzer Brothers of Winterthur, Switzerland, successfully tested the firm's new generation of low-speed engines early in 1983. This uniflow scavenged RTA "Superlong-stroke" series, with a thermal efficiency of more than 50 percent, has proven a success with excellent acceptance in the marine marketplace.

Early this year, 85 of the RTA engines had been committed for production with eleven different

(continued on page 34)

◄ Write 747 on Reader Service Card


A Warship Propeller
Tomorrow, another warship will join the fleet. With a controllable pitch propeller proven in service to satisfy mission requirements: Extreme reliability. Tactical quickness. Quiet running. Shock resistance. Controlled noise signature. Cruise economy. Integrated logistic support. And system redundancy. Eliminate any element and you won't have a Bird-Johnson built CP propeller. Over 25% of the U.S. Navy's surface combatant fleet does.* That's a performance record we're proud of. For the details on naval propellers with 15 years' experience at sea, write or call the International Marketing Manager.
*Jane's Fighting Ships 1982-1983, ed. by Captain John Moore RN.
BIRD-JOHNSON COMPANY
MARINE DIVISION
110 Norfolk Street, Walpole, Massachusetts 02081, USA
Telephone: (617) 668-9610
Telex: 6817294

Sulzer

(continued from page 32)

manufacturers. Five of the engines were being built at the headquarters in Winterthur.

In addition, Sulzer's RL series continues to prove its value and, because of its simple design, remains in demand for many standard ships.

Sulzer further developed it's medium-speed ZA40 engine and began production in its Mantes, France facility. The ZA40 is particularly suited to ship propulsion installations requiring minimum engine height as well as for standard power installations.

The ZA40 offers high reliability with low lube oil consumption when burning poor quality heavy fuel. The engine is well into the manufacturing phase at Sulzer licensees in Japan and Finland.

New orders for Sulzer marine engines worldwide—for both Sulzer and through its licensees—reached 1.6-million kw (2.2-million bhp) during 1982. Also during 1982 Sulzer engines with a total output of 2.4-million kw (3.2-million bhp) were installed in oceangoing vessels of 2,000 dwt and above, an increase from 2.2-million kw (3.0-million bhp) in the previous year.

Sulzer offers 10 types of slow-speed, two-stroke engines each with four basic ratings, designed for the widest possible range of applications. The smallest of these engines is rated at 2,320 bhp/152 rpm, or 3,320 bhp/190 rpm. On the other end of the scale, the largest engine develops 34,200 bhp at 70 rpm, or 48,360 bhp at 87 rpm. Specific fuel consumptions for the entire range are between 123 and 235 gr/bhp/hr. This includes the proven RL design, with the valveless loop scavenging system as well as the newly designed RTA.

In addition, for special applications as well as auxiliary power, Sulzer offers four-stroke engines from 840 to 15,660 bhp. These A and Z type engines have been designed for heavy fuel operation and have proven their efficiency in over 10 years of service.

For electrical power, choices include turbogenerator, slow-speed shaft generator, power take-off and/or heavy fuel burning auxiliary engines. The best choice can be determined with a feasibility study of a vessel's intended service, the capabilities of the main engine, and the waste heat system.

Sulzer is offering a free 12-page "Technical Summary of Sulzer Diesel Engines."

TRANSAMERICA DELAVAL

Write 68 on Reader Service Card

The Enterprise R and RV medium-speed diesels of Transamerica Delaval have proved themselves over hundreds of thousands of operating hours, powering vessels ranging from rig work boats to 1,000-foot ore carriers. The R4 series is composed of 6 and 8-cylinder in-line engines and vee-form engines with 12, 16, or 20-cylinders. The bore is 17 inches (432 mm), the stroke 21 inches (533 mm), and the output ranges up to 677 bhp per cylinder.

The latest development in the Enterprise line of marine engines is the R5. Rated at 514 rpm, the R5 produces 850 bhp per cylinder with a bmep of 275. Bore and stroke are the same as the R4. Through selective redevelopment and design advances of critical engine parts, test results show that Transamerica Delaval has achieved in the R5, as compared to the R4: 40 percent more horsepower per cylinder; 40 percent more horsepower per sq. ft. of installation space; and 3.5 percent lower fuel consumption.

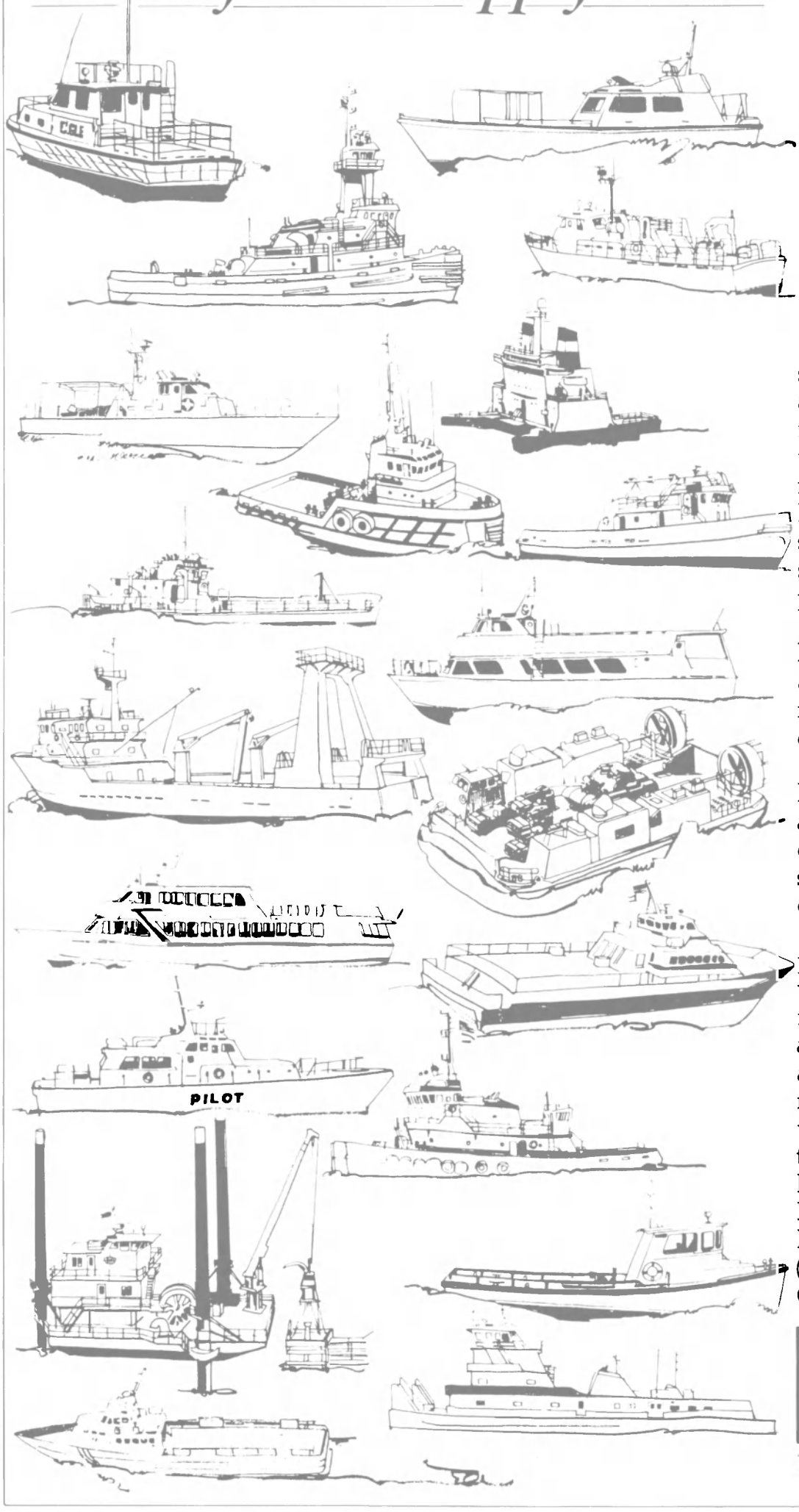
Enterprise engines are experienced burning cost-saving residual fuels, and designed with the intensive cooling heavy fuels demand. For America's river towboats this heavy fuel capability in the R4 size range can mean substantial savings. Rising fuel costs account for an ever increasing share of total operating expenses for towboat fleets—up to 70 percent in some cases.

The ability to burn heavy fuel reliably is paying off for a wide range of Enterprise equipped vessels. Three 36,000-dwt dry bulk

(continued on page 36)

◄ Write 396 on Reader Service Card

And you thought we only build supply boats.



It's true, we build a lot of supply boats. In fact, we build more supply boats than anyone else in the world. But—we also build more than thirty different types of other vessels ranging from small pilot boats to giant 18,000 HP CATUGS.™ We build everything from crewboats, tugs, fishing boats, patrol boats, lift boats, utility boats and ferries to surface effect ships and amphibious landing craft with Bell Aerospace-Textron. And we have more diesel-electric shipbuilding experience than anyone in our field.

We offer complete in-house services from cost-free design and engineering to global warranty assistance. Should your vessel need modification or repairs, it can be done at our large dry dock. We even have a subsidiary to handle all of your spare parts requirements—promptly and accurately.

Our six shipyards are staffed by shipbuilding experts who are supported by the latest technology including computer directed metal cutting robots.

We have been designing and building vessels for more than a quarter of a century and have delivered over 1,100 boats to some of the largest and smallest operators in the world.

This unequaled experience pays dividends in every boat we build and is one of the reasons for our success. Chances are we have already designed and built the kind of vessel you need. So—if you need a boat to transport something on or above the water, we can and want to build it for you. Ask us. Halter Marine, Inc., Box 29266, New Orleans, LA 70189 U.S.A., (504) 246-8900, Telex 58-4200, Cable HALMAR.

HALTER MARINE INC.

The Total Shipbuilding Group.

©

Transamerica Delaval

(continued from page 34)

carriers, Pride of Texas, Star of Texas, and Spirit of Texas, built by Levingston Shipbuilding, of Orange, Texas, for Asco Falcon I are powered by twin Enterprise R4-V12 direct-reversing engines, giving each ship a total of 15,600 hp. By burning residual fuels these vessels remain competitive with international dry bulk carriers.

Twin Enterprise R4-V16 engines propel U.S. Steel's M/V Edwin H. Gott, a mammoth ore boat longer than three football fields. Inspections of the main propulsion engines continue to show clean internals and very low wear rates under heavy fuel service.

Ship service diesel generators for three American President Lines containerships were supplied by Transamerica Delaval. Constructed by Avondale Shipyards of New Orleans, these are the largest containerships ever built in the U.S. Their refrigerated cargo is safeguarded by three heavy fuel burning Enterprise R4-L6 diesels, rated at 2500 kw each.

Four Enterprise R4-V16 engines power two 35,000-dwt tankers built by Bath Iron Works for Falcon I Sea Transport Company. These will be chartered to the Military Sealift Command for transporting fuels to government bases worldwide. The R4-V16s, each rated at 7,360 bhp, are designed to operate on various fuels including the more economical grades with viscosities up to 3500 Redwood.

Other Enterprise equipped vessels include the world-circling rig work boats of Biehl, Inc. and six 47,000-dwt Catug petroleum carriers built by Halter Marine and Bethlehem Steel.

Transamerica Delaval has complemented its line of Enterprise diesels by signing an agreement with the Dutch firm of Stork-Werkspoor Diesel B.V. of Amsterdam, which gives Transamerica Delaval the rights to the exclusive manufacture and marketing of the Enterprise-SWD TM 620 diesel. This engine, which operates up to 430 rpm, is offered as a 9-cylinder in-line unit with an output of 16,650 at the flywheel, and a vee-type 12-cylinder unit rated at 22,200 bhp.

Available from Transamerica Delaval free of charge are technical reports examining heavy fuel economics in marine applications, including today's river boat industry.

VOLVO PENTA

Write 69 on Reader Service Card

Volvo Penta has introduced a new, improved version of its turbocharged 12-liter diesel engine, the TMD 120. Specially designed for use as the main engine in workboats and leisure craft, it is claimed to exhibit high output in relation to weight and installed dimensions, low fuel consumption, and a high level of operational reliability.

The B-version of the TMD-120 features advanced control of the injection and combustion processes with new injectors which provide the possibility of more rapid injection at higher pressure and with decreased combustion delay. Together with efficient turbocharging and a combustion chamber of new design, this will yield a considerable improvement in efficiency.

Other technical refinements in Volvo Penta's 12-liter diesel include piston-cooling, a hose-free seawater system with a heat exchanger, and thermostat-controlled cooling of the engine block, cylinder heads, turbo, and exhaust manifold.

The Swedish firm's line of diesels includes 2, 3, 4, and 6-cylinder engines covering 12 different models. Some models are equipped with turbochargers and others with both turbo and after-coolers.

Additionally, Volvo Penta offers twin engines driving through a compound gear providing a single shaft output from 336 shp to 580 shp. The twin-engine/single-output package provides many advantages including "take-home" capability on one engine.

A wide range of accessories designed for commercial use are available such as front or side mounted power take-offs, flexible

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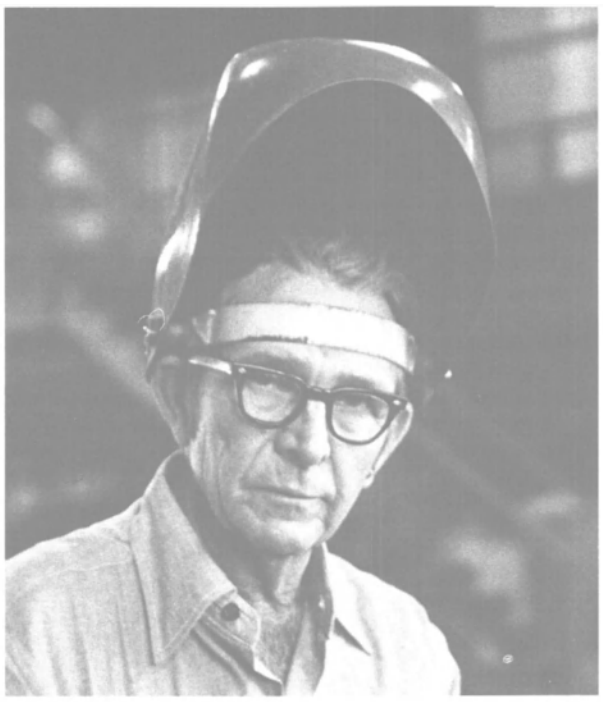
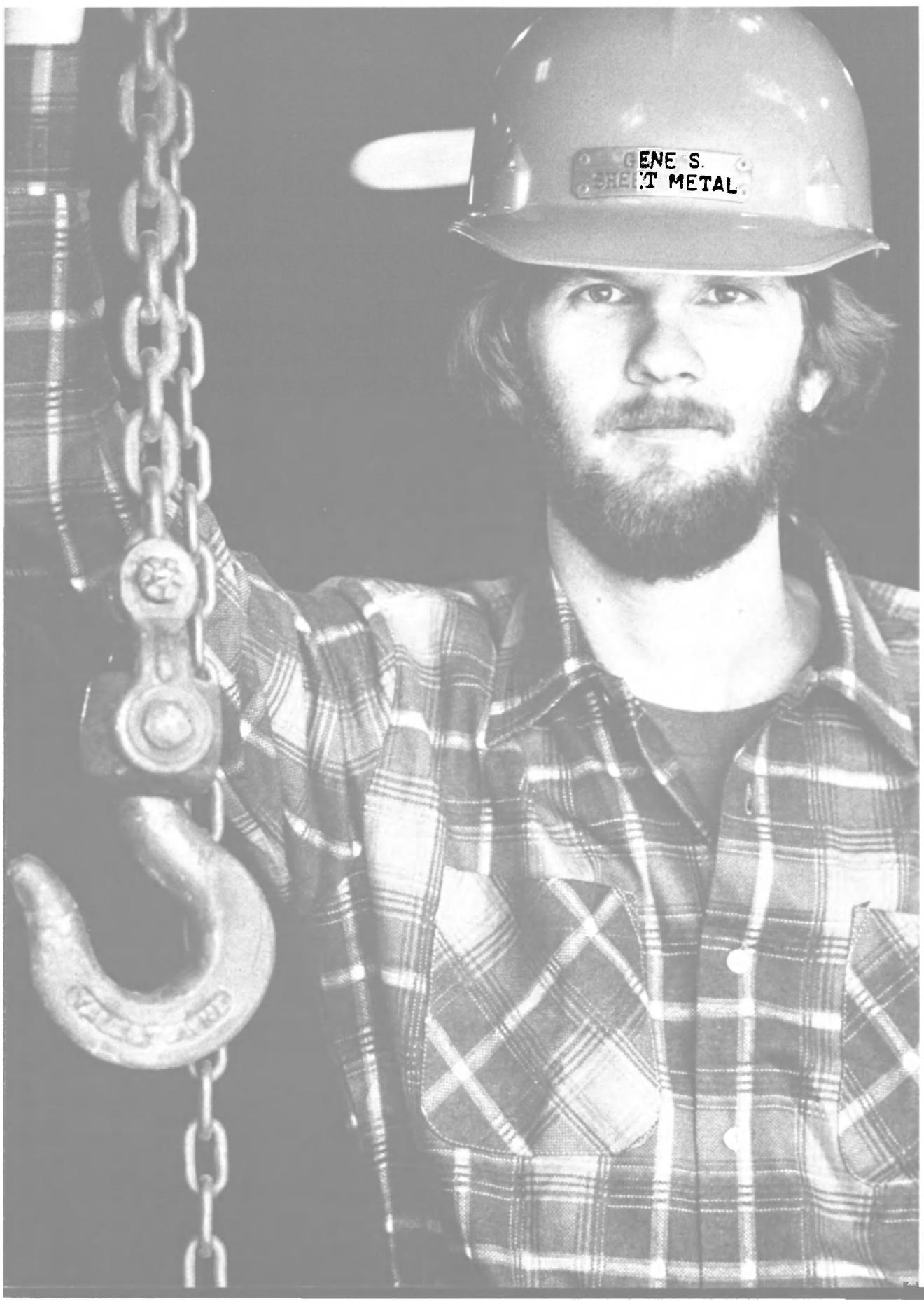


"I KNOW HE'S GOOD, I TRAINED HIM."

James A. Greenwood Jr.



If you think the shipyard business is all nuts and bolts, you're wrong. It's a people business, plain and simple. The best yards are the ones with the most experienced supervisors, and the best-trained workers.

Bill Greenwood, top photo, is a great example. He's one of the last great Coppersmiths in our business. An artist with copper, galvanized and stainless. Like most of our key men, Bill's been with us almost forever – about 36 years.

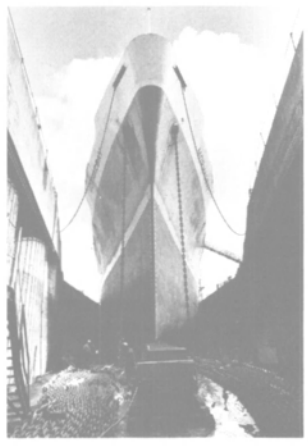
Bill and our other senior people do more than just supervise jobs. They spend years as teachers. Passing on their skills to younger men like Gene Stafford. Gene is well on his way to being one of the best. In fact, Gene now does what Bill did, which gives Bill a little more time to fish.

What you get from us is a well-trained, intelligent, motivated work force. And that saves you and us hassles and, especially, money

Sure, we've got nuts and bolts too, and all the stuff the other yards have. And in Savannah we've got beautiful year-round weather, so there are fewer delays than up north. But the main reason to come to Savannah is Bill Greenwood, Gene Stafford and our other heavy hitters.

Remember, to do a job once – correctly – a yard needs skilled people. Because that is what saves you time and money on your voyage repairs, major conversions, alterations, or drydocking.

Savannah Shipyard Co. You can't find a better yard anywhere. Telex 546426 SAV.MACSHIP SAV., P.O. Box 787, Savannah, Ga. 31402. Telephone (912) 233-6621. Or call our New York office: 74 Trinity Place, Suite 1800, New York, N.Y. 10006. Telephone (212) 432-0350.



THE SAVANNAH YARD

Write 324 on Reader Service Card

Volvo Penta

(continued from page 36)

engine mounts and shaft couplings, freshwater filters, auxiliary alternators, engine-mounted pumps, and many more.

The heavy-duty Volvo line includes the model MD 120A, a 6-cylinder engine with maximum continuous rating of 168 shp at 1,800 rpm, and the 6-cylinder TMD 120A with mcr of 260 shp at 1,800.

WARTSILA DIESEL

Write 70 on Reader Service Card

Wartsila Diesel, one of the world's leading manufacturers of medium-speed diesel engines, has three production plants: the Wartsila Vasa factory in Finland, the Trollhattan factory in Sweden, and the newest factory, Wartsila Power Singapore in Singapore.

The purpose of Wartsila's product development program was to create diesel engines capable of both maximum economy and safe operation even in the most demanding applications. As a result, Wartsila now produces two high-standard medium-speed diesel engines designed and developed from the very beginning to operate on the poorest quality fuel.

The Vasa 32, introduced in 1977, is well established in the world's engine market as a main or auxiliary power source on a variety of ships. This engine, with its seven different cylinder versions—4R32, 8R32, 9R32, 12V32, 16V32 and 18V32—covers an output range of 1,820 to 8,350 hp at 720 to 800 rpm. The Vasa 32 accepts fuel with a maximum viscosity of 380 cSt.

The second of Wartsila's very heavy fuel engines is the Wartsila Vasa 22HF—the smallest engine in the world developed exclusively to operate on heavy fuel. The output range of Vasa 22HF covers 720 to 3,480 hp at 900 to 1,200 rpm. The engine is built in five different cylinder versions—4R22HF, 6R22HF, 8R22HF, 12V22HF, and 16V22HF—running on heavy fuel with the same maximum viscosity as the Vasa 32 engine, 380 cSt.

The main features of these engines are: starting, stopping, and running over the entire load range on heavy fuel without any limitations; heavy fuel operation with the same safety and reliability as when operating on distillate fuel; and all engines can run on the same type of heavy fuel.

The Wartsila Diesel very heavy fuel engines can be operated equally well on distillate fuels such as gas, oil, or diesel oil. The high level of reliability and durability when operated on heavy fuel oil will be improved by a factor of 1.5 to 5 when operated on distillate fuel. The engines retain this advantage with distillate fuels of lower quality proposed in future international standards.

Distillate fuel quality has been deteriorating rapidly. Sulphur content in the region of 2 percent will be normal in the future for the cheaper grades. The Wartsila Vasa 32 and Vasa 22 diesels were designed from the outset to burn the poorest quality heavy fuel anticipated during the next decade.

Wartsila Diesel reports, because it was the first company to introduce purpose-designed heavy fuel engines with outputs below 9,000 hp, it has gained extensive field experience with heavy fuel engines in that range. This experience confirms: low maintenance costs resulting from long periods between overhauls, ease of maintenance, and low spare part consumption. Wartsila Diesel engines are backed by an efficient service organization in three factories and at numerous service centers worldwide.

Since 1980, Wartsila Diesel has been represented in the U.S. by Wartsila Power Inc., with its main office in New Orleans, La., and branch offices in Houston, Texas, Seattle, Wash., and New York City.

WAUKESHA

Write 71 on Reader Service Card

Waukesha Engine Division, Waukesha, Wis., has begun production of the AT25 diesel series at its Wisconsin plant. These high-output, medium-speed 250-mm bore diesels are built under a license agreement with Sulzer Brothers Ltd., Winterthur, Switzerland. Designed to operate economically on distillate or blended fuels, the primary applications for the AT25 are marine propulsion and offshore drilling platforms.

Available in V-16 and V-12 configurations, in-line versions of the AT25 will be offered late in 1984. These diesels are rated up to 300 bhp per cylinder at 1,000 rpm on distillate fuel, and up to 270 bhp per cylinder at 1,000 rpm on heavy fuels.

The AT25 is ideal for heavy fuel operation. The bore-cooled cylinder head and the two-part piston assure lower induced stresses and moderate valve seat temperatures, both important when running on heavy fuel. Also when compared with a former double bottom design, (used for most engines of this kind), the bore-cooled head has 2.5 times fewer deformations. This enhances valve sealing conditions, resulting in more efficient combustion of heavy oil fuel.

The application of a Brown Boveri pulse-type turbocharger provides more rapid response to load changes and helps lower fuel consumption at both part and full loads. Low fuel consumption is also achieved by high pressure fuel injection and optimized injection timing.

All pistons, piston rings, connecting rods, cylinder heads, cylinder liners, injection pumps and nozzles are completely interchangeable among all models offered.

A significant capital investment program at Waukesha includes new AT25 cylinder block and crankshaft machining centers, and new assembly and test centers for the new series. Waukesha's major thrust with the AT25 will be in the coastal marine, inland waterways, and oceangoing vessel markets.

Gary V. Bollenbach has been appointed head of the AT25 program at Waukesha.

ZF OF AMERICA

Write 72 on Reader Service Card

ZF of North America, Inc. of Northbrook, Ill., offers a full line of light-weight high-performance marine gears.

(continued on page 40)

put of awarded a $4 6,600 firm fixed-

Diesel Power Review

ZF of North America

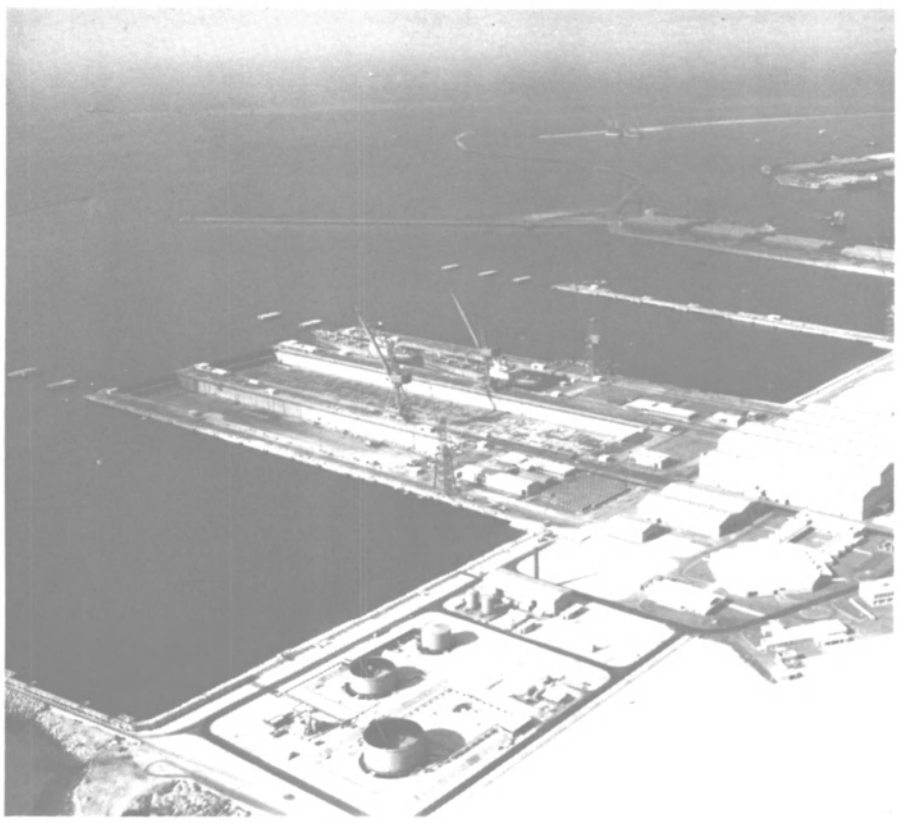
(continued from page 38)

The ZF BW 250 marine gear series provides all the advantages of compactness and light weight without sacrificing speed, power and durability. The BW 250 series is designed to handle up to 1,500 hp over a wide range of marine applications in a compact, modular design that's easy to operate and easy to maintain.

Available in reversing/reduction or reduction only, the BW 250 features: hydraulically-operated oil-cooled multiple disc clutches; motor-driven and prop-driven pumps; anti-friction bearings; and a wide range of standard ratios. U-drive engine or separate mounting is available.

ZF maintains a worldwide service organization for service and parts back-up.

Diesel Power Review



Dubai Dry Dock Begins Operations

A & P Appledore International Limited has been appointed as managers for The Dubai Dry Dock Company, one of the world's largest ship repair complexes.

Dubai Dry Dock received many inquiries during the weeks preceding the opening of the yard, last month.

Although there is strong worldwide competition, A & P Appledore is optimistic that business will be good. In order to promote sales, the yard has offered all major oil companies and large fleet owners the possibility of using the yard as a safe port for long term repairs and lay-ups. Ships can arrive at the Dubai Dry Docks and await docking and other repairs until market requirements are suitable and it is convenient for them to start trading again.

There are three drydocks in the complex with capacities of 350,000 dwt, 500,000 dwt and one million dwt. The yard is the largest in the Middle East. The docks are equipped with heavy cranes and supported by a complete range of back-up facilities. These include not only mechanical, steel, electrical, pipework and joiner shops, but also a fully equipped tank cleaning station, a large industrial laboratory and a substantial training school. The facilities are suitable not only for major ship repair work, but also for a wide range of industrial, mechanical and engineering work. Much of the equipment and plant is unique in the Middle East.

The first chief executive is **Thorsten Andersson,** whose wide experience in ship repairing includes eight years as managing director of the well known Portuguese yard, Lisnave. Under his guidance Lisnave became one of the most successful repairers of large tankers in Europe. Mr. **Andersson** is supported by a highly experienced team of proven ship repair yard managers, including **Jan Neeb**. Mr. **Neeb's** background includes working for Lisnave as the commercial director of Amsterdam Drydocks.

Mr. **Andersson** is one of A & P Appledore's highly successful experts in the field of shipyard management and consultancy. The company has worked in 50 countries. Its many contracts included the provision of a total range of design and organizational services for Hyundai and Daewoo in South Korea, two of the largest shipyards in the world.

Mr. **Andersson** believes, if all goes well, Dubai Dry Dock should handle up to 75 ships in its first year of operation. The firm booking of the first tanker for drydocking at the yard this month is an excellent beginning.

For a copy of a free full color brochure completely describing all facilities and services offered by the Dubai Dry Dock,

Write 74 on Reader Service Card

Pan-American Naval Engineers To Hold 1983 Meeting In Washington

The Eighth Congress of the Pan-American Institute of Naval Engineering (IPEN) will be held in Washington, D.C. (Hyatt Regency Hotel, Crystal City, Arlington, Virginia), September 11-17, 1983.

In announcing plans for the meeting, Rear Admiral **James W. Lisanby,** U.S. Navy, president of the western hemisphere organization of naval architects and marine engineers, said several hundred government, academia, and private industry representatives from maritime nations throughout the Americas are expected at the congress. Observers from a number of other world maritime nations are also anticipated to attend the meeting. It will be the first time for the pan-American professional maritime group to hold its congress in the United States.

IPEN is a non-profit organization dedicated to the promotion of technical advancement of naval architecture, marine engineering, and water transportation. Members of the society are engineers, architects, technicians and management personnel, both government and private industry, engaged in maritime activities. Headquarters of the organization is in Rio de Janeiro.

The Washington congress is structured to promote learning and resource exchange in the areas of ship building and repair, ocean and inland water transportation, naval science and research, standardization, information processing, off-shore construction, fishery management, and maritime education. The five day business sessions will include the presentation of professional papers, technical discussions, exhibits and displays. Visits to the U.S. Naval Ship Research and Development Center and to the U.S. Naval Academy have been arranged. A variety of social activities for visitors to the United States capital city are planned. The U.S. Navy's Ship Systems Command and the U.S. Society of Naval Architects and Marine Engineers (SNAME) will serve as hosts for the international gathering.

Registration fee for IPEN members is $200 (U.S.) and $350 for non-members. The fee includes costs for planned technical and social events. Admittance to technical sessions only is $95 for non-government persons and $45 for government employees.

Additional information concerning registration and hotel reservations may be obtained by writing to IPEN Registration Center, P.O. Box 17413, Dulles International Airport, Washington, D.C. 20041. Telephone (703) 471 6180; Telex 899 133 WHIT-EXPO.

Discussing the forthcoming IPEN Conference are, left to right, Rear Adm. **Randolph King,** (USN-ret.), IPEN technical program chairman; **Ellsworth Peterson,** president, Peterson Builders; Rear

New Engine Program For Sterndrive Packages

have the capability of offering directly, or through their outlets, a completely integrated sterndrive delivery with the engines, ready for customer installation.

STERN-POWR drive systems are

Popular accessories are also available including trim angle indicators, controls, auto pilots and power

ZF of North America

(continued from page 38)

The ZF BW 250 marine gear series provides all the advantages of compactness and light weight without sacrificing speed, power and durability. The BW 250 series is designed to handle up to 1,500 hp over a wide range of marine applications in a compact, modular design that's easy to operate and easy to maintain.

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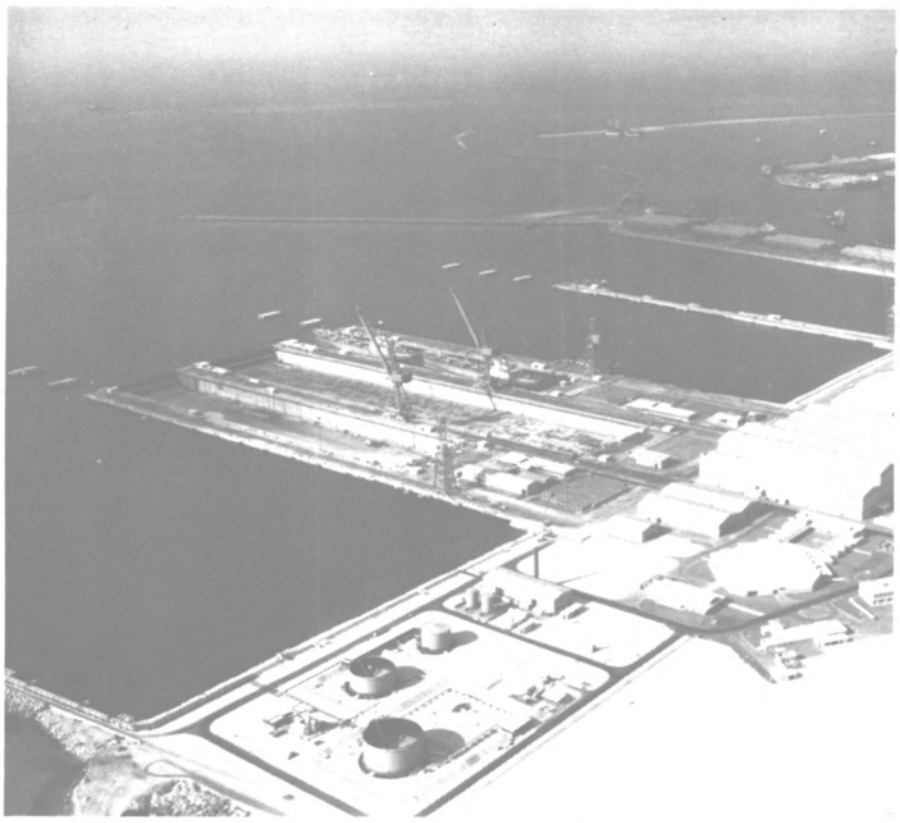

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A & P Appledore International Limited has been appointed as managers for The Dubai Dry Dock Company, one of the world's largest ship repair complexes.

Dubai Dry Dock received many inquiries during the weeks preceding the opening of the yard, last month.

Although there is strong worldwide competition, A & P Appledore is optimistic that business will be good. In order to promote sales, the yard has offered all major oil companies and large fleet owners the possibility of using the yard as a safe port for long term repairs and lay-ups. Ships can arrive at the Dubai Dry Docks and await docking and other repairs until market requirements are suitable and it is convenient for them to start trading again.

There are three drydocks in the complex with capacities of 350,000 dwt, 500,000 dwt and one million dwt. The yard is the largest in the Middle East. The docks are equipped with heavy cranes and automatic docking arms, and are supported by a complete range of back-up facilities. These include not only mechanical, steel, electrical, pipework and joiner shops, but also a fully equipped tank cleaning station, a large industrial laboratory and a substantial training school. The facilities are suitable not only for major ship repair work, but also for a wide range of industrial, mechanical and engineering work. Much of the equipment and plant is unique in the Middle East.

The first chief executive is **Thorsten Andersson,** whose wide experience in ship repairing includes eight years as managing director of the well known Portuguese yard, Lisnave. Under his guidance Lisnave became one of the most successful repairers of large tankers in Europe. Mr. **Andersson** is supported by a highly experienced team of proven ship repair yard managers, including **Jan Neeb**. Mr. **Neeb's** background includes working for Lisnave as the commercial director and more recently as managing director of Amsterdam Drydocks.

Mr. **Andersson** is one of A & P Appledore's highly successful experts in the field of shipyard management and consultancy. The company has worked in 50 countries. Its many contracts included the provision of a total range of design and organizational services for Hyundai and Daewoo in South Korea, two of the largest shipyards in the world.

Mr. **Andersson** believes, if all goes well, Dubai Dry Dock should handle up to 75 ships in its first year of operation. The firm booking of the first tanker for drydocking at the yard this month is an excellent beginning.

For a copy of a free full color brochure completely describing all facilities and services offered by the Dubai Dry Dock,

Write 74 on Reader Service Card

Pan-American Naval Engineers To Hold 1983 Meeting In Washington

The Eighth Congress of the Pan-American Institute of Naval Engineering (IPEN) will be held in Washington, D.C. (Hyatt Regency Hotel, Crystal City, Arlington, Virginia), September 11-17, 1983.

In announcing plans for the meeting, Rear Admiral **James W. Lisanby,** U.S. Navy, president of the western hemisphere organization of naval architects and marine engineers, said several hundred government, academia, and private industry representatives from maritime nations throughout the Americas are expected at the congress. Observers from a number of other world maritime nations are also anticipated to attend the meeting. It will be the first time for the pan-American professional maritime group to hold its congress in the United States.

IPEN is a non-profit organization dedicated to the promotion of technical advancement of naval architecture, marine engineering, and water transportation. Members of the society are engineers, architects, technicians and management personnel, both government and private industry, engaged in maritime activities. Headquarters of the organization is in Rio de Janeiro.

The Washington congress is structured to promote learning and resource exchange in the areas of ship building and repair, ocean and inland water transportation, naval science and research, standardization, information processing, off-shore construction, fishery management, and maritime education. The five day business sessions will include the presentation of professional papers, technical discussions, exhibits and displays. Visits to the U.S. Naval Ship Research and Development Center and to the U.S. Naval Academy have been arranged. A variety of social activities for visitors to the United States capital city are planned. The U.S. Navy's Ship Systems Command and the U.S. Society of Naval Architects and Marine Engineers (SNAME) will serve as hosts for the international gathering.

Registration fee for IPEN members is $200 (U.S.) and $350 for non-members. The fee includes costs for planned technical and social events. Admittance to technical sessions only is $95 for non-government persons and $45 for government employees.

Additional information concerning registration and hotel reservations may be obtained by writing to IPEN Registration Center, P.O. Box 17413, Dulles International Airport, Washington, D.C. 20041. Telephone (703) 471 6180; Telex 899 133 WHIT-EXPO.

Discussing the forthcoming IPEN Conference are, left to right, Rear Adm. **Randolph King,** (USN-ret.), IPEN technical program chairman; **Ellsworth Peterson,** president, Peterson Builders; Rear Adm. **James W. Lisanby** (USN) president, IPEN; Prof. **Manley St. Denis,** University of Hawaii, and **Perry Nelson,** executive vice president, M. Rosenblatt & Son.

Beier Offers Free Brochure On Nav/Com Equipment Certified Compass Repairs

Frank L. Beier Radio's fact-filled 1983 brochure is available on request. This unique brochure features illustrated articles by leading electronics industry representatives on subjects ranging from satellite communications to color radar. In addition, the brochure profiles the company's broad range of services offered to the commercial, fishing and industrial markets.

Beier Radio has also added certified magnetic compass repair and calibration, and nautical instrument repair services. Beier's is the only such certified compass service available on the Gulf Coast (certification is available in only a few foreign countries, excluding the U.S.). Company personnel are certified by the respective authorities in both England and Norway for repairs, calibration, and manufacture of compasses.

Beier Radio has announced its newest customer service charts by mail. Now a vessel can automatically receive the most current N.O.S. navigational charts, when new issues are printed, by subscribing to this service.

To receive a free copy of the Beier brochure, or for further information on compass and instrument services,

Write 75 on Reader Service Card

ASEA Stal-Laval Offers Free Brochure On Soot Cleaning Device Infrafone

ASEA Stal-Laval, Inc. of Elmsford, N.Y., is offering a free six-page full-color brochure on a soot cleaning device, Infrafone. Used for cleaning boilers, air preheaters, precipitators, etc., Infrafone is driven by air and emits a 20-Hz frequency sound which agitates dry deposits. A pneumatic exigator pulses air into a resonance tube directed into the space to be cleaned.

The Infrafone has the advantage of continuous cleaning and hence gives a higher efficiency of heat transmission. This is achieved by an intermittent insonating of some 5-15 seconds every 5 to 10 minutes.

Installation is simple and can easily be done in one day by the ship's own crew. More than one hundred units have been delivered for use on land based boilers around the world. The first marine Infrafone has been in operation approximately one year and a boiler inspection after eight months revealed: an extraordinarily clean boiler; cancellation of a planned wash down; and a recommendation not to use the steam soot blowers, except for once a week in the rotating air preheater.

The illustrated brochure contains a complete description of the system, installation diagrams, and detailed performance charts.

For a free copy,

Write 76 on Reader Service Card

Christening Held For Coal Fired Dry Bulk Carrier At Italcantieri Shipyard

The TNT Capricornia, a 75,750-dwt coal-fired dry bulk carrier, was christened recently in ceremonies held at Italcantieri's Monfalcone shipyard. The ship and her sistership, the TNT Carpentaria, are being built for TNT Bulkships of Australia.

The Capricornia features an automated coal-fired steam turbine propulsion plant producing a full-load speed of 25.8 knots with a maximum continuous output of 19,000 shp. The ship measures 255 meters long overall, with a molded breadth of 35.30 meters, and a design draft of 12.20 meters. The Capricornia is designed with four holds, a continuous double bottom, and side ballast tanks.

$4-Million Antenna Contract Awarded Datron

Datron Systems Incorporated, Chatsworth, Calif., has been awarded a $4,096,600 firm-fixed-price contract for 39 OE-82/WSC-1 (V) UHF fleet satellite antenna systems for shipboard use. The Naval Electronic Systems Command, Washington, D.C. is the contracting activity (N000-39-83-C-0383).

New Engine Program For Sterndrive Packages Detailed In Free Literature

Marine Drive Systems of Edison, N.J., is offering literature describing its recently announced new private label type program with certain suppliers of medium-sized marine engines. Under this program, engine companies will have the capability of offering directly, or through their outlets, a completely integrated sterndrive propulsion package centered around the latest 100 Series STERN-POWR product line.

Emphasis will be directed to simplify package definition, presentation and handling for each engine. For special customer requirements, applicable drives will be furnished in cartons complete for delivery with the engines, ready for customer installation.

STERN-POWR drive systems are available in several different forms with a wide variety of combinations of reduction ratios and rotational direction to suit mating engines and vessels. All standard drives are furnished with heavy duty electrohydraulic trim/life systems. Steering systems are of the latest type marine gear operation. Popular accessories are also available including trim angle indicators, controls, auto pilots and power steering.

For more information,

Write 77 on Reader Service Card

Gulf Fleet Marine Offers 20-Page Color Brochure Describing Vessels, Service

Gulf Fleet Marine Corporation, headquartered in New Orleans, La., is offering a 20-page full color brochure describing the range of transportation services it provides to the marine and offshore industries.

A Houston Natural Gas Corporation subsidiary, Gulf Fleet's vessels provide service for offshore exploration, development, and production worldwide. The brochure details the company's tug operations, deck cargo barges, supply vessels, towing/anchor-handling supply vessels, specialized vessels, utility craft, and crewboats.

Gulf Fleet's support personnel, and the capabilities of its Quality Shipyard Division located in Houma, La., also are described in the well-illustrated brochure. A handy reference guide for all the Gulf Fleet vessels, broken down by vessel types, is fitted into a coverpocket.

The guide includes data such as: vessel name; dimensions; hp; special features; capacities for bulk mud, liquid mud, and drill water; clear cargo deck area; dwt.; registry, and bollard pull.

There is also a reference list of Gulf Fleet global offices with addresses, and telephone and telex numbers that can be used in conjunction with a world map showing the company's main areas of operations.

For a free Gulf Fleet brochure which includes the reference guides,

Write 78 on Reader Service Card

Damen Adds New Yard In Holland For Offshore Vessels—Literature Offered

Damen Shipyards has extended its production facilities for offshore and passenger vessels with its new yard in Foxhol, Groningen, in the north of Holland.

The yard builds tugs, anchor handling, SBM mooring and salvage vessels, offshore supply vessels, tankers, passenger vessels, oceanographic research and diving support vessels. The full range of vessels for the offshore sector is covered in a free brochure being offered by the company.

For a free copy,

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ON THE COVER

New Design For Firefighting—Pemex 652

Matsumoto Shipyards of Vancouver, British Columbia, Canada, recently delivered the 150-foot aluminum-hull fireship, the Pemex 652, to Pemex, Mexico's national oil company, for service in the extensive Gulf of Mexico oil fields owned and managed by the firm. The Pemex 652 is the first of two sister ships of a new design ordered by Pemex.

Matsumoto Shipyards has, since its inception, worked with aluminum as its chosen material. The yard has not only built a major portion of British Columbia's current fishing fleet, but landing craft for the Canadian forces as well.

PEMEX 652

Length Overall	150.88ft. (46m)
Breadth, Moulded	31.16ft. (9.5m)
Draft	11.81ft. (3.6m)
Fuel Capacity	35,000 Gal.
Fresh Water Capacity	8,000 Gal.
Foam Capacity	6,000 Gal.
Pumping Capacity	25,000 Gal./min.
Propulsion Engines	Two MTU Diesels, 12 cylinder, each developing 1725 BHP at 1400 rpm
Pumping Engines	Two MTU Diesels, 12 cylinder, each developing 1200 BHP at 1800 rpm
Auxiliary Engines	Two Caterpillar Model 3406 marine generator sets of 210 kW each
Reduction Gears	Two Reintjes
Propellers	Two Osborne 4-blade stainless steel
Thrusters	Schottel (stern and bow) —130 HP each
Engine Controls	J. Kobelt
Steering Gear	Wagner
Davits and Cranes	Kingsway
Anchor Windlasses	Harrison & Robbins
Pumps	Worthington, Jabsco, Paramont, Rotoking
Inflatable Liferafts (4-12 man)	Beaufort
Firefighting System (internal Halon)	Svenska
Coatings	International Paints
Radars, Echosounders, Gyrocompasses	Sperry Marine
VHF, SSB	Canadian Marconi
Fenders	Seaward

Pemex chose Matsumoto to build the two 150-foot fireships because of the yard's expertise and because aluminum hulls possessed the properties the owners wanted in their huge new vessels.

The two Pemex fireships are reported to be the largest in the world. Each uses about 170 tons of plate and 30 tons of extrusions from Alcan Canada Products, Ltd.

Each vessel is 500 gross tons. They are 150 feet in length, have a beam of 32 feet and the distance to the top monitor from the deck is 40 feet.

The twin-screw fireships are each powered by two 1725-hp MTU diesel engines. Their V-shaped hulls give them maximum speed and maneuverability. Cruising range is 250 miles and top speed is 16 knots.

The Pemex 652 is now on station, based out of Tampico, Tamps Province, Mexico. The Pemex 653 is under construction and will be based at Campeche, Camp Province. Each vessel will remain on patrol for about a week at a time with a crew of 22 to 24 (eight officers, 16 crew).

Twin Worthington pumps, powered by separate 1200-hp MTU diesel engines are capable of drawing sea water, mixing it with a 3% AFFF foam solution, and spraying it onto offshore fires at a rate of up to 25,000 gallons per minute.

The three main monitors, or nozzles, made by the Swedish Foam Fire Extinguishing Company can each handle 5,200 gallons of water per minute. Cranes can position two more Stang monitors 75 feet above the water surface to handle 2,600 more gallons per minute, and each vessel carries 6,000 gallons of foam concentrate to mix with the water.

The hulls of the fireships are made from a special Alcan marine-grade alloy that includes magnesium and manganese. Pemex specified aluminum for the vessels because of its light weight and because the high superstructure of the vessel would have been impossible without it. Aluminum is also corrosion resistant, even in salt water, so maintenance can be kept to a minimum.

In use, the firefighting power of each vessel is controlled from the bridge which also contains the latest in navigation equipment, ship-to-shore radio telephone, depth sounder, radar, loud-hailer, engine controls and hydraulic steering controls.

Schottel bow and stern thrusters enable the vessel to maneuver with ease. This permits precise station-keeping and allows the fireship's fire-fighting equipment to be quickly positioned to the best advantage.

Service Machine Group Develops Plans for a Diving Support Vessel

Service Machine Group, Inc., a Terramar company headquartered in Morgan City, La. in cooperation with Design Associates, Inc., of New Orleans, has developed plans to produce a 205-foot diving support vessel (the DSV 205).

Service Machine president **Tom Hensley** and **Mat Kawasaki** of Design Associates, naval architects and marine engineers, said the vessel carries a White Gill thruster system and Z-Peller main drive for computerized dynamic positioning. The vessel is designed to utilize heavy fuel for economy of power and maintenance.

Planned primarily as a specialized vessel for diving work in the Gulf of Mexico but with severe environmental capability, the 300-meter Lloyd's classed system permits saturation of 12 divers for continuous eight-man operations. The three-man bell fitted for observation or lock-out dives is to be equipped with internal and external television to receive input from computer depth scanners.

The bell also carries duplicated hardware communications self-contained through a water emergency telephone, a semiautomatic oxygen injection system, and divers' gas reclaim system.

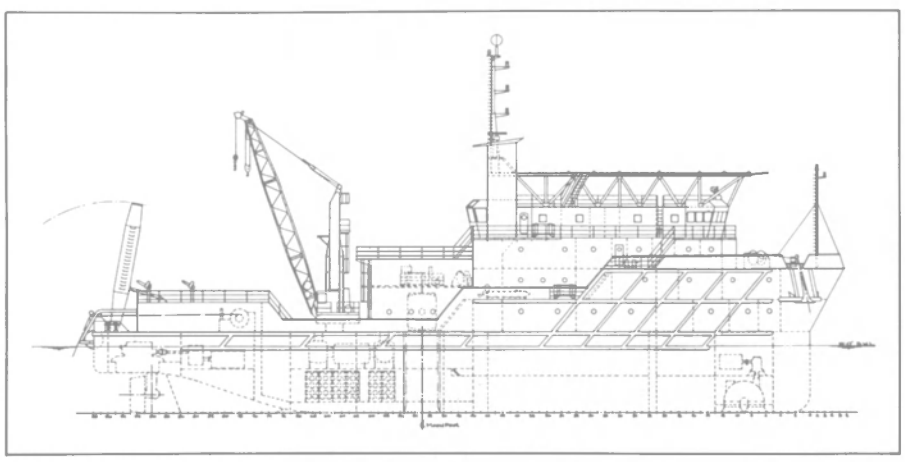
The DSV 205 bell handling system includes a heave compensated winch, composite umbilical and winch, captive cage, guide wire system, bell control cabin overlooking moon pool, four point mooring, and a bell handling area.

Mr. **Hensley** said the chamber complex includes three 2,300-mm four-man living chambers with back projecting TVs for entertainment and briefing, hospital facilities, two vertical 2,000-mm transfer chambers with showers and toilets, three external gas regenerators and manifold, as well as a saturation control cabin.

Powering the DSV 205 are four main engines Wartsila Vasa 22HF model 8R2HF 8-cylinder, 1,000 kw capacity at 900 rpm (1,250 bhp) harbor generator 4R22HF with 500 kw at 900 rpm (625 hp). These engines provide 4,000 kw to supply the SCR system for the main drive and auxiliary power.

Measuring 205 by 50 by 22 feet, the DSV 205 accommodates 60 persons with fully air-conditioned living quarters with recreation rooms, lounges, offices, and a heliport.

Special equipment aboard the DSV 205 includes a 50-ton crane, a 25-ton crane, and a Gantry crane to handle diving bell entry and retrieval through the moon pool. Also, the vessel design includes an "A" frame on the stern for deployment and retrieval of RCVs and ROVs. Ample helium storage space is provided, and the vessel carries an anti-roll tank. Uses projected for the vessel include salvage, industrial development such as pipeline inspection, pipe repair, rig inspection, jacket installation, pile grouting, pipeline riser hook-up, and pipeline trenching support, as well as geophysical and military assignments.



Plans for Service Machine Group's diving support vessel call for the installation of four Wartsila Vasa 22HF main diesel engines.

AGAIN IN 1982

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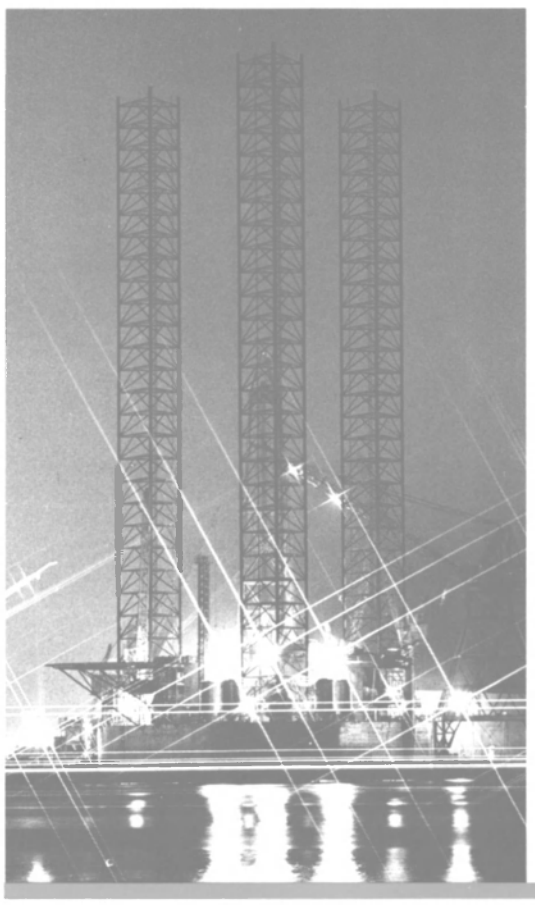

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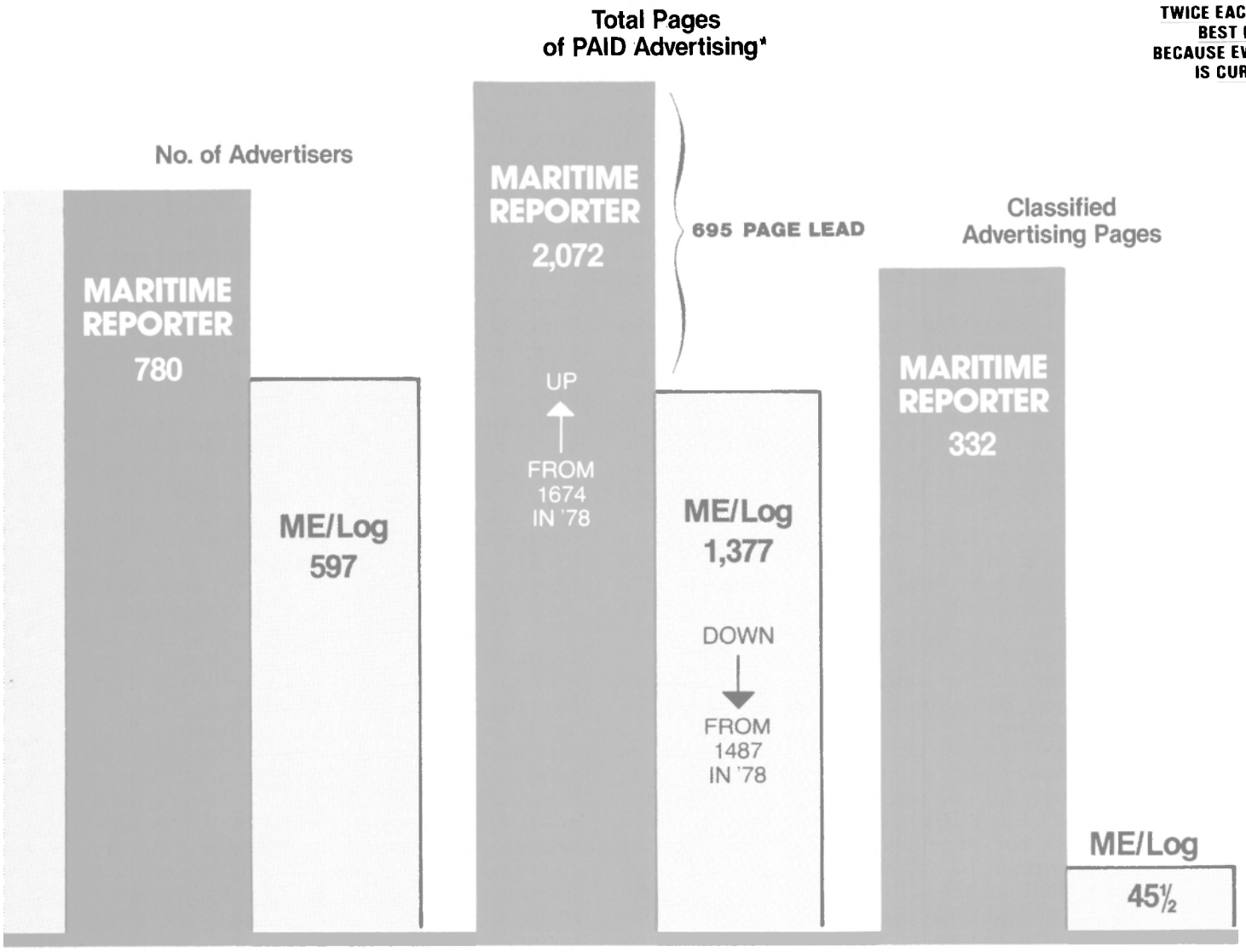

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Navy Awards $46.5-Million Contract To General Ship For Maintenance Of Two Frigates

General Ship Corporation president **James Harvie** (seated) and **William B. Latham,** senior vice president of Systems Engineering Associates Corporation of Cherry Hill, N.J., sign a contract for a $46.5-million Navy Phased Maintenance Program.

General Ship Corporation of Boston, Mass., was recently awarded a $46.5-million contract for a Phased Maintenance Program to be conducted on the Navy frigates USS Miller and USS Valdez. General Ship is the prime contractor for the overhaul project, and Systems Engineering Associates Corporation (SEACOR) of Cherry Hill, N.J., will be providing software support.

The Miller and Valdez, both based in Newport, R.I., are the first combatant ships to be overhauled under the relatively new Navy Phased Maintenance Program. The contract, with options, is slated to extend over the next five years and was issued by Naval Sea Systems Command in Washington, D.C.

SEACOR's responsibilities in the project include planning and coordination support, scheduling and engineering/design assistance, and the writing of growth work specifications.

$4-Million Navy Computer Parts Contract To Sperry

Sperry Corporation, Sperry Univac Division, St. Paul, Minn., has been awarded a $4,085,262 unpriced delivery order under a basic ordering agreement to provide various quantities of spare parts including character code assemblies, light indicators, toggle switches, real time clocks, etc., in support of the computer system AN/UYK-7 (V) for shipboard use. The Navy Ships Parts Control Center, Mechanicsburg, Pa., is the contracting activity (N00024-80-D-7112).

Navy Awards Gould $9.9 Million Contract

Gould National Batteries, Langhorne, Pa., has been awarded a $9,992,426 firm-fixed-price contract for 18 ship sets of Guppy I MOD C type submarine batteries with an option for one set of Guppy I MOD A and 14 sets of Guppy I MOD C batteries. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-83-C-4035).

Construction Underway On ACL's Five 36,000-Dwt "Leader Ships"

Construction of Atlantic Container Line's (ACL) "LeaderShips" has progressed past the first major milestone, according to **Otto I.M. Porton,** president, ACL-USA. Shipyards in Sweden, the U.K., and France began building five RO/RO-containerships early this year.

Mr. **Porton** said the main sections of the first vessel—expected to be delivered in February—have been lifted from the main fabrication hall into the building dock at Kockums Shipyard, Malmo, Sweden. Kockums, part of the Swedyards Corporation. is building three of the five 36,000-dwt ships. The three vessels will be delivered to ACL's Swedish shareholders: Wallenius Line, Transatlantic and Brostroms.

The remaining two vessels are also under construction. One is being built at the U.K.'s Swan Hunter Wallsend-on-Tyne Shipyard for the Cunard Steam-Ship Company. The other will be built at the France-Dunkerque Shipyard in Dunkirk, France, for Compagnie Generale Maritime. All five vessels are scheduled to enter ACL's fleet between February and August.

The new ships will each be powered by a single-screw B & W diesel engine of 23,800 hp. Each will have a total capacity of 2,300 TEUs and each has been designed by ACL for maximum flexibility of operation and cargo configurations.

They will be powered by single screw economical 23,800 hp Burmeister and Wain diesel engines.

Major features include a large quarter ramp, permanent cell guides on the weather deck, capacity for 600 cars in the stern superstructure, 1,140 TEUs of containers on the weatherdeck and in cellular holds, and three decks for normal, heavy, or outsized RO/RO cargo. In addition, these RO/RO decks will incorporate hoistable car decks. The ships will be fitted with 150 reefer points—double the existing capacity on current ACL ships.

Tracor Marine Announces Two Executive Appointments

Hermann H. Haferkamp — John D. Klockow

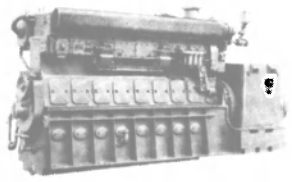
Joseph D. Deal Jr., president of Tracor Marine, Inc., Fort Lauderdale, Fla., has announced the addition of two new members to his management staff at the Port Everglades facility. **Hermann H. Haferkamp** has been named general manager of the Shipyard Division, and **John D. Klockow** is now director of administration.

Prior to joining Tracor Marine as shipyard general manager, Mr. **Haferkamp** served as assistant general superintendent of the Bethlehem Steel Shipyard in Baltimore, Md. He served with Bethlehem for more than 20 years in various capacities at their ship repair facilities in San Francisco, Beaumont, and Sparrows Point. In this new position, Mr. **Haferkamp** will oversee the management of all facets of the Tracor Marine full-service shipyard for the drydocking, overhaul, repair, and maintenance of commercial and military vessels.

Mr. **Klockow,** in his new position as director of administration at Tracor Marine, will be responsible for contract administration and will direct the activities of the materials management department, including the purchasing functions. Following his retirement from the U.S. Navy as a commissioned officer, Mr. **Klockow** worked with J.J. Henry Company in Portsmouth, Va., and the HBH Company as a subcontract administrator prior to joining Tracor Marine.

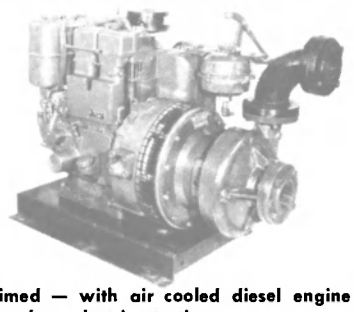
In addition to the shipyard facility at Port Everglades, Tracor Marine's Ocean Technology/Engineering Division also operates from this location, providing its marine oriented services to industry and government. Among the capabilities offered by the oceanographers, naval architects, and engineers of this division are marine design and engineering, including complete installation of underwater systems, detailed marine and hydrographic surveys, program management, and cable laying.

500 KW AC GE DIESEL GENERATOR



G.E. ATI — 985Y — 500KW — 625 KVA — 480 volts — 800 amps—3-phase 60-cycle—720 RPM. Self-ventilated — totally enclosed — water-cooled — directly connected to Cooper-Bessemer model G.S.B. 8-cyinder diesel engine — 10½" X 13½" — four cycle — 720 RPM. Air starting — 300 PSI — with Ross water and oil coolers. Total weight 48,700 lbs.

NEW AIR-COOLED STANDBY DIESEL FIRE & GENERAL SERVICE PUMP



Hand primed — with air cooled diesel engine and 3" pump. Hand or electric starting.

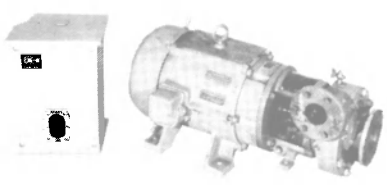
200 GPM @ 56 PSI @ 2600 RPM
325 GPM @ 65 PSI @ 3000 RPM

EXPLOSION-PROOF AXIAL FLOW FANS — UNUSED

A12A4X6 — 12,000 CFM — Service A USN FAN. Joy Mfg. Co. 65°C — Class N insulation — 10/3 HP — 440/3/60 — 14/5.2 amps — 1800/1200 RPM. Explosion-proof Reliance motor — frame 254U — group D.

4 IN STOCK — IMMEDIATE DELIVERY

100 GPM CIRCULATING PUMP

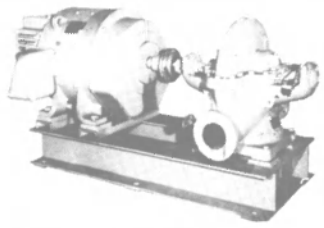


Mfg. by Frederick Iron & Steel. Size 1½ — type N-4. 115 Ft. head — 50 PSI — 3500 RPM. MOTOR: Continental — 7½ HP — 440/3/60 — 9.5 amps — 3520 RPM. With control.

$2450

FAIRBANKS-MORSE 750 GPM — 125 PSI STAINLESS STEEL CENTRIFUGAL SEA WATER FIRE & FLUSHING PUMP

NEW UNUSED

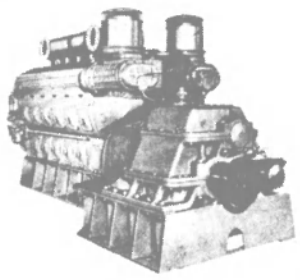


EX U.S.N.

125 PSI (281 Ft.) total head. Suction lift none (flooded) 1750 RPM. With Falk #8F coupling—flexible, all metal, enclosed. MOTOR: Reliance type T—100 HP—1750 RPM —343 amps—230 volts DC—Frame 503AS. Pump has 5" suction—4" discharge. Pump & Motor mounted on base 37¾" wide X 6' 2¾" long X 3' 0½" high. Total weight 3348 lbs.

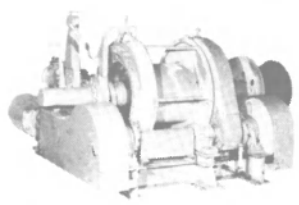
900HP GM 12-567A PORT DIESEL ENGINE

WITH FALK REVERSE AND REDUCTION GEAR

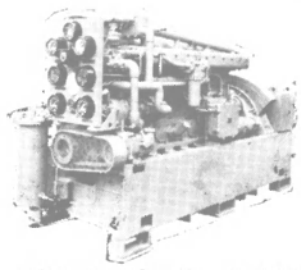


ENGINE: GM 12-567A—8½ X 10—V-type—2-cycle—747 RPM — electric starting. GEAR: Falk AirFlex — reverse & reduction — 2.48:1 forward — 2.52:1 reverse.

UNUSED STEAM WINCH FOR MOORING & CARGO SERVICES



Morse Steam Winch Co. — 10 x 12 — 10,000 lb. line pull — declutchable gypsy — hand compression brake.



100KW GBD-8 DIESEL GENERATORS

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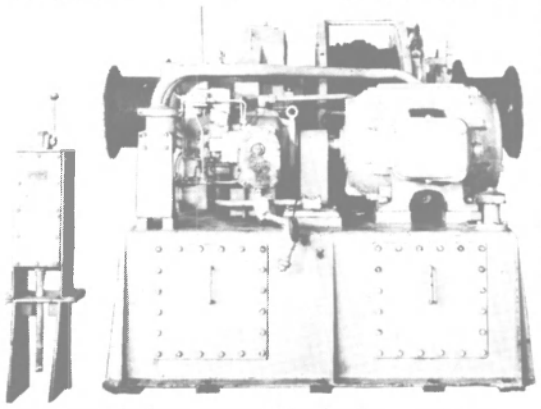

Made by Lakeshore. DUTY: 7400 lbs SLP — 220 FPM — drum size 24" diameter — 15" wide. Complete with ratchet & pawl. CAPACITY: 600 ft. of ¾" wire. MOTOR: 50 HP — 440 volts — 66.3 amps — 3-phase 60 cycle — squirrel cage — 1200 RPM constant — Frame CC-445-N — 1 hour duty. Motor drives Waterbury size 5 "A" end — size 5K heavy duty remote servo control 1150 RPM — WP 1900# — test 3000#. "B" End motor — type 5K heavy duty — size 5 1150 RPM. Originally built for U.S. Navy refueling at sea. AVAILABILITY: Some with double gypsy; some with single gypsy; some with no gypsys. Ex-U.S.N.

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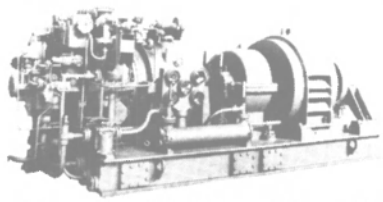

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Dates And Place Set For Expoship North America

Expoship North America '84, a major international maritime exhibition, will be held March 19 to 23, 1984, at Pier 88 on Manhattan's west side, it was announced recently by exhibition officials.

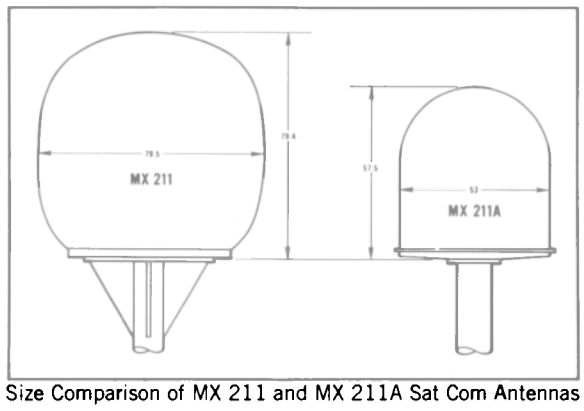
The event is geared to attract shipowners, shippers, shipbuilders and repairers, marine equipment manufacturers, financial and broker interests, and other senior representatives of marine related companies. A Seatrade money and ship conference will be held in conjunction with the exhibition.

For more information contact: **Terry Dougherty,** Seatrade North America, 17 Battery Place, New York, N.Y. 10004. Tel. (212) 422-6470. Telex 233629 SEA UR.

Latest Magnavox Ship Earth Station Features Small Antenna

Continuing the trend towards reduced size INMARSAT ship earth station antennas, Magnavox has introduced a 53-inch (1.4 meter) diameter antenna as part of their updated satcom ship earth station, the MX 211A. Company spokesmen anticipate that the new antenna, which is approximately 33 percent smaller and lighter than the former model, will make the system more suitable for yachts and small commercial vessels with limited bridge space. The smaller antenna also results in a substantial savings in both freight and installation costs.

A unique gimbal axis rotation system has been incorporated in the new antenna design to increase the tracking rate to 9 degrees per second and minimize communications link interruption during cable unwrap. The new unit also has an exclusive auto scan feature which automatically searches for and acquires the satellite signal, permitting terminal initialization and telephone service with the touch of a single button. The MX 211A antenna is connected to the below decks electronics via a single flexible cable for added installation convenience, and utilizes passive stabilization which was a Magnavox innovation.



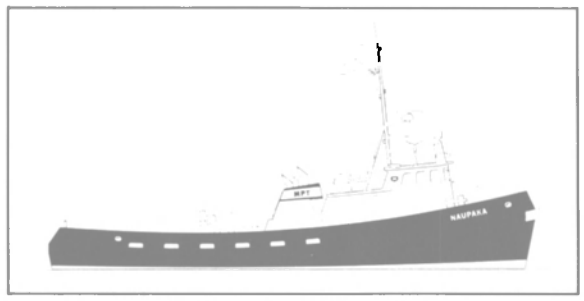
Size Comparison of MX 211 and MX 211A Sat Com Antennas

The MX 211A meets all of the INMARSAT Standard A ship earth station performance requirements, including those for proposed new services.

For complete literature on the new antenna as well as the new MX 211A sat/com system,

Write 11 on Reader Service Card.

Marco To Build 75-Foot Tug For Hawaiian Island Service


Profile of the tug Naupaka.

Marco of Seattle, Wash., primarily known as a builder of fishing boats, has signed a contract for the construction of a 75-foot twin-screw tugboat. The Shipyard Division has recently increased its emphasis in the workboat fields as evidenced by its installation of an 1,800-ton-capacity floating drydock and a major increase in tugboat repair work in the yard.

The new all-steel vessel, to be known as the Naupaka, will be built for Mid Pacific Towing, Limited, of Honolulu, Hawaii. The tug's primary use will be for interisland towing for the petroleum industry, but she will also perform ship-assist work and offshore mooring equipment servicing.

The vessel design is by Marco's Naval Architecture Division, headed by **Bruce O. Whittemore,** and is a refinement of previously built Marco tugs. She will have a beam of 26 feet 6 inches (8 meters), a molded depth of 12 feet 6 inches (3.8 meters), and a draft of 10 feet (3 meters). The vessel's two Caterpillar 398TA diesel main engines will provide a total of 1,500 hp driving a pair of 84-inch, 4-blade, stainless propellers. A Markey TYS-24 single-drum hydraulic towing winch will be installed.

Galley, mess, and berthing facilities will be provided for a crew of seven. The vessel will be completed in early October of this year, and the owners plan to put her into service in Hawaii before the first of November.

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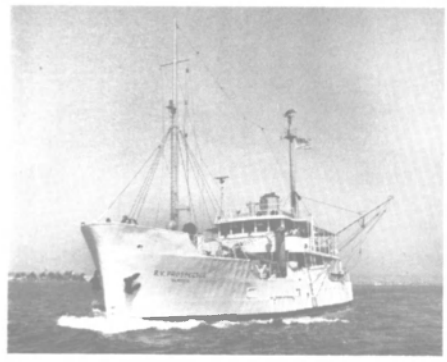

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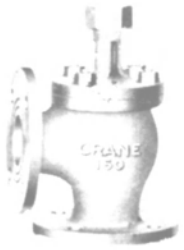

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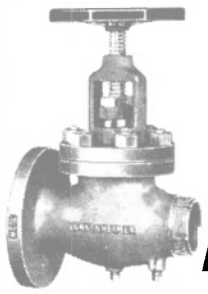

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Beam	99'6"
Depth	25'0"
Deadrise	27"
Draft Light	3'11"
Draft Loaded	19'4"
Transverse Bulkheads	5 O.T.
Length Bulkheads	3 O.T.
No. Tanks	20
Rolled Bilge	48" R.
Mich. Bow	60' length
Sq. Raked Stern	80' length

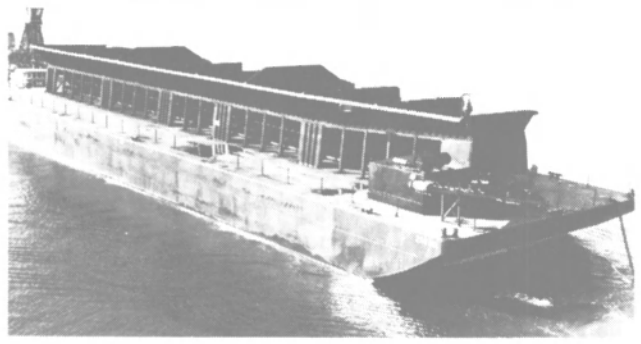
DECK CARGO

Open Deck Area	37,886 S.F.
Deck Load	1,500 P.S.F.
D.W.T.	15,800 L.T.

AS OIL BARGE

Oil Cargo	148,500 BBL's 21,000 L.T.
Cargo Piping	14" Mains 10" Suctions

Self Unloading Aggregate Barge



ZAG-501

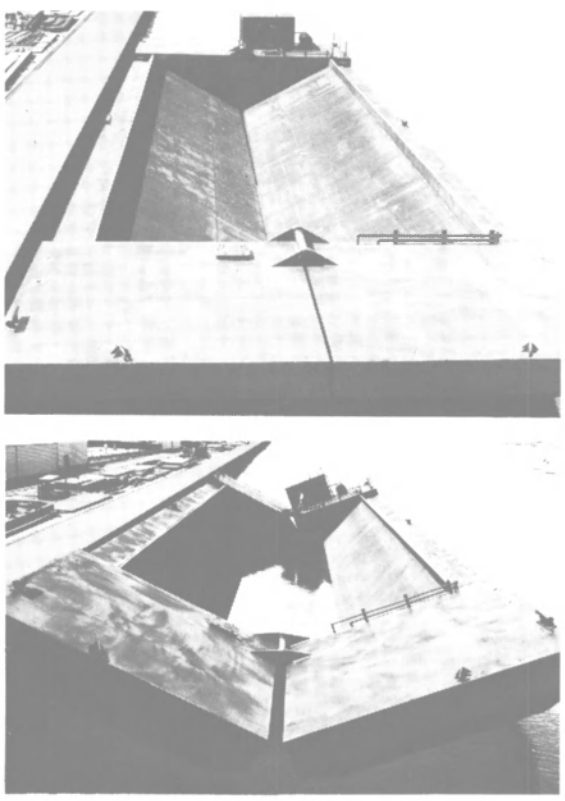
Length (O.A.)	248'- 0"
Beam	63'- 0"
Depth	16'- 0"
Displacement Light	1010 S.T.
Draft Light (F.W.)	2'- 7½"
Draft Loaded (F.W.)	11'- 8"
DWT	4000 S.T.
Diesel Electric Set	100 KV
Hopper Volume	2667 cu. yd

Hopper Unloading Gates: 27-36" x 36" Horiz. sliding gates w/individual hydr. controls.

Main Unloading Conveyer: 48" wide belt, 30 H.P. elect. motor, 250 ft./min. Max. disch. rate – 667 cu. yd./hr.

Transfer Conveyer: 42" wide belt, 10 H.P. elect. motor, 350 ft./min. off loading location – Stbd. side fwd. at 9 ft. above deck.

Hull Plating: Deck, side shell & bott. 9/16"



Split Type Self Dumping Scows

Built 1979. For sale, long or short term charters

SPECIFICATIONS

ABS loadlined for USCG-approved offport dumping

Length (ML'D)	180 - 0"
Beam (ML'D)	50'- 0"
Depth of Mid-Body (ML'D)	14'- 0"
Hopper Length (ML'D)	128'- 0"
Level Hopper Volume	1421 cu. yd.
DWT @ d = 10.22 ft.	1615 L.T.
Rake Lengths F. & A.	26'- 0"
Twin Skegs	
Stern & Fwd. Rake Decks Stepped up	2'- 0"
Engine GM 671	
Hydraulic Pumps (2) 12 GPM & 75 GPM	
Time To Open (Fully Closed to Fully Open)	6 Min. 5 Sec.
Time To Close	4 Min. 34 Sec.
Hopper Angle Fully Open	53.78
Fuel Tank Capacity	445 Gal.
Hydraulic Cylinders (2 Fwd. & 2 Aft)	18" Diam. 120 'Stroke
Plating	
Side	9/16"
Bottom	5/8"
Hopper	5/8"

Combination Deck Cargo & Tank Barge

Fully-Classed Ocean Service

230' x 60' x 15' Comb. Deck Cargo & Grade 'D' Tank Barge

Length O.A.	230'- 0"
Beam	60'- 0"
Depth	15'- 6"
Deadrise	6"
Number of Tanks	10
Total Tank Volume @ 95%	24,000 BBL
Cargo Pumps	Two Twin Screw, Deleval IMO GTS-268-066-CBEM
Rating	1500 GPM, 1150 RPM, 100 PSIG Disch. Press., 5000 SSU
Location	Below Deck Pumproom in Fwd. Rake
Diesel Engines	Two Detroit Model 8V-71, 230 HP @ 1800 RPM
Location	Above Deck in Fwd. Deckhouse
Fuel Capacity	1400 Gal.
Fill & Disch. Connections	8" ANSI 150# FLG P/S
Heating Coils	2" Sch. 80 Pipe For Shore Steam
Hull Plating	Deck ½", Side Shell ⅜", Bott. ⅜", Shear Strake ½"
Deck Cargo Dwt. at Loadline	3900 S.T.

For additional information or to make an appointment to inspect, call or write:
Tom Sherwood, Andy Canulette, Jr.

ZIDELL EXPLORATIONS, INC.
3121 S.W. Moody Ave., Portland, Oregon 97201
Phone: 503 228-8691 • Telex 36-0502 • Cable "Zidell"

BUYERS DIRECTORY

This directory section is an editorial feature published in every issue for the convenience of the readers of MARITIME REPORTER/Engineering News. A quick-reference readers' guide, it includes the names and addresses of the world's leading manufacturers and suppliers of all types of marine machinery, equipment, supplies and services. A listing is provided,

KEEL COOLERS
R.W. Fernstrum & Co., 1716 Eleventh Ave., Menominee, MI 49858
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights
ACR Electronics, Inc., P.O. Box 2148, Hollywood, FL 33022
Browning Marine Inc., (Aqua Signal) 33W 480 Fabyan Parkway, Ste 105, West Chicago, IL 60185
idl d- ss t sion. 530 W. Mt. Pleasant Ave., Liv-

SUPERIOR DIESELS

2 White Superior Diesel Marine Propulsion Engines ... Rated 800 HP at 900 RPM. Model 40-S2X8. Excellent Condition. Available Now. Also included in package — 2 Capital Seamaster Gears 3-1 ratio. Limited supply of spare parts and tooling for Superior engines.
Total Package Price: $49,500 FOB Jackson, MS

Jim Cleveland
PUCKETT MACHINERY
P.O. Box 3170
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WINCHES -- WINDLASSES -- DECKCRANES
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CHOCKS -- FAIRLEADS -- ETC.

WILLEM POT B.V.
45 Stationsplein—Rotterdam
Tel: 011-31-10-11 98 70 Telex: 22496 (wbpot)

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Excess Equipment Available for Immediate Use:

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(90 ton) 995 American Crawler
(70 ton) 670WLC P&H Crawler
(60 ton) 7250 American Crawler
(50 ton) 5299 American Crawler
(40 ton) 599C American Crawler
(90 ton) MC790 Lorain Cable Truck Crane
(80 ton) 7450 American Cable Truck Crane
(50 ton) MC550A Lorain Cable Truck Crane
(45 ton) TMS375LP Grove Hydraulic Truck Crane
(30 ton) TM275LP Grove Hydraulic Truck Crane
(18 ton) T-180 P&H Hydraulic Truck Crane
(14 to 25 ton) Grove & P&H Rough Terrain Cranes

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9 x 12 American Hoist & Derrick Winches, reconditioned equal to new

Spare parts for all steam winches

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SPECIAL SALE
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2 — AMERICAN 250-AW 4-DRUM, 25,000#SLP, CUMMINS DIESEL/T.C. each $85,000

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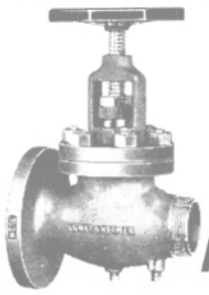
CMC COMMUNICATIONS, INC.
5479 Jetport Industrial Blvd.
Tampa, Florida 33614
813-885-3996



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Length	400'0"
Beam	99'6"
Depth	25'0"
Deadrise	27"
Draft Light	3'11"
Draft Loaded	19'4"
Transverse Bulkheads	5 O.T.
Length Bulkheads	3 O.T.
No. Tanks	20
Rolled Bilge	48" R.
Mich. Bow	60' length
Sq. Raked Stern	80' length

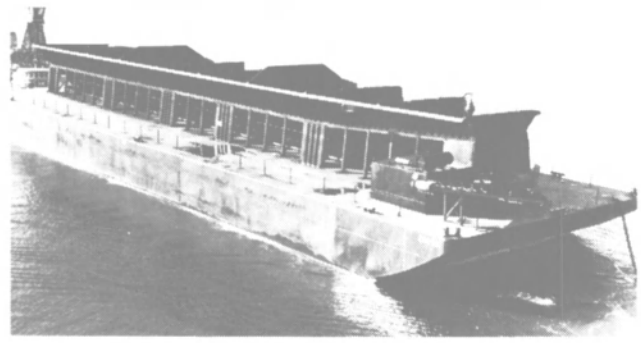
DECK CARGO

Open Deck Area	37,886 S.F.
Deck Load	1,500 P.S.F.
D.W.T.	15,800 L.T.

AS OIL BARGE

Oil Cargo	148,500 BBLs 21,000 L.T.
Cargo Piping	14" Mains 10" Suctions

Self Unloading Aggregate Barge



ZAG-501

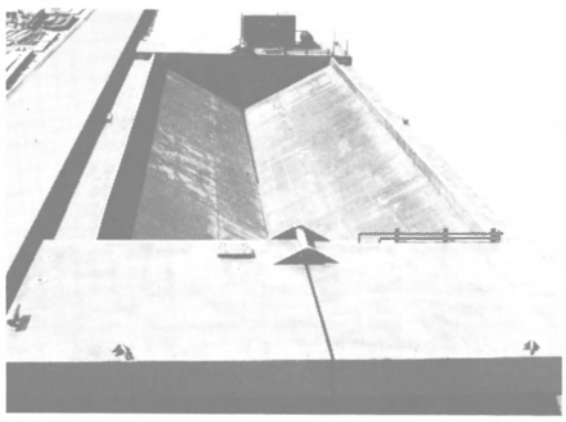
Length (O.A.)	248'- 0"
Beam	63'- 0"
Depth	16'- 0"
Displacement Light	1010 S.T.
Draft Light (F.W.)	2'- 7½"
Draft Loaded (F.W.)	11'- 8"
DWT	4000 S.T.
Diesel Electric Set	100 KV
Hopper Volume	2667 cu. yd

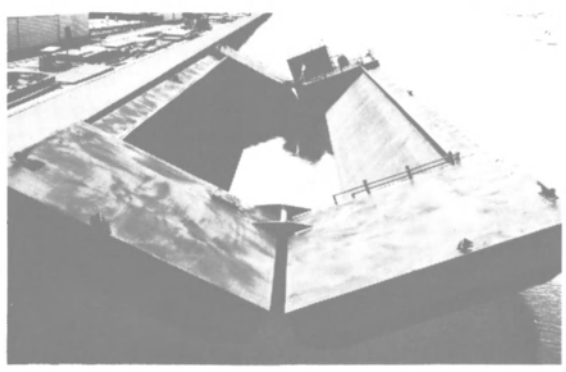
Hopper Unloading Gates: 27-36" x 36" Horiz. sliding gates w/individual hydr. controls.

Main Unloading Conveyer: 48" wide belt, 30 H.P. elect. motor, 250 ft./min. Max. disch. rate – 667 cu. yd./hr.

Transfer Conveyer: 42' wide belt, 10 H.P. elect. motor, 350 ft./min. off loading location – Stbd. side fwd. at 9 ft. above deck.

Hull Plating: Deck, side shell & bott. 9/16"





Split Type Self Dumping Scows

Built 1979. For sale, long or short term charters

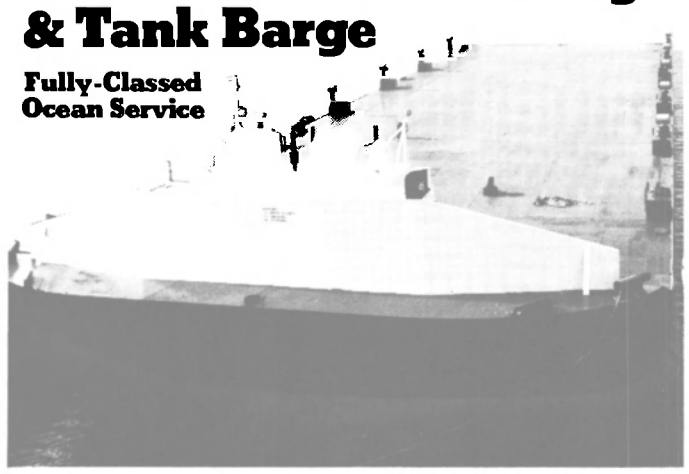
SPECIFICATIONS

ABS loadlined for USCG-approved offport dumping

Length (ML'D)	180'- 0"
Beam (ML'D)	50'- 0"
Depth of Mid-Body (ML'D)	14'- 0"
Hopper Length (ML'D)	128'- 0"
Level Hopper Volume	1421 cu. yd.
DWT @ d = 10.22 ft.	1615 L.T.
Rake Lengths F. & A.	26'- 0"
Twin Skegs	
Stern & Fwd. Rake Decks Stepped up	2'- 0"
Engine GM 671	
Hydraulic Pumps (2) 12 GPM & 75 GPM	
Time To Open (Fully Closed to Fully Open)	6 Min. 5 Sec.
Time To Close	4 Min. 34 Sec.
Hopper Angle Fully Open	53.78°
Fuel Tank Capacity	445 Gal.
Hydraulic Cylinders (2 Fwd. & 2 Aft)	18" Diam. 120"Stroke
Plating	
Side	9/16"
Bottom	5/8"
Hopper	5/8"

Combination Deck Cargo & Tank Barge

Fully-Classed Ocean Service



230' x 60' x 15' Comb. Deck Cargo & Grade 'D' Tank Barge

Length O.A.	230'- 0"
Beam	60'- 0"
Depth	15'- 6"
Deadrise	6"
Number of Tanks	10
Total Tank Volume @ 95%	24,000 BBL
Cargo Pumps	Two Twin Screw, Deleval IMO GTS-268-066-CBEM
Rating	1500 GPM, 1150 RPM, 100 PSIG Disch. Press., 5000 SSU
Location	Below Deck Pumproom in Fwd. Rake
Diesel Engines	Two Detroit Model 8V-71, 230 HP @ 1800 RPM
Location	Above Deck in Fwd. Deckhouse
Fuel Capacity	1400 Gal.
Fill & Disch. Connections	8" ANSI 150# FLG P/S
Heating Coils	2" Sch. 80 Pipe For Shore Steam
Hull Plating	Deck ½", Side Shell ⅜", Bott. ⅜", Shear Strake ½"
Deck Cargo Dwt. at Loadline	3900 S.T.

For additional information or to make an appointment to inspect, call or write:
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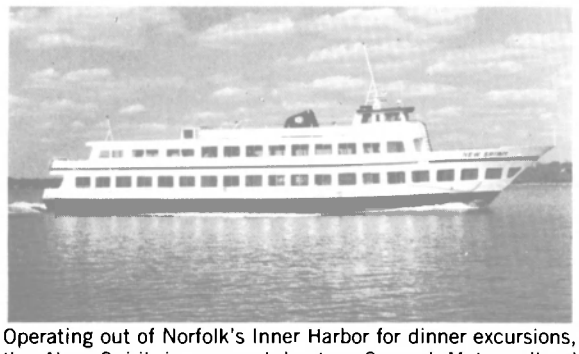
Blount Delivers The New Spirit To Holiday Cruises of Norfolk



Operating out of Norfolk's Inner Harbor for dinner excursions, the New Spirit is powered by two General Motors diesel engines.

Blount Marine Corporation of Warren, R.I., has delivered the New Spirit to Holiday Cruises, Inc., of Norfolk, Va.

The 134-foot by 31-foot by 6-foot dinner boat will operate from the new waterside development of the Norfolk Inner Harbor.

The New Spirit is capable of carrying 600 passengers on dinner cruises on its two completely enclosed and panelled decks and a third open deck. Interiors are finished cabaret style with wall-to-wall carpeting and air-conditioning. Holding tanks insure that the vessel complies with pollution standards.

Admeasuring under 100 gross tons, the vessel was built under U.S. Coast Guard supervision for Lakes, Bays, and Sounds service. Two General Motors 8V-71 diesel engines provide the main propulsion, and ship's power is provided by two generators totalling 110 kw.

The New Spirit is the third Bay Queen type vessel contracted this year and the eighth of this class pioneered and built by Blount.

HONORED—Clarence L. French (left), president of The Society of Naval Architects and Marine Engineers, presented a certificate of appreciation to **Dean Champlin,** chairman of the SNAME Philadelphia Section at the section's recent 33rd annual dinner-dance held at the Bellevue Stratford Hotel. More than 300 persons attended.

$5-Million Navy Parts Contract Awarded To Rockwell

Rockwell International Corporation, Autonetics Group, Anaheim, Calif. has been awarded a $5,030,032 unpriced delivery order under a basic ordering agreement to provide various quantities of spare parts including signal data connectors, control panel, test panel, network display, etc., in support of the Electrically Suspended Gyro Navigator (ESGN), AN/WSN-3A (V) 2, to be used onboard ships. The Navy Ships Parts Control Center, Mechanicsburg, Pa., is the contracting activity (N000104-80-G-0004).

SNAME Southeast Section Elects Officers And Hears Tracor Barge Salvage Report

The Southeast Section of The Society of Naval Architects and Marine Engineers held its final meeting of the year recently in Fort Lauderdale, Fla. The meeting featured the results of the election of officers for 1983-84, and a presentation by **William K. Lane,** chief engineer of Tracor Marine.

Elected to office were: **John W. Shortall III,** as chairman; Comdr. **William E. Remley,** USCG, vice chairman—North; **Chet Swenson,** vice chairman—West; **Klemme, M. Jones,** vice chairman—South; and **William L. Lane,** secretary-treasurer.

Dr. **John Sainsbury** was elected to a three-year term on the executive committee and **Bob Hobbs** to a one-year term.

Mr. **Lane** presented an informal report on the salvage of 13 barges that had become impaled at Dam No. 2 on the Arkansas River in December 1982. The hazardous operation, which removed a potential threat to the entire Arkansas River flood control system, was done by Tracor for the U.S. Army Corps of Engineers through the office of the U.S. Navy Supervisor of Salvage.

BUYERS DIRECTORY

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Mechanical Resources, Inc., 191 Cambridge Ave., Jersey City, NJ 07307
Nance Industries, P.O. Box 1547, Beaumont, TX 77704-1547
Unitemp Inc., 3590 Kennedy Rd., So. Plainfield, NJ 07080
York Division, Borg-Warner Corp., P.O. Box 1592, York, PA 17405

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Baldt Incorporated, P.O. Box 350, Chester, PA 19016
Neptunia, Via Giovanni da Verrazzano, 12, 16165 Genova, Italy
William Pot B.V., Industriele Handelnij., Groothandelsgebouw, 45 Stationsplein, Rotterdam, 3004, Holland

ANODES—Cathodic Protection
American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Engelhard Industries Division, 2655 U.S. Route 22, Union, NJ 07083
Kaiser Chemical, Div., of Kaiser Aluminum & Chemical Corp., 300 Lakeside Dr., Rm. 1128 KB, Oakland, CA 94643

BASKET STRAINERS
North Star Marine & Industrial Products, Inc., 84 Wall Street, Farmingdale, NY 11735

BEARINGS—Rubber, Metallic, Non-Metallic
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Lucian Q. Moffitt, Inc., P.O. Box 1415, Akron, Ohio 44309
Thomson-Gordon Limited, 3225 Mainway, Burlington, Ontario, Canada L7M 1A6
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wisc. 53186

BLASTING—Cleaning—Equipment
Apache Equipment, Inc., 10690 Shadow Wood Dr., Suite 112, Houston, TX 77043
Butterworth Systems Inc., 224 Park Ave., Florham Park, NJ 07932
CLEMCO, P.O. Box 7680, San Francisco, CA 94120
Complete Abrasive Blasting Systems, 18250 68th Avenue South, Kent, WA 98031
E.I. DuPont De Nemours & Co., Inc., Starblast Division, Room X39186, Wilmington, DE 19898
Schmidt Mfg. Inc., P.O. Box 37, Fresno, TX 77545

BOILERS
Combustion Engineering, Inc., Windsor, Connecticut 06095
Foster Wheeler Boiler Corp., 110 S. Orange Ave., Livingston, NJ 07039

BROKERS
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Hughes Bros., Inc., 17 Battery Pl., New York, N.Y. 10004

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Duramax Metals, Inc., 2401 Wesley Street, Portsmouth, VA 23707

BUNKERING SERVICE
Belcher Company, Inc., 8700 West Flagler, P.O. Box 525500, Miami, FL 33152
Gulf Oil Trading Co., 1290 Ave. of the Americas, N.Y., N.Y. 10019
National Marine Service Inc. (Transport Div.), 1750 Brentwood Blvd., St. Louis, MO 63144

CARGO HANDLING EQUIPMENT
Dynamic Air, Inc., P.O. Box 43074, St. Paul, MN 55164
Navire Cargo Gear (U.S.) Inc., 570 Rahway Avenue, Woodbridge, NJ 07095
Navire Cargo Gear International AB, Box 8991, s-402 74, Goteborg 8, Sweden

CHOCKING SYSTEMS
Palmer Products Inc., P.O. Box 8, Worcester, PA 19490
Philadelphia Resins Corp., 20 Commerce Drive, Montgomeryville, Pa 18936

CLAMPS
Band-It Company, P.O. Box 16307, Denver, CO 80216

CLOSURES—Marine
Cornell-Carr Co. Inc., 63 Main St., Monroe, CT 06468

CONDENSERS
G & W Acme Division, Gulf & Western Manufacturing Company, Jackson, MI 49202

CONTAINERS—Cargo Container Handling
Paceco Inc. (A division of Fruehauf), West Seaway Access Road, Gulfport, MS 39501

CONTROL SYSTEMS—Monitoring
American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
ARMTEC Industries, Inc., Manchester, NH 03103
Aris Electric Company, 327 Fourth St., Brooklyn, NY 11215
Autronica Marine USA, 280 Industrial Pkwy., Northvale, NJ 07647
Avicon Corp., 7750 East Redfield Rd., Scottsdale, AZ 85260
Electric Tachometer Corp., 68th & Upland Street, Philadelphia, PA 19142
Fluidyne, a Div. of Electrodata Inc., P.O. Box 11366, Santa Rosa, CA 95406
Henschel Corporation, 14 Cedar St., Amesbury, Mass. 01913
Megasystems, Inc., 1075 N.W. 58th Street, Boca Raton, FL 33431
National Control Systems, Inc., 827 Hanley Industrial Court, St. Louis, MO 63144
Norcontrol, 135 Fort Lee Rd., Leonio, NJ 07605
Norske Telektron A/S, Drammensveien 126, Oslo 2, Norway
Row Computer Automations, Inc., 1085 Rockaway Ave., Valley Stream, NY 11580
Tracor Marcon, Inc., 13433 N.E. 20th St., Bellevue, WA 98005
Transamerica Delaval, Inc., Gems Sensors Division, Cowles Road, Plainville, CT 06062

COUPLINGS
SKF Steel, 20 Tower Lane, P.O. Box 745, Avon, CT 06001

CRANES—HOISTS—DERRICKS—WHIRLEYS
American Hoist & Derrick Company (AMHoist), St. Paul, MN 55107
ASEA Stal-Laval Inc., 525 Executive Blvd., Elmsford, NY 10523
Blohm & Voss Company, 55 Morris Avenue, Springfield, NJ 07081
Grove Manufacturing Co., P.O. Box 21, Shady Grove, PA 17256
HIAB Cranes & Loaders Inc., R.D. 22 Interchange Place, York, PA 17404
Hertz Equipment Rental Corp., 7 Entin Rd., Bldg # 2, Parsippany, NJ 07054
Marathon LeTourneau Offshore Co., 1700 Marathon Bldg., 600 Jefferson, Houston, TX 77002
Marine Travelift, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235
Matson Terminals, Inc., P.O. Box 3933, San Francisco, CA 94119
National Crane Corp., 11200 North 148 St., Waverly, NE 68462
National Supply Company, 1455 West Loop South, Houston, TX 77027
Superior-Lidgerwood-Mundy Corp., 1101 John Ave., Superior, WI 54880
Washington Crane, Div. of Ederer, Inc., P.O. Box 24708, Seattle, WA 98124

DECK MACHINERY—Cargo Handling Equipment
General Hydraulics Corp., A Marotta Subsidiary, P.O. Box 3302, Huntsville, AL 35810
Marine Technical Associates, 195 Patterson Avenue, Little Falls, NJ 07424
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, Wash. 98134

DIESEL ACCESSORIES—CYLINDER LINERS
B & W Marine Service, 50 Broadway, New York, NY 10004
General Thermodynamics Corporation, 210 South Meadow Road, P.O. Box 1105, Plymouth, Massachusetts 02360
Haynes Corporation, P.O. Box 179, Jackson, MI 49204
Van der Horst Corp. of America, 314 Penn Ave., Olean, NY 14760

ELECTRICAL EQUIPMENT
NewMar, P.O. Box 1306, Newport Beach, CA 92663
Valod Electric Heating Corporation, 162 Wildey St., Tarrytown, NY 10591
Ward Leonard Electric Co., 31 South St., Mt. Vernon, NY 10550
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, Ore. 97201

EMULSIFICATION SYSTEMS
Cleanodan A/S, N. American Agents, American United Marine Corp., 5 Broadway, Route 1, Saugus, MA 01906
Fire-Brite, Hoffert Manufacturing Company, Inc., 1700 East Church Street, Jacksonville, FL 32201

EQUIPMENT—Marine
American General/Levin Corp., 445 Littlefield Ave., So. San Francisco, CA 94080
Band-It Division, Houdaille Industries, Inc., P.O. Box 16307, Denver, CO 80216
Consafe Inc., P.O. Box 40339, Houston, TX 77040
Donn Corporation, 1000 Crocker Road, Westlake, OH 44145
b.v. Holmatro Industrial Equipment, P.O. Box 33, 4940 aa Raamsdonksveer, Holland
Juniper Industries Inc., 72-15 Metropolitan Ave., Middle Village, NY 11379
Kearfott Marine Products, 550 South Fulton Ave., Mount Vernon, N.Y. 10550
Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302
John P. Nissen, Jr. Company, Glenside, PA 19038
Softech, 460 Totten Pond Road, Waltham, MA 02154
Stal Laval Inc., 525 Executive Blvd., Elmsford, NY 10523
Strachan—Mackoe Corporation, P.O. Box M850, Hoboken, NJ 07030

EVAPORATORS
Alfo-Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
Aqua-Chem Inc., P.O. Box 421, Milwaukee, WI 53201
Riley-Beaird, Inc., P.O. Box 1115, Shreveport, La. 71130

FANS—VENTILATORS—BLOWERS
American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Flexaust Company, 11 Chestnut Street, Amesbury, MA 01913
Hartzell Fan, Division of Castle Hills Corp., 901 S. Downing St., P.O. Box 919, Piqua, OH 45356
Joy Manufacturing Co., 338 So. Broadway, New Philadelphia, Ohio 44663
Marlo Coil/Nuclear Cooling, Inc., P.O. Box 171, High Ridge, MO 63049
Tranter Inc., 6700 Finch Ave. West, Rexdale, Ontario, Canada M9W 5P5
Zidell Explorations, 3121 S.W. Moody St., Portland, Ore. 97201

FENDERING SYSTEMS—Dock & Vessel
Hughes Bros., Inc., 17 Battery Place, New York, N.Y. 10004
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Seaward International, Inc., 6269 Leesburg Ave., Falls Church, Va. 22044

FINANCING—Leasing
A.G. Becker Paribus Inc., 2 First National Plaza, Chicago, IL 60670
Yegen Marine, P.O. Box 25504, Ft. Lauderdale, FL 33320

FUEL OIL/ADDITIVES—Analysis & Combustion Testing
Ferrous Corporation, 910-108th N.E., P.O. Box 1764, Bellevue, WA 98009
New York Mercantile Exchange, Four World Trade Center, New York, NY 10048
Rolfite Products Inc., 300 Broad Street, Stamford, CT 06901

FURNITURE
Bailey Joiner Co., Inc., 74 Sullivan Street, Brooklyn, N.Y. 11231
Comfort-Mate, Inc., 7988 NW 56th Street, Miami, FL 33166

GALLEY EQUIPMENT
Insinger Machine Company, 6245 State Rd., Philadelphia, PA 19135
Kiefer Corporation, W227 N546 Westmound Dr., Waukesha, WI 53186

GANGWAYS
Rampmaster Inc., 9825 Osceola Blvd., Vero Beach, FL 32960

HATCH & DECK COVERS—Chain Pipe
Hayward Marine Products, 900 Fairmount Avenue, Elizabeth, NJ 07207
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Navire Cargo Gear (U.S.) Inc., 570 Rahway Avenue, Woodbridge, NJ 07095
Navire Cargo International AB, Box 8991, s-402 74, Goteborg 8, Sweden
Julius Mock & Sons, Inc., 20 Vesey Street, New York, NY 10007
J.E. Steigerwald Co., Inc., 5515 Belair Rd., Baltimore, MD 21206

HEAT EXCHANGERS
Alfo-Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
American Standard Inc., Heat Transfer Div., Buffalo, NY 14240

HULL CLEANING
Butterworth Systems Inc., 224 Park Ave., Florham Park, N.J. 07932
Performance Hull Cleaning Services, Inc., P.O. Box 655, New Orleans, LA 70059-0655
Phosmorin Equipment, 21, Boulevard de Paris, 13002 Marseille, France
Seaward Marine Services, Inc., 6269 Leesburg Pike, Falls Church, VA 22044
Stork Services B.V., P.O. Box 2013, 7750 CA Hengelo, Holland
Underwater Hull Maintenance, 104 Waterview Dr., Crownsville, MD 21032

HYDRAULICS
Aeroquip Corp., 1130 Maynard Road, Jackson, MI 49202
HRS, Inc., 3334 Victor Court, Santa Clara, CA 95050
Helmut Eller & Son, Inc., 2000 East Bay Street, Jacksonville, FL 32202
Hydronautics, 6338 Lindmar Drive, Goleta, CA 93017
Victor Fluid Power, 7527 Mitchell Rd., Eden Prairie, MN 55344

INERT GAS—Generators—Systems
Camar Corporation, P.O. Box 460, Worcester, MA 01613
Foster Wheeler Boiler Corp., 110 So. Orange Ave., Livingston, N.J. 07039
Maritime Protection A/S, N. American Agents, American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Salwico Inc., 5 Marine View Plaza, Hoboken, NJ 07030

INSULATION—Cloth, Fiberglass
Bailey Carpenter & Insulation Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
Superior Energies, Inc., P.O. Drawer 386, Groves, TX 77619

INSURANCE
Adams & Porter, 1819 St. James Place, Houston, Texas 77027
Adams & Porter, 1 World Trade Center, Suite 8433, New York, N.Y. 10048
Assurance Foreningen Skuld, P.O. Box 1376 Vika, Stortingsgaten 18, N-OSLO 1, Norway
Midland Insurance Co., 160 Water St., New York, N.Y. 10038

JOINER—Watertight Doors—Paneling
Masonite Commercial Division, Dover, OH 44622
Pioneer Industries, Division of CORE Industries Inc., 401 Washington Avenue, Carlstadt, NJ 07072
Walz & Krenzer, Inc., 400 Trabold Road, Rochester, NY 14624

KEEL COOLERS
R.W. Fernstrum & Co., 1716 Eleventh Ave., Menominee, MI 49858
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights
ACR Electronics, Inc., P.O. Box 2148, Hollywood, FL 33022
Browning Marine Inc., (Aqua Signal) 33W 480 Fabyan Parkway, Ste 105, West Chicago, IL 60185
Midland-Ross Corp., Russellstoll Division, 530 W. Mt. Pleasant Ave., Livingston, NJ 07039
Oceanic Electrical Mfg. Co., 157 Perry St., New York, NY 10014
Oreck Corp., 100 Plantation Rd., New Orleans, LA 70123
Perko Inc., P.O. Box 6400D, Miami, Florida 33164
Phoenix Products Company, Inc., 4769 North 27th Street, Milwaukee, WI 53209
Port Electric Supply Corp., 157 Perry St., New York, NY 10014
SSAC Inc., P.O. Box 395, Liverpool, NY 13088

MACHINE TOOLS
Republic-Lagun Machine Tool Co., 1000 E. Carson St., Carson, CA 90749
Triboro Industries Inc., 173 Marine Street, New York, NY 10464

MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING
American General/Levin Corp., 445 Littlefield Ave., So. San Francisco, CA 94080
Essex Machine Works, Essex, CT 06426
Jered Brown Brothers Inc., 1300 Coolidge, Troy, MI 48007-2006
Scotchman Industries, Inc., P.O. Box 850, Philip, SD 57567-0850
Triboro Industries Inc., 173 Marine Street, Bronx, NY 10464

METALS
Bayou Steel Corp., P.O. Box 5000, Laplace, LA 70068
Inland Steel Company, 30 West Monroe Street, Chicago, IL 60603
International Grating, Inc., 7625 Parkhurst, Houston, TX 77028

MOORING SYSTEMS
Samson Ocean Systems, Inc., 99 High Street, Boston, Mass. 02110

NAME PLATES—BRONZE—ALUMINUM
Duramax Metals, Inc., 2401 Wesley Street, Portsmouth, VA 23707

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS
Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Highway (Suite 1300), Arlington, VA 22202
Aero Nav Laboratories, Inc., 14-29 112 St., College Point, NY 11356
American Systems Engineering Corp., P.O. Box 4265, Virginia Beach, VA 23454
Amirikian Engineering Co., Chevy Chase Center Bldg., Suite 505, 35 Wisconsin Circle, Chevy Chase, Md. 20015
Art Anderson Associates, 148 First St., Bremerton, WA 98310
B.C. Research, 3650 Wesbrook Mall, Vancouver, B.C., Canada V6S 2L2
The Borg/Luther Group, 876 Elm Ave., Carpinteria, CA 93013
Del Breit Inc., 326 Picayune Place (Suite 201), New Orleans, LA 70130
Bretagne ACB Corp., 344 Camp St., Suite 1000, New Orleans, LA 70130
Bristolcomp, P.O. Box 450, Bristol, RI 02809
C.D.I. Marine Co., Regency East, Ste 222, 9951 Atlantic Blvd., Jacksonville, FL 32211
C.T. Marine, 18 Church Street, Georgetown, CT 06829
CADCOM, 107 Ridgely Ave., Annapolis, MD 21401
Phillips Cartner & Co., Inc., 203 So. Union St., Alexandria, VA 22314
Childs Engineering Corp., Box 333, Medfield, Mass. 02052
John P. Colletti & Associates, P.O. Box 13378, Pittsburgh, PA 15243
Crandall Dry Dock Engrs., Inc., 21 Pottery Lane, Dedham, Mass. 02026
Crane Consultants Inc., 15301 1st Ave., So. Seattle, Washington 98148
C.R. Cushing & Co., Inc., One World Trade Center, New York, N.Y. 10048
Norman N. DeJong & Associates, Inc., 1734 Emerson St., Jacksonville, Fla. 32207
Design Associates Inc., 14360 Chef Menteur Highway, New Orleans, LA 70129
Designers & Planners, Inc., 1725 Jefferson Davis Highway, Suite 700, Arlington, VA 22202
Donhaiser Marine, Inc., 11511 Katy Freeway, Houston, TX 77079
Parker C. Emerson & Associates, 17935 Cardinal Drive, Lake Oswego, Oregon 97034
Express Engineering Inc., 33125 15th Ave. So., Federal Way, WA 98003
Christopher J. Foster, Inc., 16 Sintsink Drive East, Port Washington, N.Y. 11050
Friede and Goldman Ltd., 935 Gravier St., New Orleans, LA 70112
GEOD Corporation, 73 Oak Ridge Road, NJ 07438
Giannotti & Associates, Inc., 703 Giddings Ave., Suite U-3, Annapolis, MD 21401
Gibbs & Cox, Inc., 119 West 31st Street, New York, NY 10001
John W. Gilbert Associates, Inc., 58 Commercial Wharf, Boston, Mass. 02110
The Glosten Associates, Inc., 610 Colman Bldg., 811 First Ave., Seattle, WA 98104
Phillip Gresser Associates, Ltd., 3250 South Ocean Blvd., Palm Beach, FL 33480
Morris Guralnick Associates, Inc., 620 Folsom Street, Suite 300, San Francisco, CA 94107
The E.W. Heinrich Co., P.O. Box 91M, Gross Ile, MI 48138
J.J. Henry Co., Inc., Two World Trade Center—Suite 9528, New York, N.Y. 10048
Hoffman Maritime Consultants Inc., P.O. Box 186, Glen Head, NY 11545
Intramarine, Inc., P.O. Box 53043, Jacksonville, FL 32201
R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073
Capt. Ernest James, 2849 Beavercrest Dr., Lorain, OH 44053
Jantzen Engineering Co., 6655-H Amberton Drive, Baltimore, Md. 21227
James S. Krogen & Co., Inc., 3333 Rice St., Miami, Fla. 33133
Rodney E. Lay & Associates, 13891 Atlantic Blvd., Jacksonville, FL 32225
Nils Lucander, 5307 N Pearl St., Tacoma, WA 98407
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
John J. McMullen Associates, Inc., 1 World Trade Center, New York, N.Y. 10048
MacLear & Harris, Inc., 28 West 44 Street, New York, N.Y. 10036
Mampaey Marine Engineering B.V., P.O. Box 667, 3300 AR Dordrecht, Holland
Fendall Marbury, 1933 Lincoln Drive, Annapolis, MD 21401
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, Ohio 44114
Marine Design Inc., 401 Broad Hollow Road, Rte. 110, Melville, N.Y. 11746
Marine Technical Associates, Inc., 95 River Rd., Hoboken, NJ 07030
George E. Meese, 194 Acton Rd., Annapolis, Md. 21403
Metritape, Inc., 33 Bradford Street, Concord, MA 01742
R. Carter Morrell, 715 S. Cherokee, Bartlesville, OK 74003
NKF Engineering Assoc., Inc., 8150 Leesburg Pike, Vienna, VA 22202
Nelson & Associates, Inc., 1405 N.W. 167th Street, Miami, FL 33169
Nickum & Spaulding Associates, Inc., 2701 First Ave., Seattle, WA 98121
Ocean-Oil International Engineering Corporation, 3019 Mercedes Blvd., New Orleans, La. 70114
Offshore Power Systems, 8000 Arlington Expressway, Jacksonville, FL 32211
PRC Guralnick, 5252 Balboa Ave., San Diego, CA 92117
Pearlson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, Florida 33156
S.L. Petchul, Inc., 1380 S.W. 57th Avenue, Fort Lauderdale, FL 33317
M. Rosenblatt & Son, Inc., 350 Broadway, New York, NY 10013 and 667 Mission St., San Francisco, CA 94105
Rothfuss Engineering Corp., P.O. Box 97, Columbia, MD 21045
Schmahl and Schmahl, Inc., 1209 S.E. Third Ave., Fort Lauderdale, Florida 33316
SEACOR Systems Engineering Associates Corp., 19 Perina Blvd., Cherry Hill, NJ 08003 (Publications Division at Cherry Hill location)
Seaworthy Engine Systems, 36 Main Street, Essex, CT 06426

Seaworthy Engine Systems, 17 Battery Place, New York, NY 10004
George G. Sharp, Inc., 100 Church St., New York, N.Y. 10007
Simmons Associates, P.O. Box 760, Sarasota, FL 33578
R.A. Stearn, Inc., 253 N. 1st Ave., Sturgeon Bay, WI 54235
Richard R. Taubler Inc., 8 Columbia St., Milford, Del. 19963
Timsco, 622 Azalea Road, Mobile, AL 36609
Tracor Hydronautics, Inc., 7210 Pindell School Rd., Laurel, MD 20707
Uhlig & Associates, Inc., 8295 SW 188th St., Miami, FL 33157
Wesley D. Wheeler Assoc., Ltd., 104 E. 40th St., Suite 206, New York, NY 10016
Thomas B. Wilson, Associates, 1258 North Avalon Blvd., Wilmington, CA 90744
Wink Incorporated, 8020 Mayo Blvd., New Orleans, LA 70126
Yacht Design Institute, 9 Main St., Blue Hill, ME 04614

NAVIGATION & COMMUNICATIONS EQUIPMENT

Alden Electronics, 1145 Washington St., Westborough, MA 01581
American Hydromath Co., Buckwheat Bridge Rd., Germantown, N.Y. 12526
Anschutz & Co. GmbH, Postfach 6040, D-2300 Kiel 14, West Germany
Atkinson Dynamics, Section 6, 10 West Orange Ave., South San Francisco, CA 94080
Cybernet International, Inc., 7 Powder Horn Dr., Warren, NJ 07060
DEBEG Marine, Inc., 10 Manor Parkway, Salem, NH 03079
Electric Tachometer Corp., 68th & Upland Street, Philadelphia, PA 19142
A/S Elektrisk Bureau, P.O. Box 98, N-1360 Nesbru, Norway
Electro-Nav Inc., 840 Bond Street, Elizabeth, NJ 07201
EPSCO Marine, 550 Wholesalers Parkway, Harahan, LA 70123
Fleet Marine, 1820 N.E. 146th Street, North Miami, FL 33181
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
Griffith Marine Navigation, Inc., 134 North Avenue, New Rochelle, NY 10801
Harris Communications (RF Communications), 1680 University Avenue, Rochester, NY 14610
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Hose McCann Telephone Company, Inc., 9 Smith Street, Englewood, NJ 07631
ITT Mackay Marine, 2912 Wake Forest Road, Raleigh, N.C. 27611
Japan Radio Co., Ltd., Akasaka Twin Tower (Main), 17-22 Akasaka 2-chome, Minato-ku, Tokyo 107, Japan
King Radio Corporation, 400 North Rodgers Rd., Olathe, KS 66062
Kongsberg North America Inc., 135 Fort Lee Road, Leonia, NJ 07605
Kongsberg Vapenfabrikk, Norcontrol Division, P.O. Box 145, Horten 3191, Norway
Krupp Atlas-Elektronik, 1453 Pinewood St., Rahway, NJ 07065
Lorain Electronics Corp., 2307 Leavitt Rd., Lorain, OH 44052
Magnavox Navigation Systems, 2829 Maricopa Street, Torrance, CA 90503
Nav-Com, Inc., 9 Brandywine Drive, Deer Park, NY 11729
Navidyne Corp., 11824 Fishing Point Drive, Newport News, VA 23606
Racal-Decco Marine, Inc., 4200 23rd Avenue West, Seattle, WA 98199
Radar Devices, Inc., 2955 Merced Street, San Leandro, CA 94577
Radio-Holland USA, Inc., One Allen Center, Suite 1000, Houston, TX 77002
Raytheon Marine Co., 676 Island Pond Road, Manchester, N.H. 03103
Raytheon Ocean Systems Company, Westminster Park, Risho Avenue, East Providence, RI 02914
Raytheon Service Co., 103 Roesler Rd., Glen Burnie, MD 21061
Rivertronics, P.O. Box 247, Godfrey, IL 62035
Robertson Auto Pilot, 135 Fort Lee Road, Leonia, NJ 07605
Selesmar S.p.A., Casella Postale 9, 50020 Montagnana Val Di Pesa, Firenze, Italy
Servo Corporation of America, 111 New South Road, Hicksville, NY 11802
Simrad, Inc., 2215 NW Market St., Seattle, WA 98107
Si-Tex Marine Electronics, P.O. Box 6700, Clearwater, FL 33518
Sperry Corporation, Great Neck, NY 11020
Standard Communications, P.O. Box 92151, Los Angeles, CA 90009
Texas Instruments, Inc., P.O. Box 405, 3438, Lewisville, TX 75067

OILS—Marine—Additives

Gulf Oil Company—U.S. (Domestic Oils), 909 Fannin Street, Houston, TX 77001
Gulf Oil, New York District Sales Office (Domestic), 433 Hackensack Avenue, Hackensack, NJ 07601
Gulf Oil Trading Co., 1290 Ave. of Americas, New York, N.Y. 10019
Mobil Oil Corp., 150 East 42 Street, New York, NY 10017
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
Texaco, Inc. (International Marine), 135 East 42nd St., N.Y., N.Y. 10017

OIL/WATER SEPARATORS

Biospherics Incorporated, 5001 Forbes Blvd., Lanham, MD 20801
Butterworth Systems, Inc., 224 Park Ave., Florham Park, N.J. 07932
Centrico, Inc. (Westfalia Separators), 100 Fairway Court, Northvale, NJ 07647
Dahl Manufacturing, Inc., 2521 Railroad Ave., Ceres, CA 95307
From Industrial, P.O. Box 33210, Tulsa, OK 74135
McTighe Industries Inc., 1615 Ninth Avenue, Suite 1 South, Bohemia, NY 11716
National Fluid Separators, Inc., 1239 Hanley Industrial Court, St. Louis, MO 63144
Phoenix Oil Refiner Co., Inc., 330 Hill Ave., Nashville, TN 37210

PAINTS—COATINGS—CORROSION CONTROL

American Abrasive Metals, 460 Coit Street, Irvington, NJ 07111
Ameron, 4700 Ramona Blvd., Monterey Park, CA 91754
Bywater Coatings, 1610 Engineers Road, Belle Chasse, LA 70037
CLEMCO, P.O. Box 7680, San Francisco, CA 94120
"CONSOL" manufactured by Contact Paint & Chemical Co. Inc., 200 S. Franklintown Rd., Baltimore, MD 21223
Devoe Marine Coatings Co., P.O. Box 7600, Louisville, KY 40207
E.I. Dupont De Nemours & Co., Inc., Nemours Bldg. Rm. N-2504-2, Wilmington, DE 19898
Esgard, Box 2698, Lafayette, LA 70502
Eureka Chemical Company, 234 Lawrence Avenue, So. San Francisco, CA 94080
Farboil, 8200 Fischer Road, Baltimore, MD 21222
Grow Group, Inc., 200 Park Ave., New York, NY 10017
Hempel Marine Paints, Inc., 65 Broadway, New York, NY 10006; P.O. Box 41, So. Houston, TX 77587; P.O. Box 10265, New Orleans, LA 70181
International Paint Company, Inc., 2270 Morris Avenue, Union, NJ 07083
Jotun-Baltimore Copper Paint Co., 840 Key Highway, Baltimore, MD 21230
Magnus Maritec International Inc., 150 Roosevelt Pl., P.O. Box 150, Palisades Park, NJ 07650
Mobil Chemical Co., Maintenance & Marine Coatings Dept., P.O. Box 250, Edison, N.J. 08817
Palmer Products Inc., P.O. Box 8, Worcester, PA 19490
Products Research & Chemical Corp., 5454 San Fernando Rd., Glendale, CA 91203
Salwico Glassflake, Inc., 5 Marine View Plaza, Hoboken, NJ 07030
Seaguard, 4030 Seaguard Ave., Portsmouth, VA 23705
Selby, Battersby & Company, 5220 Whiby Avenue, Philadelphia, PA 19143
SermeTel, Inc., 4401 SermeTel Dr., Moss Point, MS 39563
Teledyne Metal Finishers, 1725 East 27th St., Cleveland, OH 44114

PETROLEUM SUPPLIES

Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002

PIER REPAIRS

Acquatic Marine Systems, Inc., P.O. Box 326, Williamsville, NY 14221

PIPE-HOSE—Cargo Transfer, Clamps, Couplings, Coatings

Camlock Flange Sales Corp., 449 Sheridan Blvd., Inwood, L.I., N.Y. 11696
Hydro-Craft, Inc., 1821 Rochester Industrial Dr., Rochester, MI 48063
Knights' Piping Inc., 5309 Industrial Road, Pascagoula, MS 39567
Kubota Ltd., 2-47, Shikit Suhigashi 1-Chome, Naniwa-Ku, Osaka 556-91, Japan
Metropolitan Plumbing Supply Corp., 5000 Second St., Long Island City, NY 11101
Penco Division/Hudson Engineering Co., P.O. Box 68, Bayonne, NJ 07002
Pioneer Valve & Fitting Co., Inc., 93 Seigel Street, Brooklyn, NY 11206
Selkirk Metalbestos, Box 19000, Greensboro, NC 27419
Stauff Corporation, 21-31 Industrial Park, Waldwick, NJ 07463

PLAQUES—BRONZE—ALUMINUM

Duramax Metals, Inc., 2401 Wesley Street, Portsmouth, VA 23707

PLASTICS—Marine Applications

Hubeva Marine Plastics, Inc., 390 Hamilton Ave., Bklyn, N.Y. 11231

PROPULSION EQUIPMENT—Bowthrusters, Diesel Engines, Gears, Propellers, Shafts, Turbines

American Lohmann Corp., 1415 Chestnut Ave., Hillside, NJ 07205
Armco Steel/Advanced Materials Div., 703 Curtis St., Middletown, OH 45043
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, La. 70150
Bird Johnson Company, 110 Norfolk St., Walpole, Mass. 02081
Burmeister & Wain Alpha Diesel AS, DK-1400 Copenhagen K, Denmark
Caterpillar Engine Division, 100 N.E. Adams, Peoria, IL 61629
Colt Industries Inc. (Fairbanks Morse Engine Div.), 701 Lawton Avenue, Beloit, WI 53511
Columbian Bronze Corporation, 216 No. Main Street, Freeport, NY 11520
Combustion Engineering, Inc., Windsor, Connecticut 06095
Deutz Corp., 7585 Ponce de Leon Circle, Atlanta, GA 30340
Diesel Marine International, Ltd., c/o NORSHIPCO, P.O. Box 2100, Norfolk, VA 23501
Elliott Company, 1809 Sheridan Ave., Springfield, OH 45505
Escher Wyss GmbH, (Member Sulzer Group), Ravensburg, Germany
General Electric Co., Diesel Power Products, 2901 E. Lake Rd., Erie, PA 16531
General Motors, Electro-Motive Division, LaGrange, IL 60525
George Engine Company, Inc., Lafayette, LA
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, NY 11231
Harbormaster, 36 Hancock St., Quincy, MA 02171
Krupp Mak Diesels, Inc., 4329-33 Di Paolo Center, Glenview, IL 60025
M.A.N.-B&W Diesel, 2, Ostervej, DK-4960 Holeby, Denmark
MTU of North America, One E. Putnam Ave., Greenwich, CT 06830; 10450 Corporate Dr., Sugarland, TX 77478; 2945 Railroad Ave., Morgan City, LA 70203; 180 Nickerson St., Seattle, WA 98109; 1730 Lynn St., Arlington, VA 22209
MWM-Murphy Diesel, 12 Greenway Plaza, Suite 1100, Houston, TX 77046
Mapeco Products, Inc., 20 Vesey St., New York, NY 10007
Maritime Industries, Ltd., 6307 Laurel St., Burnaby, B.C. Canada V5B 3B3
Michigan Wheel, 1501 Buchanan Ave., S.W., Grand Rapids, MI 49507
National Marine Service Louisiana, Inc., 222 Bayou Rd., Belle Chasse, LA 70037
Omnithruster Inc., 9515 Sorensen Ave., Santa Fe Springs, CA 90670
Penske GM Power, Inc., 600 Parsippany Road, Parsippany, NJ 07054
Propulsion Systems, Inc., 21213 76th Ave. So., Kent, WA 98031
SACM (Societe Alsacienne De Constructions Mechaniques De Mulhouse) 1, Rue De La Fonderie, Boite Postale 1210, 68054 Mulhouse Cedex, France
Skinner Engine Company, P.O. Box 1149, Erie, PA 16512
Sulzer Brothers, Dept. Diesel Engines, CH-8401 Winterthur, Switzerland
Transamerico DeLavol Inc., Engine & Compressor Div., 550 85th Ave., Oakland, CA 94621
Transamerica Delaval, Inc., Turbine & Compressor Div., P.O. Box 8788, Trenton, N.J. 08650
Turbine Specialties, Inc., P.O. Box 207, West State Street Road, Salina, KS 67401
Turbine Specialties/Gulf Coast, Inc., 1900 Industrial Blvd., Harvey, LA 70058
Voith Schneider America, 159 Great Neck Rd., .Ste 200, Great Neck, NY 11021
WABCO Fluid Power, an American-Standard Company, 1953 Mercer Rd., Lexington, KY 40505
Wartsila Power Inc., 5132 Taravella Rd., P.O. Box 868, Marrero, LA 70072
Waukesha Engine Division, Waukesha, WI 53187
ZF of North America, Inc., 3225 Commercial Avenue, Northbrook, IL 60062
ZF of North America, Inc. (Motive Power Corporation, P.O. Box 365, Mineola, NY 11501)

PUMPS—Repairs—Drives

FMC Corporation, Pump Division, 326 S. Dean Street, Englewood, NJ 07631
Industrial Products & Engineering Co., Inc., 1 Sawyer Dr., Coventry, RI 02816
Jim's Pump Repair, 48-55 36th St., Long Island City, NY 11101
Megator Corporation, 562 Alpha Drive, Pittsburgh, PA 15238
Naniwa Pump, c/o Maritime Equipment Inc., P.O. Box 537, Flemington, NJ 08822
Penco Division/Hudson Engineering Co., P.O. Box 68, Bayonne, NJ 07002
Sims Pump Valve Co., Inc., 1314 Park Ave., Hoboken, NJ 07030
Transamerica Delaval, IMO Pump Division, P.O. Box 447, Monroe, NC 28110
Warren Pumps Division, Bridges Avenue, Warren, MA 01083
Wilden Pump & Engineering Co., 22060 Van Buren St., P.O. Box 845, Colton, CA 92324

REFRIGERATION—Refrigerant Valves

Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
Port Refrigeration Div., 157 Perry St., New York, NY 10014

ROLLING SYSTEMS

Hilman, Inc., 2604 Atlantic Ave., Wall (Belmar), NJ 07719

ROPE—Manila—Nylon—Hawsers—Fibers

American Mfg. Co., Inc., Willow Avenue, Honesdale, Pa. 18431
Atlantic Cordage Corp., 60 Grant Avenue, Carteret, NJ 07008
DuPont Co., KEVLAR Aramid Fiber, Room G-15465, Wilmington, DE 19898
Samson Ocean Systems, Inc., 99 High Street, Boston, Mass. 02110
Tubbs Cordage Company, P.O. Box 709, Orange, CA 92666

RUDDER ANGLE INDICATORS—STEERING

Electric Tachometer Corp., 68th & Upland St., Philadelphia, Pa. 19142
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Hy-Drive America Corp., 3629 Vernon Blvd., Long Island City, NY 11106
Marine Drive Systems, 519 Rariton Center, Edison, NJ 08817
Robertson, 135 Fort Lee Rd., Leonia, NJ 07605

SAFETY EQUIPMENT

Datrex, 3795 N.W. 25th Street, Miami, FL 33142
Elkhart Brass Manufacturing Co., Inc., P.O. Box 1127, Elkhart, IN 46515

SANITATION DEVICES—Pollution Control

Effluent Technology Corporation, P.O. Box 2094, Tacoma, WA 98401
Envirovac Inc., 1260 Turret Dr., Rockford, IL 61111
Marine Moisture Control Co., Inc., 449 Sheridan Blvd., Inwood, L.I., N.Y. 11696
Marland Environmental Systems, Inc., N. Main Street, Walworth, WI 53184
National Sanitation Foundation, P.O. Box 1468, Ann Arbor, MI 48105
Tyson Industries, Ltd., P.O. Box 51997, New Orleans, LA 70151
World Wide Pollution Control Tank Cleaning & Lining Corp., 403 St. Marks Ave., Brooklyn, NY 11238

SCAFFOLDING EQUIPMENT—Work Platforms

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Potent Scaffolding Co., One Bridge Plaza, Fort Lee, NJ 07024
Swiss Fabricating Inc., Camp Horne Rd., Emsworth, Pittsburgh, PA 15237
Waco Ladder & Scaffolding Co., Inc., 4315 41 St., P.O Box 126, Brentwood, MD 20722

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Bird-Johnson Co., 100 Norfolk St., Walpole, MA 02081
Crane Packing Company, 435 Regina Dr., Clarksburg, MD 20734
Electric Tachometer Corp., 68th & Upland St., Philadelphia, Pa. 19142
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Penco Division/Hudson Engineering Co., P.O. Box 68, Bayonne, NJ 07002

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The Boston Metals Co., 313 E. Baltimore St., Baltimore, Md. 21202
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, Ore. 97201

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Bethlehem Steel Corp., One State Street Plaza, N.Y. 10004

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A.D.M. (Amsterdam Drydock Mfg.), Moatschappij bv, P.O. Box 3006, 1003 AA, Amsterdam, Holland
Alabama Maritime Corp., P.O. Box 3026, Mobile, AL 36652
Asmar Shipyards Co., Astilleros y Maestranzs de la Armada, Prat 856, Piso 14, Casilla 150-V, Valpariso, Chile, S.A.
Astilleros Balboa, S.A., c/o Jackson Marine Corp., 17 Battery Place, New York, NY 10004
Ateliers et Chantiers de Bretagne—ACB, 44040 Nantes Cedex, France
Atlantic Dry Dock, P.O. Box 276, Ft. George Island, Jacksonville, FL 32226
Atlantic Marine Inc., P.O. Box 138, Ft. George Island, Jacksonville, FL 32226
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, La. 70150
Bath Iron Works Corp., 700 Washington St., Bath, ME 04530
Bay Shipbuilding Corp., 605 North 3rd Ave., Sturgeon Bay, WI 54235
BFC Marine Services, Inc., 25 Fifth St., Brooklyn, NY 11231
Bender Shipbuilding & Repair Co., Inc., P.O. Box 42, Mobile, AL 36601
Bethlehem Steel Corp., Bethlehem, PA 18016
Blohm & Voss Company, 55 Morris Avenue, Springfield, NJ 07081
Burmeister & Wain Skibsvaerft A/S, P.O. Box 2122, Refshaleoen-1015 Copenhagen K-Denmark
Burrard Yarrows Corporation, P.O. Box 86099, North Vancouver, B.C., Canada
Burton Shipyard, Inc., P.O. Box 3636, Port Arthur, TX 77640
Caneco Shipyard, Rua Carlos Seidl, 714, Caju, 20.931, Rio de Janeiro, RJ, Brazil
Cantieri Navali Riuniti, Via Cipro, 11, 16100 Genova, Italy
Carrington Slipways Pty, Ltd., Old Punt Road, Tomogo, N.S.W., Australia 2322
China Shipbuilding Corp., 3 Chung Kang Rd., Hsia Kang, Kaohsiung, Taiwan, Republic of China
Conrad Industries, P.O. Box 790, Morgan City, La. 70380
Curacao Drydock Company Inc., 26 Broadway, Suite 741, New York, NY 10004
Daewoo Shipbuilding & Heavy Machinery Ltd., Ayangri, Changsung-PO, Koje-Kun, Kyungnam, Korea
Dorbyl Ltd., Military Road, 1 Industrial Sites, West Bank, 5201 East London, Republic of South Africa
Dravo Marine Equipment Company, Neville Island, Pittsburgh, PA 15225
Eastern Marine, Inc., P.O. Box 1009, Panama City, FL 32401
FMC Corp., Marine & Rail Equipment Div., 4700 N.W. Front Ave., Portland, Oregon 97208
Far East Levingston Shipbuilding Ltd., 31 Shipyard Rd., Jurong Town, Singapore 2262
Genstar Marine, 10 Pemberton Ave., No. Vancouver, B.C., Canada V7P 2R1
Gladding-Hearn Shipbuilding Corp., 1 Riverside Ave., Somerset, MA 02725
HBC Barge, Inc., Grant Building, Pittsburgh, PA 15219
Halter Marine, Inc., P.O. Box 29266, New Orleans, LA 70189
Hong Kong United Dockyards Ltd., P.O. Box 534, Kowloon Central Post Office, Kowloon, Hong Kong
Hyundai Mipo Dockyard Ltd., 456 Cheonha-Dong, Ulsan, Korea
I.N.M.A. S.p.A., 19100 La Spezla, v. le S. Bartolomeo 362, Italy
Jakobson Shipyard Inc., P.O. Box 329, Oyster Bay, NY 11771
Jeffboat, Inc., Jeffersonville, Ind. 47130
Keppel Shipyard Limited, 325 Telok Blangah Rood, P.O. Box 2169, Singapore 0409
Koch Ellis Barge & Ship Service, P.O. Box 187, Westwego, LA 70094
Leevac Corporation, P.O. Box 2607, Morgan City, LA 70381
Lisnave Estaleiros Navais De Lisboa, P.O. Box 2138, Lisbon, Portugal
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134
McDermott, Incorporated, 1010 Common Street, New Orleans, LA 77227
John Manly Shipyards, 2050 East Kent Ave., Vancouver, B.C. V5P 2T2, Canada
Marathon LeTourneau Offshore Co., 1700 Marathon Bldg., 600 Jefferson, Houston, TX 77002
Marystown Shipyard Limited, P.O. Box 262, Marystown, Newfoundland, Canada AOE 2MO
Matton Shipyard Co., Inc., P.O. Box 645, Cohoes, New York 12047
Misener Industries, Inc., 5353 Tyson Avenue, P.O. Box 13625, Tampa, Fla. 33681
Monark Boot Co., P.O. Box 210, Monticello, Ark. 71655
Moran Shipping Agencies, 10 Jefferson Blvd., Warwick, RI 02888
Moss Point Marine Inc., P.O. Box 1310, Escatawpa, MS 39552
Nashville Bridge Company, P.O. Box 239, Nashville, TN 37202
National Marine Service (Shipyard Division), P.O. Box 38, Hartford, IL 62048
National Steel & Shipbuilding Corp., San Diego, Calif. 92112
Newport News Shipbuilding & Dry Dock Co., 4101 Washington Ave., Newport News, Va. 23607
O.A.R.N. (Officine Allestimento-Riprazioni Navi), P.O. Box 1395, Genoa, Italy 16100
Overseas Shipyards, Inc., 21 West St., New York, NY 10006
Patti Industries Inc., South B St., Pensacola, FL 32573
Pearlson Engineering Co., P.O. Box 8, Kendall Branch, Miami, Fla. 33156
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Promet (PTE) Ltd., 27 Pandam Rd., Jurong Industrial Estate, Singapore 22
Promet Marine Services Corp., 242 Allens Ave., Providence, RI 02906
Puerto Rico Drydock & Marine Terminals, Inc., P.O. Box 2209, San Juan, Puerto Rico 00903
Rauma-Repola, 26100 Raumo 10, Finland
Samsung Shipbuilding & Heavy Industries Co., Ltd., Samsung Main Bldg. 250, 2Ka, Taepyong-ro, Chung-ku, Seoul, Korea
Savannah Shipyard Co., P.O. Box 787, Savannah, GA 31402
Service Machine Group, Inc., P.O. Box 2664, Morgan City, LA 70381
Southbay Boat Inc., P.O. Box 13308, San Diego, CA 92113
Southwest Marine, Inc., P.O. Box 13308, San Diego, Ca 92113
Swiftships Inc., P.O. Box 1908, Morgan City, LA 70380
Thomas Marine, 37 Bransford St., Patchogue, NY 11772
Thunderbolt Marine, Inc., P.O. Box 5628, Savannah, GA 31404
Todd Shipyards Corp., 1 State St. Plaza, New York, N.Y. 10004
Total Transportation Systems Inc., 813 Forest Dr., Newport News, VA 23606
Total Transportation Systems (International) A/S, Bjornegarden, P.O. Box 28, N5201 Oslo, Norway
Tracor Marine, P.O. Box 13107, Port Everglades, Fla. 33316
Umpqua Marine Way, Inc., Port Industrial Park, Reedsport, OR 97467
Union Dry Dock & Repair Co., Foot of Pershing Road, Weehawken, N.J. 07087
Volmet Oy, Helsinki Shipyard, Laivanrakentajantie 2, P.O. Box 910 SF-00101 Helsinki 10, Finland
Verolme Estaleiros Reunidos Do Brasil S.A., Rua Buenos Aires, 68, Rio de Janeiro—RJ—Brazil
Waterman Supply Co., 2815 E. Anaheim St., P.O. Box 596, Wilmington, CA 90748
West Coast Salvage And Contracting, 2150 East Kent Avenue, Vancouver, B.C. V5P 2T2
Zidell Explorations, Inc., 3121 S.W. Moody Street, Portland, OR 97201

SHIPPING—PACKING

Pilotage Consultants, Inc., P.O. Box 2046, New Hyde Park, NY 11040

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Burgess-Manning Silencing Equipment Division, 8108 Carpenter Frwy., Dallas, TX 75247

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Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Smith-Meeker Engineering Co., 157 Chambers Street, New York, NY 10007
SURVEYORS AND CONSULTANTS
Francis B. Crocco, Inc., P.O. Box 1411, San Juan, Puerto Rico 00903
Hull & Cargo Surveyors, Inc., 99 John St., New York, NY 10038
Frank Jeffrey & Assoc., 5201 Westbank Exp., Suite 206, Marrero, LA 70073
M.A. Stream Associates, Inc., 400 Second Ave. W., Seattle, WA 98119
TANK CLEANING
Butterworth Systems Inc., 224 Park Ave., P.O. Box 352, Florham Park, N.J. 07932
Penco Division/Hudson Engineering Co., P.O. Box 68, Bayonne, NJ 07002
TANK LEVELING INDICATORS
ARMTEC Industries, Inc., Manchester, NJ 03103
Kockumation AB, Box 1044, S-212 10 Malmo, Sweden
Norcontrol, 135 Fort Lee Rd., Leonia, NJ 07605
Salwico Inc., 5 Marine View Plaza, Hoboken, NJ 07030
Transamerica Delaval, Inc., Gems Sensors Division, Cowles Road, Plainville, CT 06062
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Atlantic Towing Ltd., 300 Union Pl., St. John, N.B., Canada E2L 1B6
Bay-Houston Towing Co., 805 World Trade Bldg., Houston, Texas 77002
Bulkfleet Marine Corporation, 1800 West Loop So., Houston TX 77027
Curtis Bay Towing Co., Mercantile Bldg., Baltimore, Md. 21202
Henry Gillen's Sons Lighterage, 21 West Main St., Oyster Bay, N.Y. 11771
James Hughes, Inc., 17 Battery Pl., New York, N.Y. 10004
International Transport Contractors Holland B.V., 5 Kenaupark, P.O. Box 21, Haarlem, Holland
McAllister Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
McDonough Marine Service, P.O. Box 26206, New Orleans, La.
Midland Affiliated Co., 580 Walnut St., Cincinnati, OH 45201
Moran Towing & Transportation Co., Inc., One World Trade Center, Suite 5335, New York, N.Y. 10048
National Marine Service, Transport Div., 1750 Brentwood Blvd., St. Louis, MO 63144
Sudermon & Young Co., Inc., 918 World Trade Bldg., Houston, Texas 77002
Turecamo Coastal & Harbor Towing Corp., One Edgewater St., Clifton, Staten Island, N.Y. 10305
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The Crosby Group, Inc., P.O. Box 3128, Tulsa, OK 74101
Dover Corporation, Norris Division, P.O. Box 1739, Tulsa, OK 74101
Hayward Marine Products, 900 Fairmount Avenue, Elizabeth, NJ 07207
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Metropolitan Plumbing Supply Corp., 50-09 Second Street, Long Island City, NY 11101
Newmans Inc., 9 Joanna Court, East Brunswick, NJ 08816
Pioneer Valve & Fitting Co., Inc., 93 Seigel Street, Brooklyn, NY 11206
Pittsburgh Brass Manufacturing, Sandy Hill Rd., R.D. 6 Box 387-A, Irwin, PA 15642
Stockham Valves & Fittings, Box 10326, Birmingham, AL 35202
Tate Temco, Inc., 1941 Lansdowne Road, Baltimore, MD 21227
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Waukesha Bearings Corp., 405 Commerce St., P.O. Box 798, Waukesha, WI 53186
William E. Williams Valve Corporation, 38-52 Review Avenue, Long Island City, NY 11101
Winel, Inc., 34655 Mills Road, North Ridgeville, OH 44039
Zidell Explorations, Inc., (Valve Division), 3121 S.W. Moody Avenue, Portland, OR 97201
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DLI Engineering Corp., 253 Winslow Way West, Bainbridge Island, WA 98110
WATER PURIFIERS
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AquaGlobal, 50/60 Inip Dr., Inwood, NY 11696
Drew Chemical Corporation, One Drew Chemical Plaza, Boonton, NJ 07005
Everpure, Inc., 660 N. Blackhawk Dr., Westmont, IL 60559
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CRC Automatic Welding, P.O. Box 3227, Houston, TX 77253-3227
Metallizing Co. of America, Inc., 321 So. Hamilton, Sullivan, IL 61951
Oerlikon Welding Industries, Inc., P.O. Box 40964, Houston, TX 77240
WINCHES AND FAIRLEADERS
Braden Winch Co., 800 East Dallas, Broken Arrow, OK 74012
CONMACO, Inc., 820 Kansas Ave., P.O. Box 5097, Kansas City, KS 66119
Markey Machinery Co., 79 South Horton St., Seattle, Washington 98134
McElroy Machine & Mfg. Co., Inc., P.O. Box 4454, W. Biloxi, MS 39531
Reel-O-Matic Systems, Inc., 418 Hellam Street, Wrightsville, PA 17368
Stanspec Corp., 13600 Deise Ave., Cleveland OH 44110
Superior-Lidgerwood-Mundy Corp., 1101 John Avenue, Superior, WI 54880
Timberland Equipment Ltd., Box 490, Woodstock, Ont. Canada N4S 7Z2.
WINDOWS
Kearfott Marine Products, A Singer Co., 550 South Fulton Avenue, Mt. Vernon, N.Y. 10550
WIRE AND CABLE
Anaconda Ericsson Inc., Continental Wire and Cable, P.O. Box 1863, York, PA 17405
Anixter Bros., Inc., 4711 Golf Road, One Concourse Plaza, Skokie, Illinois 60076
Delco Wire & Cable, Inc., 257 Rittenhouse Circle, Keystone Industrial Park, Bristol, PA 19007
Seacoast Electric Supply Corp., 225 Passaic St., Passaic, NJ 07055
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WIRE ROPE—Slings
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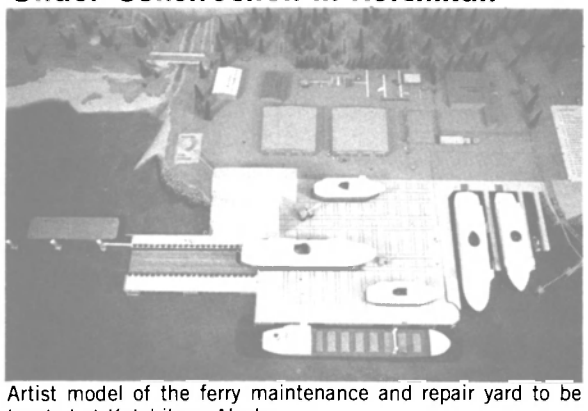
A.L. Don Company, Foot of Dock Street, Matawan, NJ 07747
I & I Sling Company, 2626 Market Street, Dept. D, Aston, PA 19014
ZINC
Smith & McCroken, 153 Franklin St., New York, N.Y. 10013

Alaska Ferry Maintenance Yard Under Construction In Ketchikan



Artist model of the ferry maintenance and repair yard to be located at Ketchikan, Alaska.

The first phase of construction of a modern maintenance and repair shipyard for the Alaska State Ferries is presently underway in Ketchikan, in southeast Alaska.

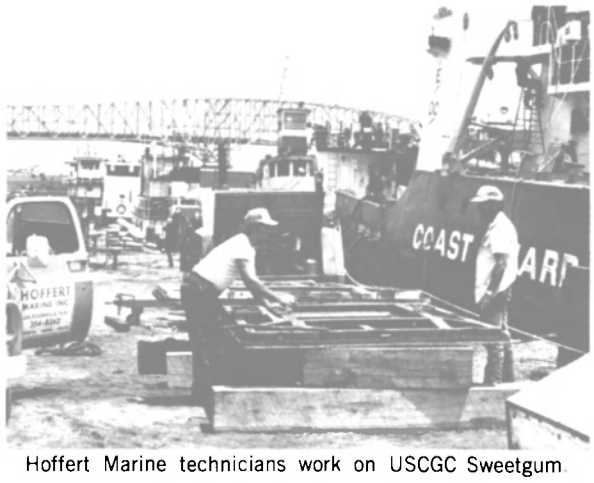
The yard will have facilities required to perform annual maintenance and repair work on the fleet of nine Alaska Marine Highway ferries. Work on the ferries will be performed during the off-season winter months, when the ferries are on their service runs in the straights and narrows of the Alaskan islands and between Seattle and Alaskan vacation spots.

The heart of the shipyard, says **Jay Hassani,** the state's project consultant, will be a 6,000-ton Synchrolift shiplift operating in conjunction with a unique ship transfer system from Pearlson Engineering on land. The transfer system is capable of translating ships sideways as well as longitudinally on a level bed at ground level. Other facilities will consist of a number of workshops, all housed under one roof, a warehouse, garage, and other support facilities.

A wastewater treatment plant will allow only clear effluent to be discharged to the adjacent waters and a grit removal system will be installed for solids generated during shipyard operations. Grit will be collected in trenches and grit collector pits and will be removed by trucks to landfill sites.

The operating authority will engage an operator, experienced in ship repair, to manage and operate the shipyard. The consulting engineer for the Department of Transportation and Public Facilities of the State of Alaska is Century/Quadra of Anchorage, and the contractor is Dawson Construction of Bellingham, Wash.

Hoffert Marine Repairs USCGC Sweetgum



Hoffert Marine technicians work on USCGC Sweetgum.

The USCGC Sweetgum, commissioned 40 years ago, was built by the Marine Iron and Shipbuilding Company of Duluth, Minn. Now engineers and technicians at Hoffert Marine, Inc. are busy doing a repair program on the ship that entered service during World War II.

Skipper of the Sweetgum is Lt. Comdr. **Wayne T. Shipman,** a native of Hamilton, Ohio.

Work aboard ship includes the following: The deck will be sandblasted and painted. The bridge, galley, mast lights and guntub life rails will be repaired along with steel plating and electric lighting.

Diesel fuel oil tanks will be cleaned and gas freed. Main deck hatches, bulwarks fore and aft, heads and showers will receive needed work.

The repair program by Hoffert Marine will be inspected by Coast Guard marine inspection officers as each phase of the work is completed.

PETERSON BUILDERS— Inc. of Sturgeon Bay, Wisc., recently laid the keel for a 224-foot prototype Mine Counter Measure ship (MCM) contracted by the Navy. The section of keel is 1½-inch laminated Douglas Fir, measuring 108 feet long. An 80-foot-long laminated oak frame, in the center, is one of 68 that form the MCM's skeleton. Peterson also is building seven wooden 108-foot Yard Patrol craft used for training Naval Academy midshipmen. Officiating at the MCM keel laying are left to right: **Ellsworth Peterson,** president, Comdr. **Paul Robinson,** Sturgeon Bay supervisor of shipbuilding, and **Robert Spafford,** Navsea deputy program manager.

First of Four Indonesian Passenger Ships Christened At Meyer Yard

The first of four passenger ships being built for P.T. Pelni of Indonesia was christened and launched recently at Jos. L. Meyer Shipyard, Papenburg-Ems, West Germany. The ships were ordered by the Indonesian Directorate of Sea Communications, Jakarta.

The twin screw ship was christened Kerinci by **Mrs. Henriette Josephine Muskita,** wife of the Indonesian Ambassador to Bonn, **Josef Muskita.** The 14,020-gt Kerinci will transport up to 1,596 passengers between the Indonesian islands.

The Kerinci measures 144.00 meters long overall, has a molded breadth of 23.40 meters, a depth to the second deck of 8.20 meters, and a 5.90-meter draft. Propulsion is supplied by two MaK four-stroke diesel engines, model 6MU601, each driving a fixed blade propeller. The Kerinci is equipped with a variable pitch bow thruster.

Indonesian architects designed the interior accommodations. The ship will have a mosque included among its public facilities.

The Kerinci is scheduled for delivery this summer with the other passenger ships to be delivered in early 1984 and 1985.

Raymond Unit Sells Jackup Barge To Abu Dhabi Firm For $7.25 Million

A unit of Raymond International Inc. of Houston, Texas, recently sold a jackup construction barge to National Petroleum Construction Company, Ltd., an Abu Dhabi firm, for $7.25 million.

The Regulus, built in 1976, is a 230-foot jackup barge with living quarters for 84 persons. It has been stationed in the Arabian Gulf since last year serving as an accommodations and maintenance vessel for National Petroleum Construction Company's work in the Zakum field. The Regulus was owned by Raymond International Builders (Liberia) Inc., a wholly-owned subsidiary of Raymond International Inc.

Chinese Plant Receives Manufacturing License For M.A.N.-B&W Diesel Engines

Under an agreement concluded recently between the China State Shipbuilding Corporation and the M.A.N. Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft, Augsburg Works, the Xinzhong Power Machine Plant in Shanghai has been granted a license to manufacture medium-speed four-stroke engines in the 300–4,000-kw power range.

The engines are suitable for installation in ships, as main propulsion engines for river vessels, and as auxiliary engines for shipboard electricity generation. They can also be used in stationary plants in combination with generators as stand-by generating sets or for smaller solo-operation power stations.

The first three medium-speed 5-cylinder diesel engines (612 hp/450 kw at 900 rpm), which were assembled at Xinzhong from parts delivered from M.A.N.'s Augsburg plant recently passed testbed trials.

Jacobs Elected To Society Of Marine Consultants

R.D. Jacobs, president of R.D. Jacobs and Associates of Roscoe, Ill., has been elected to membership in the Society of Marine Consultants of New York City. The society is organized to advance the professionalism of its members and to provide the maritime industry with a reliable source of professionally qualified consultants with marine expertise.

Consulting services are provided by the Jacobs firm in a wide range of marine activity such as design, operational studies, repair problems, supervision services in both construction and repair work, damage surveys, diesel engine operations, ships service and diesel generator sets.

For more information on R. D. Jacobs and Associates,

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