MARITIME REPORTER
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OUTSTANDING OFFSHORE/SHALLOW-DRAFT VESSELS OF 1983

Justin T. Rogers

WORKBOAT INDUSTRY ISSUE

JANUARY 1, 1984

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ON THE COVER

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Triple A South Awarded $10-Million Navy Contract For Overhaul Of AS-37

Triple A. South, San Diego, Calif., has been awarded a $10,284,918 firm-fixed-price contract for the overhaul of submarine tender USS Dickson (AS-37). The Supervisor of Shipbuilding, Conversion and Repair, San Diego, Calif. is the contracting activity.

Consafe Will Design And Build Accommodations Unit For A Tenneco Company

Consafe, Inc. of Houston will design and fabricate a 40-man offshore accommodations unit for a Tenneco production platform in South Timbalier, Block 27, Gulf of Mexico. Tenneco Oil Explorations and Productions, Eastern Gulf Division, awarded the contract. Completion of the quarters unit is expected in early 1984. It will contain approximately 5,000 square feet of living space.

The Consafe type of modular construction is used worldwide, but this project represents a breakthrough to Consafe design for the Gulf of Mexico. According to Consafe president **Bertil Larsson:** "Consafe provides heavy-duty steel construction in its units, which can be used for clustering as well as for temporary or permanent use. Total flexibility is a primary feature of Consafe design."

MARITIME REPORTER and Engineering News

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MARITIME REPORTER AND ENGINEERING NEWS

(USPS) 016-750
No. 1 Volume 46

107 EAST 31st STREET
NEW YORK, N.Y. 10016
(212) 689-3266
Telex: MARINTI 424768
ESTABLISHED 1939

Maritime Reporter/Engineering News is published the 1st and 15th of each month by Maritime Activity Reports, Inc. Controlled Circulation postage paid at Waterbury, Connecticut 06701.

Postmaster send notification (Form 3579) regarding undeliverable magazines to Maritime Reporter/Engineering News, 107 East 31st Street, New York, N.Y. 10016.

Member
BPA
Business Publications Audit of Circulation, Inc.

Navy Contracts Totaling $477 Million Awarded To Avondale Shipyards

The U.S. Navy recently exercised its option to have Avondale Shipyards, Inc., a subsidiary of Ogden Corporation, construct two additional fleet oilers at a total cost of $231.9 million. The Navy also awarded Avondale a $166-million contract to build a landing ship dock.

The Navy has options to award Avondale up to four additional LSDs, two through January 1985 at a total cost of $304 million, and two through January 1986 at a total cost of $297 million. Both the fleet oiler and the landing ship dock contracts provide for escalation related to cost of labor and materials.

In November 1982 the Navy awarded Avondale a contract to build a first fleet oiler, scheduled for delivery in early 1986, and subsequently exercised an option for the construction of a second oiler for mid-1986 delivery. The two additional oilers awarded recently will be delivered at 4-month intervals after the mid-1986 delivery. Construction of the first oiler will begin in 1984 at Avondale's main yard near New Orleans.

$56.6-Million Award To Ingalls For Long-Lead Materials For LHD-1

Litton Systems Incorporated, Ingalls Shipbuilding Division, Pascagoula, Miss., has been awarded a $59,607,882 face-value-increase to a previously awarded cost-plus-fixed-fee contract for long-lead time material for the multi-purpose amphibious assault ship LHD-1, including one boat and aircraft crane, two deck edge elevators, five air conditioner chill water plants, main and emergency switchboards, exterior communications system, various power supplies, switchboards and control consoles, and four main feed booster pumps. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

Marinette Marine Awarded $1-Million Minesweeper Phase II Design Contract

Marinette Marine Corporation (MMC) has been notified by the Naval Sea System Command that it is being awarded one of two Phase II minesweeper hunter (MSH) design contracts. As a previous participant in the MSH Phase I preliminary design, MMC was one of four shipbuilders competing for the Phase II contracts. MMC completed Phase I earlier this year, and the resultant Phase II award was based upon the technical content of MMC's Phase I MSH design effort.

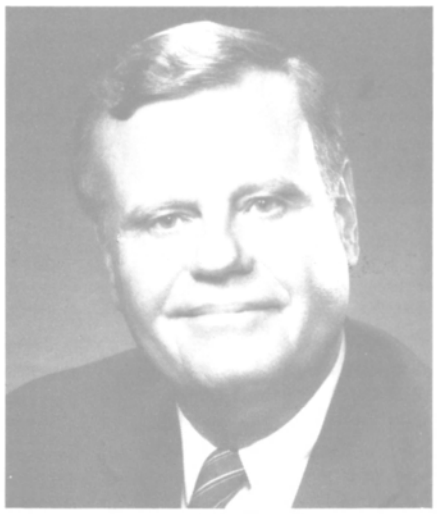
The MSH ship is a totally new class of vessel designated for U.S. coastal water mine hunting and sweeping duty. MMC is developing this design through the efforts of its in-house engineering group, and such qualified teaming members as General Electric, Magnavox, Marconi, NKF Engineering and Research, Analysis and Management Corporation. MMC's design approach utilizes the glass reinforced plastic (GRP) hull technology of Intermarine, S.p.A. of Italy, a world-renowned producer of fiberglass minesweepers. Designed as a low-cost, highly effective multi-mission mine hunting and sweeping vessel, the MMC ship will provide the Navy with a greatly expanded U.S. defense capability.

Navy plans for the MSH program require MMC to complete the $1,000,000 Phase II MSH contract design in 8½ months, with the anticipated award of the detail design and lead ship construction contract scheduled for August 1984. The Navy intends to obtain 17 vessels of the new MSH class over a multi-year procurement cycle. MMC currently has under contract the construction of the Navy's new Mine Countermeasure (MCM) class vessel. The continuation of the MSH design program provides MMC with the opportunity to become one of the leading producers of state-of-the-art minesweepers worldwide.

WEAKENING THE JONES ACT

— A Threat To Our Competitive Position —

Joseph A. Farrell, President
American Waterways Operators, Inc.



Joseph A. Farrell

Most of us in the water freight transportation industry do not often think of the Jones Act and related cabotage laws as having much to do with the inland segment of the barge and towing industry, although clearly the protection afforded by the Act is an integral part not only of the coastal but also the inland operations. The American Waterways Operators, Inc. (AWO) represents the interests of both the inland and coastal segments of the barge and towing industry, nationwide. In carrying out the AWO objectives, we have been giving an ever-increasing amount of attention to the effect various recent efforts to dilute the Jones Act will have on the barge and towing industry as a whole. If the Jones Act is breached in the coastal trade, it isn't much of a leap to have foreign vessels plying the rivers.

The sovereign right of every nation to reserve its domestic trade to its own nationals has been recognized for centuries by international custom. The principle of cabotage, to reserve domestic freight to domestic carriers is not unique to the United States. Nearly every major maritime country adheres to this principle today, recognizing the absolute necessity to national security of a merchant marine built, owned and manned by its own citizens. Two fundamental national interests are served by cabotage laws: first, the necessity of having a merchant marine of the best-equipped and most suitable types of vessels owned and operated by U.S. citizens sufficient to carry the greater portion of its foreign and domestic commerce; and second, the necessity of having a strong merchant fleet, both domestic and international, to serve as an adjunct to national security forces.

The declaration of these purposes was made in the Merchant Marine Act of 1920. The principle of cabotage as we know it today is set forth in Section 27 of that Act, commonly referred to as the Jones Act, which provides:

> No merchandise shall be transported by water or by land and water, on penalty of forfeiture thereof, between points in the United States, including Districts, Territories, and possessions thereof embraced within the coastwise laws either directly or via a foreign port, or any part of the transportation, in any other vessel than a vessel built in and documented under the laws of the United States and owned by persons who are citizens of the United States.

The Congressional aim in mandating this section of the Act remains compelling today: to ensure that control of the shipment of American goods lies in American hands for the sake of our national security, and our general welfare.

Due to the recent worldwide recession, however, resulting in hundreds of idle tankers, bulk carriers and dry cargo ships around the world, there has been a great deal of interest on the part of various foreign-owned companies to enter the lucrative U.S. market. And, in addition, there is some interest on the part of various American factions to allow foreign operators into the domestic trade. It is argued that the short-term benefits of such a change in policy might be able to stimulate certain segments of the shipping industry here. But, the long-term damage that would occur by such weakening of the Jones Act principle would far outweigh the small value received now.

Perhaps the most highly publicized initiative in that direction is the Cunard bill, introduced in the last two Congresses, which would permit foreign-built vessels to enter the domestic passenger trade. Proponents of the bill argue that the U.S. maritime industry does not now offer and is not capable of offering U.S. cruiseship passenger service. Contrary to this claim, however, two shipping companies . . . Contessa Cruise Lines of Houston and American Flagships of New York . . . are making plans to build in U.S. shipyards large passenger vessels for the coastwise domestic cruise trade, rendering Cunard's argument invalid.

Another breach of the Jones Act is being proposed by Canadian Steamship Lines (CSL), which wants to top off colliers in Delaware Bay and other locations with foreign-built, self-unloading ships. Under the Jones Act, only vessels that are built in the U.S. can move merchandise from one point or port in the U.S. to another, or to a vessel anchored in U.S. waters. Waivers for the Jones Act may be granted only on grounds of national security. CSL's first claim was that its topping-off services are important to U.S. security, and its second was that American coal destined ultimately for Europe and Japan cannot be regarded as U.S. domestic trade. Even a cursory look at the Jones Act reveals that both these points are not valid grounds for exception. However, along the same lines as Cunard, CSL argues that U.S. shipping companies cannot offer topping-off service, and in the event they could, would not be able to do so as economically as CSL. At least two American shipping companies are currently on their way to providing topping-off services: American Steamship in Buffalo, N.Y., and Energy Terminals in New York. That the American companies may not be able to do so as cheaply as the Canadian line is debatable at this time. However, it is not the economics, but the principle of cabotage that is being threatened here.

An Administration proposal would allow U.S. subsidy-built tankers to trade coastwise upon subsidy refund. While this is not a direct threat to the Jones Act, it flies in the face of Congressional intent as mandated in the Merchant Marine Act of 1936, which set up subsidy programs for U.S.-built ships in the foreign trade. The 1936 Act recognizes the economic handicap under which U.S. ship construction operated in competition with foreign construction. It offered subsidies only to U.S.-

(continued on page 8)

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AWO—Weakening The Jones Act

(continued from page 6)

built ships operating in international trade, allowing those ships to compete on an equal basis with the foreign shipping trade. Domestic trade ships were guaranteed no such subsidies on the basis that domestic trade ships already enjoyed fair and thriving competition among themselves. Clearly, to allow subsidy-built ships into the domestic trade would give those subsidy-built ships an unfair competitive edge, one which was not intended by the Act of 1936, and which would disrupt the current environment of fair competition in the Jones Act fleet.

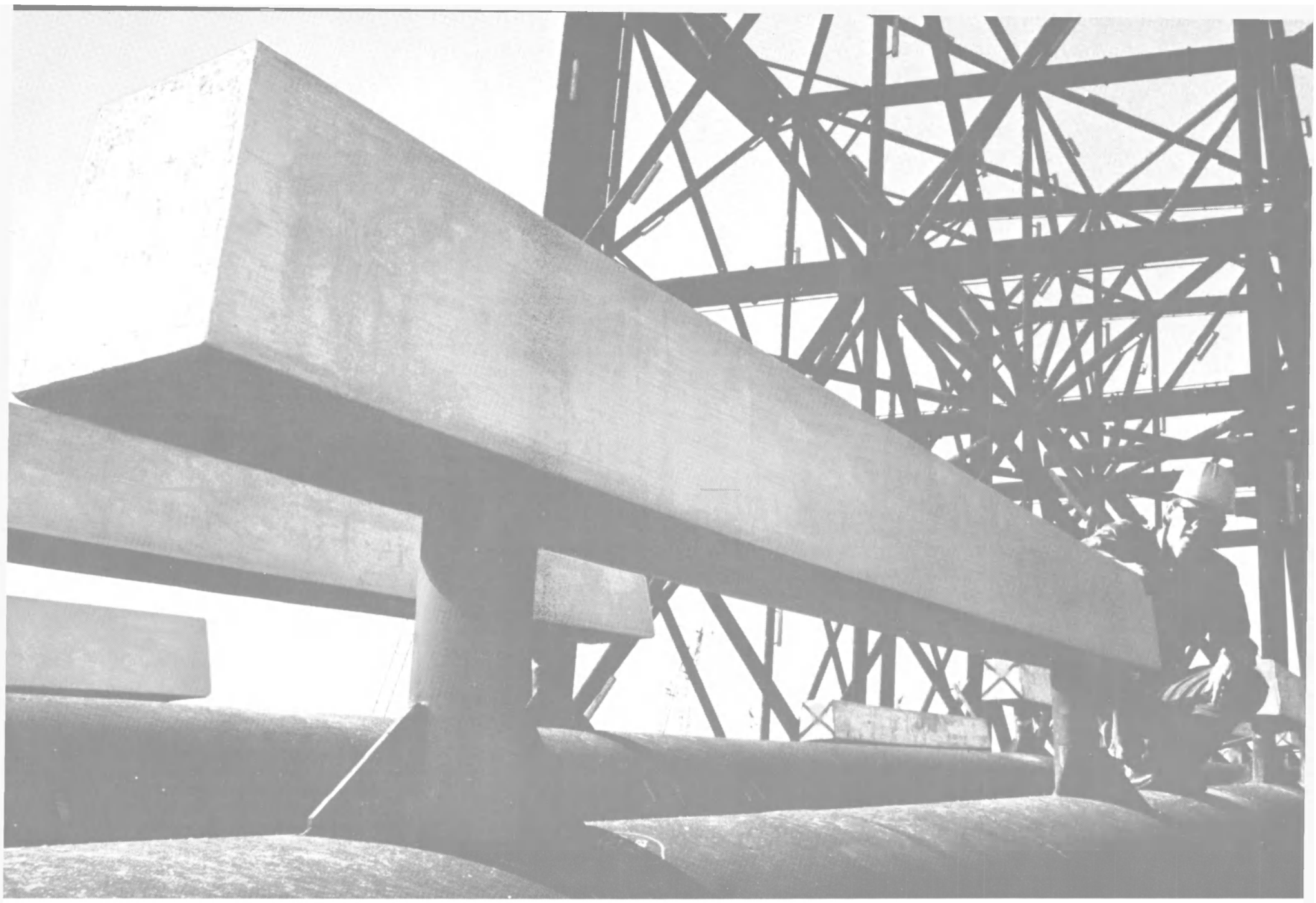
Also under consideration by the Administration is a proposal to export Alaskan oil to Japan in return for Japan's allotment of Mideastern oil. Since the shipment of this oil would be considered foreign trade, it would no longer be under the purview of the Jones Act, and would pave the way for foreign shippers to bid for the business. This of course, is perhaps secondary in importance to the fact that when domestic oil is available readily, it seems capricious to renew our dependence upon foreign oil sources.

Two other bills are currently in the Congressional works as well. One, the Frenzel bill, proposes to repeal the Jones Act altogether. Another would exempt Puerto Rico from cabotage restrictions on passenger vessels.

But perhaps the most threatening assault of all on the Jones Act, in what seems like guerilla warfare, is **Warren G. Leback's** publication of a paper for presentation at the 1983 Annual Meeting of the Society of Naval Architect, which proposed that foreign-built, but U.S.-owned and registered vessels be allowed to carry cargo in the domestic coastwise trade. Mr. **Leback** is the Deputy Administrator for Maritime Transportation at the Department of Transportation. Although the Maritime Administration has stated that Mr. **Leback's** position does not reflect MarAd's views, this opinion coming as it does from the number two man who is charged with *promoting* our maritime industry is worrisome indeed.

What do all these threats on the Jones Act mean to the barge and towing industry? As long as they remain just threats, they mean relatively little. But any one of the initiatives, if put into being, would not merely alter the course of long-standing maritime policy, but would destroy forever any notion of the U.S. maintaining a competitive position in domestic or world ocean trade. The Jones Act is an essential piece of legislation which both protects and supports our nation's domestic transportation structure. U.S. coastal and inland vessels employ about 150,000 people. Shipbuilding, terminal operations and other allied industries sustain thousands of additional jobs.

If foreign-flag operators are allowed to participate in U.S. domestic waterborne commerce, American-flag vessels will ultimately be driven out of our own trade. The result would be an unparalleled vulnerability to the political and economic pressure of foreign powers controlling the domestic commerce of the United States. America has a heavy investment in and a dependence upon its merchant marine. We cannot afford to hand over the return on that investment to foreign corporations when by doing so we would sacrifice our ability both to defend our country and to maintain our standard of living.



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Modern Fuel Systems Symposium

Exchanges Of Experiences—Problems And Solutions—Prove Use Of Heavy Fuels In Medium-Speed Diesel Engines Is Increasing And Economical

Two years ago Alfa-Laval, Inc. of Fort Lee, N.J. sponsored a symposium on modern fuel systems. This symposium was so successful that a second symposium on the same subject was held recently in St. Louis, Mo. This year's symposium was sponsored by both Alfa-Laval and *Diesel Progress*. It brought together engine builders, oil companies, shipyards, vessel owners and manufacturers of fuel-treatment additives.

The program was oriented to the needs of inland and coastal waterways operators. The topics covered included basic fuel chemistry, fuel purification, additives, fuel blending, heavy-fuel burning, engine design and operating experience.

The following excerpts from the papers presented (in order of presentation) indicate the wide range of thoughts presented, including present and future problems with suggested solutions:

Cletus H. Jones, Belcher Oil Company of Miami Fla., presented comments on "The Quality and Availability of Blended Marine Fuels in 1983." He stated that his definition of quality is "if the product does the job it was intended to do, that's quality. It may not smell good or look good—the laboratory analysis may indicate major deficiencies, but if it passes the performance test in the engine, it is a quality product."

He went on to state: purchasing blended marine fuels has an element of art to it. First of all, insisting on the lowest possible price at all times assures you of one thing—if there is a problem fuel in the market place, you will get your share of the headaches.

Another simple rule is to avoid confusing a fuel-supply specification with an engine specification. The fuel coming over the rail, in most instances, is not the fuel injected into the combustion chamber. One is a treated fuel, the other is not. I realize this is basic stuff, but it amazes me how often sophisticated operators buy an expensive grade of blended fuel because, I suspect, they either don't know or don't trust their onboard treatment procedures.

In summary, the current high-speed diesel operator contemplating installation of medium-speed residual-burning diesel engines will have to make some judgement calls on blended-fuel quality and availability. Unlike No. 2 diesel, the specifications for blended fuels are vague and there is a lot of information missing. Progress on testing and the exchange of information is improving, but we still have a way to go.

Alternately, there are operators worldwide successfully using this type of equipment despite the aforementioned shortcomings. Practically speaking, medium-speed engines are in general use everywhere except the U.S. inland waterways.

Finally, let us keep in mind that the diesel engine originally was conceived to run using pulverized coal as fuel. It is a wonderfully adaptive and forgiving piece of equipment. Certainly in today's

(continued on page 12)

(continued from page 10)
technological environment it will work in the heartland of the United States.

Nicholas H. Chavasse, Alfa-Laval, Inc., presented "The Alfa-Laval Line-Up Past and Present." He stated that the Alfa-Laval MAB-103 and MAB-104 are small, manually cleaned centrifuges used today for turbine lube oil and for lube and diesel fuel on small diesel engines. Benefits of the 100 series is that they are inexpensive, easy to install, simple to run, and the controls are simple. The drawbacks to the MAB-100 Series are that they have limited or small capacities and that their sludge-holding capacity is rather limited.

The Alfa-Laval MAB-200 Series of purifiers are similar to the 100 Series but with the following major differences. There are five units available. They are larger both in size and capacity. They have removable sludge liners and self-draining bowls. They have paring disc pumps built into the bowl for pressurized discharge of the light (oil) phase and all of these give the following benefits: Longer runs between cleaning, easier to clean, and on the larger units (MAB-205 and up) built-on bowl cranes for lifting the bowl top and stack out of the unit and to the side. The benefit of the paring disc pump on the light phase is that back pressure can be applied to the oil outlet if required. The drawbacks to the MAB-200s are that they are more expensive, larger, heavier, still labor intensive if applied to a dirty product and limited in their application to diesel fuel, small engine diesel lube oil, turbine lube oil, hydraulics and other similar applications.

The next step in the Alfa-Laval line of marine purifiers (by-passing the nozzle machines) is the MAPX or MOPX line of self-cleaning purifiers. There are six sizes in the family ranging from the small 204 to the large 313 size unit. The MAPX/MOPX units solve the problems that exist with the MAB Series of units. They can handle just about any type of marine fuel and lube oil application if sized and installed properly and are a tried and proven piece of equipment.

The Alfa-Laval WHPX Series of purifiers, introduced in 1972-73, does not lose any oil in the shoot, requires no pressurized water or hot water, generates less sludge volume and requires less water. It has become the industry standard, and although more expensive than the conventional unit, has a payback in normally less than two years.

Last is the ALCAP FOPX Series of fuel oil purifiers. The FOPX is neither a purifier nor a clarifier but a combination of both is the best way to describe it. The FOPX was developed to solve the problem with the upper limits presently imposed on purifiers, to get rid of the problems presently associated with the gravity rings, to make the centrifuge less sensitive to temperature control, and primarily to give the marine industry a piece of equipment that the operators could feel a little bit happier with.

Nels J. Hendrickson, Drew Chemical Corporation, spoke on "The Role of Chemicals and Fuel Analysis in the Marine Industry." He introduced his subject by stating that "Even though the price, quality and availability of marine fuels have not deteriorated as rapidly as forecasted, there still can be compelling economic reasons for vessel operators to consider burning heavy marine fuels. However, a hasty switch to a lower-cost fuel without full consideration for the consequences of the switch to lower-quality fuels on equipment and the need for greater personnel attention and control can have quite the opposite desired cost outcome."

The use of fuel additives has taken longer to be accepted than the use of chemicals in other systems and is an area of continued misunderstanding and controversy. Part of the problem is caused by the large number of additive manufacturers as well as by the lack of proper understanding by operators of the types of additives available and their role. Fuel additives have, however, been used successfully to solve many problems. Additives have been used in lube oils, as pour point depressants, ash modifiers and demulsifiers, as well as for many other applications. Drew AMEROID® Marine's products and services have also expanded and changed from one or two relatively simple products to our extensive present line. These products are being used worldwide on over 4,000 vessels.

It is our opinion that diesel engines can effectively burn today's fuels and those expected in the near future. This is especially important for operators who are considering burning blended fuels with engines capable of doing so. However, the operator, in order to realize the full cost benefit, must take advantage of the treatment tools available (i.e., fuel analysis, mechanical and chemical treatment).

Ole Schnohr, MAN, B&W, Alpha Propulsion Systems, spoke on "Engines on the River."

Basically, the quality of heavy fuel has not really changed since fuels entered the marine market. Any fuel considered of poor quality today for reasons of high viscosity, high Conradson Carbon content or high content of catalytic fines, etc., could be produced and was actually produced and found on the market in the early days of heavy fuel operation.

In recent years comprehensive test programs have been initiated by the engine industry in order to meet the challenge presented by an overall declining average fuel quality. The systematic accumulation of service results from those ships in service which, according to experience, would be more frequent users of such marginal fuel qualities also has been intensified.

The conclusion to be drawn from the combustion research carried out on full scale engines was the encouraging fact that all these so-called extreme fuel qualities, including coal derivatives, were fully usable in our diesel engines, as has been the case with the traditional heavy fuels in the past.

We are fully aware of the somewhat different modes of operation involved in river boat traffic versus oceangoing operation. The main difference is strongly related to manning requirements and the maintenance pattern.

With the rivers being the "freeways" for bulk cargo in this country the river tugs are operated as trucks on the road. As illustrated the complete propulsion package with its integrated control system allows such running of the engines "from the front seat", i.e., the bridge pilothouse.

The analogy to road transportation is expressing with strength that it is a natural requirement of the operator that maintenance is as fully predictable as when a truck needs service and fuel, but of course with much longer intervals.

With the stability in performance which is outlined and proven by our service experience, we can meet such requirements, meaning that unskilled personnel can operate the engines and actual service be left to shore gangs at "service stations."

Hugo Fiedler of MaK presented a paper entitled "Heavy Fuel Operation with MaK Diesel Engines for Multipurpose Application and Marine Propulsion."

The MaK diesel engine program consists of five engine lines with an overall range from 740 to 9,000 kw. Basically the engines are designed and built for marine applications, main propulsion and auxiliary service, as well as stationary application. Accordingly, economy, which means reliability, low fuel

and lube oil consumption as well as the capability of burning any kind of fuel, is the leading guideline for the design and development. Though for some engine types V-engines are available, the general tendency is to feature in-line engines, especially for marine application.

Low cylinder numbers or in-line engines mean a low number of moving parts. Though today, on account of improved materials and experience in design, a high reliability of the different parts can be achieved, there is no doubt that the all over reliability is directly related to the number of parts involved and bear a direct relation to maintenance and overhaul requirements.

The general trend for reduction of fuel consumption initiated by the increasing price of fuels has resulted in an extensive development work in this direction. Today MaK engines are of the highest efficiency and in particular cases leading in this field, achieving up to 50 percent efficiency.

For more than 15 years the burning of heavy fuels in medium-speed four-stroke engines has been developed with increasing success. Today even the highest viscosities can be burned without difficulties, not only at full but also at part load. Wear rates of parts exposed to combustion are in many cases even lower than experienced with older engines running on gas oil

Alan C. Barich and **Edwin E. Hodges** of Transamerica DeLaval presented a paper on "Exhaust Emission Control Techniques of Today's Large-Bore Medium-Speed Diesel Engines for Heavy-Fuel Operation."

Although currently in the embryonic stage for marine application, exhaust emissions are in the process of being regulated for ship operation in our inland waterways, Great Lakes and major U.S. ports. Control of diesel exhaust emissions will include changes to the basic operation of the diesel engine through such means as to retard fuel injection timing, charge air manifold temperatures and use of exhaust gas recirculation.

The work discussed in this report revealed substantial results. Injection timing and intake air manifold cooling show clear reductions in NOx emissions, but the extent of the reductions is limited. Moreover, substantial fuel penalties associated with these techniques were demonstrated. Of the combustion control techniques tried, exhaust gas recirculation was the most effective in achieving significant NOx reductions with minimum fuel-consumption penalty. However, the hidden costs associated with this method are a major concern at this time. Further development work is needed to improve the EGR system and thus reduce fouling and related gas-handling problems. The effect of EGR on lube oil contamination and ultimately on engine wear also needs additional investigation.

Ammonia-injection catalytic reduction appears to work well in reducing NOx, but again needs further attention. It has not yet achieved expected percentage reductions, and additional work directed toward the control system and related hardware is necessary.

Based on results of the experimental program to date, it is apparent that both catalytic reduction and EGR are deserving of further attention. No mechanical experiments with engine redesign are possible until completion of the present experimental program, but research can be directed at resolving the problems associated with EGR.

Until such a time as more work can be done, it is up to the engine manufacturer and owner alike to help reduce NOx by carefully and precisely sizing auxiliary equipment that will help reduce engine emissions.

C. E. Rosgren, design manager for Wartsila Diesel, spoke on "Reliable Heavy-Fuel Engine Component Designs." This paper deals with the design aspects of some critical components in heavy-fuel-burning diesel engines. The theoretical considerations are described as well as the practical outcome of applied engine tests and field experience.

The heavy fuel experiences referred to were gained during the

(continued on page 14)

(continued from page 13)

last five years and, consequently, on fuels refined by the latest secondary processes, which means cracking of different kinds. Such fuels have combustion properties which substantially differ from the heavy fuels available 10 years ago.

The evaluations are based on experiences of the purpose designed heavy fuel engines Vasa 32 and Vasa 22HF in a lot of different installation types such as main engines in ro-ro vessels, supply vessels, tugs, icebreakers, ferries and small tankers as well as a number of auxiliary engine applications.

The Vasa 32 engine was introduced in 1977 and has since then attracted much attention. At that time it was one of the first new engine designs developed after the 1973–74 oil crisis. It filled a gap between the heavy fuel burning 15.75-inch bore engines and small marine diesel engines. The Vasa 32 covers an output range of 2,010 to 9,180 bhp.

The Vasa 22HF engine, with the same basic features as the Vasa 32, was introduced in 1980. With the output range of 720 to 3,480 bhp it extends the range of Vasa 32 downwards. In the upper end of the output range it is, with its smaller size and higher speed, an attractive alternative in small vessels.

Practically, it can be said that the Vasa engines are well suited for all heavy fuels existing on the market today. They also form a stable base from which the development towards using further deteriorating future fuels can be continued.

A paper describing the Waukesha AT25 Series of diesel and heavy fuel engines was presented during the second day of the symposium. The Waukesha AT25 Engine Series consists of a family of four engine models including six and eight-cylinder in-line, and 12 and 16-cylinder vee configurations. The engines have a common 250-mm bore with a 300-mm stroke and were designed and developed by Sulzer Brothers Limited of Winterthur, Switzerland. The Waukesha Engine Division of Dresser Industries Inc., is manufacturing and further developing this new engine family at Waukesha, Wis., under a license agreement with Sulzer for marketing throughout the world.

The engine series has been designed for both diesel and heavy-fuel operation and covers a speed range of 720 to 1,000 rpm. The diesel (distillate) fuel maximum continuous power range covers 1,260 to 4,800 bhp, whereas the heavy-fuel (residual) rated power range covers 1,140 to 4,320 bhp.

This new AT 25 engine series combines the four-stroke diesel cycle with direct injection, turbocharging and intercooling. The design results in a high-density reciprocating power producing package including low fuel-oil and lube-oil consumption, high reliability and durability, and multi-fuel capability for cost effective operation. The first engine of this new series produced at Waukesha was a 12-cylinder model.

Over 3,000 engines of the A25 type have been applied by Sulzer and its licensees in universal applications including main marine propulsions (deep sea and inland waterways), ship auxiliary power generation, offshore oil-drilling platforms, railroad traction and stationary power generation.

R. Peter Spock, American Commercial Barge Line Co., described "The ACBL Blended Fuel Program."

ACBL decided to pursue blended fuels after a lengthy discussion and study of the current technologies. Several other conservation methods were put into effect, but blended fuel was to be the major effort because it showed evidence of providing the greatest amount of savings potential. At that time, about 40 percent of ACBL's line haul towboats were equipped with Alco engines, which had undergone previous blended-fuel testing. Also in 1980, our future new vessel construction called for several vessels to be equipped with Alco engines. Thus in light of the pricing structure of diesel and blended fuels, it was determined that significant fuel cost savings could be obtained in these vessels.

Another factor which influenced the decision was that ACBL had previously purchased a tank farm in Memphis as a hedge against any future oil shortages. This would prove advantageous since the quality of blended fuels must be controlled in order to provide successful operation in diesel engines.

Over the long term, it is expected that diesel fuel prices will increase much more than residual. This is the most significant reason why blended fuel is a rational approach to controlling operating costs. This must obviously be tempered by the increased maintenance costs associated with blended fuel.

The author then described in detail the impact of these changes and how ACBL arrived at its current position. Finally, the paper takes a look at the most recent ACBL heavy-fuel project which involves the re-engining of the triple-screw towboat M/V Bill Elmer with three MaK engines equipped to burn 3,500-ssu fuel.

Kenneth Siegman of the Midland-Ross Company reported on "Midland's Heavy Fuel Oil Experience." He advised that in late 1981 Midland made the decision to build two boats capable of burning heavy fuel oils of varying viscosity and varying quality. This decision was based on many factors both within the Midland organization and external to the company. The external factors were many, but were primarily concerned with the present and future cost and supply of fuels.

In November 1982, Midland took delivery of the M/V Jim Ludwig from St. Louis Ship. In May 1983, Midland took delivery of the M/V Justin T. Rogers. Both of these boats came out of the yard burning an IF-80 (600-SRI) fuel and have continued to burn this blend. This paper covers Midland's experiences during design and construction, plus much of their operating experience to date. Much of the operating data is very recent. Each day a new or unexpected bit of information is learned and they expect the learning experience to continue.

Along with the decision to go to heavier blends of up to 2,100 SRI, there were questions raised on storage tank configuration. The original hull design had two large port/starboard tanks on each side. This was later changed to divide each of the large tanks in half to give four port/starboard tanks, each side. More but smaller capacity tanks were required for two reasons. The first and prime reason was the concern of possible fuel compatibility problems. The various bunkers if purchased from different suppliers could be kept separate.

An important part of the boat design once the hull configuration was chosen, was the choice of the main engines. After an extensive search and evaluation, it was decided to go with main engines designed and built by B&W Alpha of Frederikshaven, Denmark.

Much of the data and experience contained in this paper is based on the operating experience of the two boats. From what is known now, Midland feels that they can expect to meet or exceed their expectations of the move to burn heavy fuels.

M.H. Brinker, M.A. Cereno and **W.H. Rice, Jr.,** Heartland Transportation Company, The Inland Waterways Division, Pott Industries Inc., described "The Inland Waterways Division, Pott Industries Inc. Blended Fuel Program."

The blended-fuel program of IWD began back in the mid 1950s when Federal Barge Line began operating four towboats on blended/heavy fuel oil. Federal Barge lines operated these four boats on heavy oil from 1956 through 1965 for two boats and 1972 for the other two

when, due to the expense of burning heavy oil versus diesel oil, the boats were converted back to diesel oil service and the heavy-oil equipment was removed.

Many lessons were learned from these years of operating on blended fuel oil and these lessons were thoroughly studied and considered when the Inland Waterways Division decided to build the M/V Robert A. Kyle and make it capable of burning blended fuels.

The M/V Robert A. Kyle had operated for approximately 950 hours on blended fuel when the decision was made to replace the power packs in the center engine. Since the first phase of the test was to be a shakedown of the fuel handling and delivery equipment, the power packs were not renewed prior to using heavy fuel even though EMD recommends chrome cylinder liners when using high-sulfur fuel. The performance of the cast-iron liners during the shakedown phase proved to be quite promising so that we and EMD decided to test both cast-iron and chrome liners in the wear evaluation phase of the test which is currently underway. Through the cooperation of EMD and the oil companies, the engines were thoroughly inspected and borescope photographs of the cylinder walls, exhaust valves and turbo screen were taken to record their condition before heavy fuel was introduced to the engine. There were no unexpected consequences attributable to the use of heavy fuel during the shakedown phase of the test. The Kyle has experienced no failures on the center engine due to blended fuel oil.

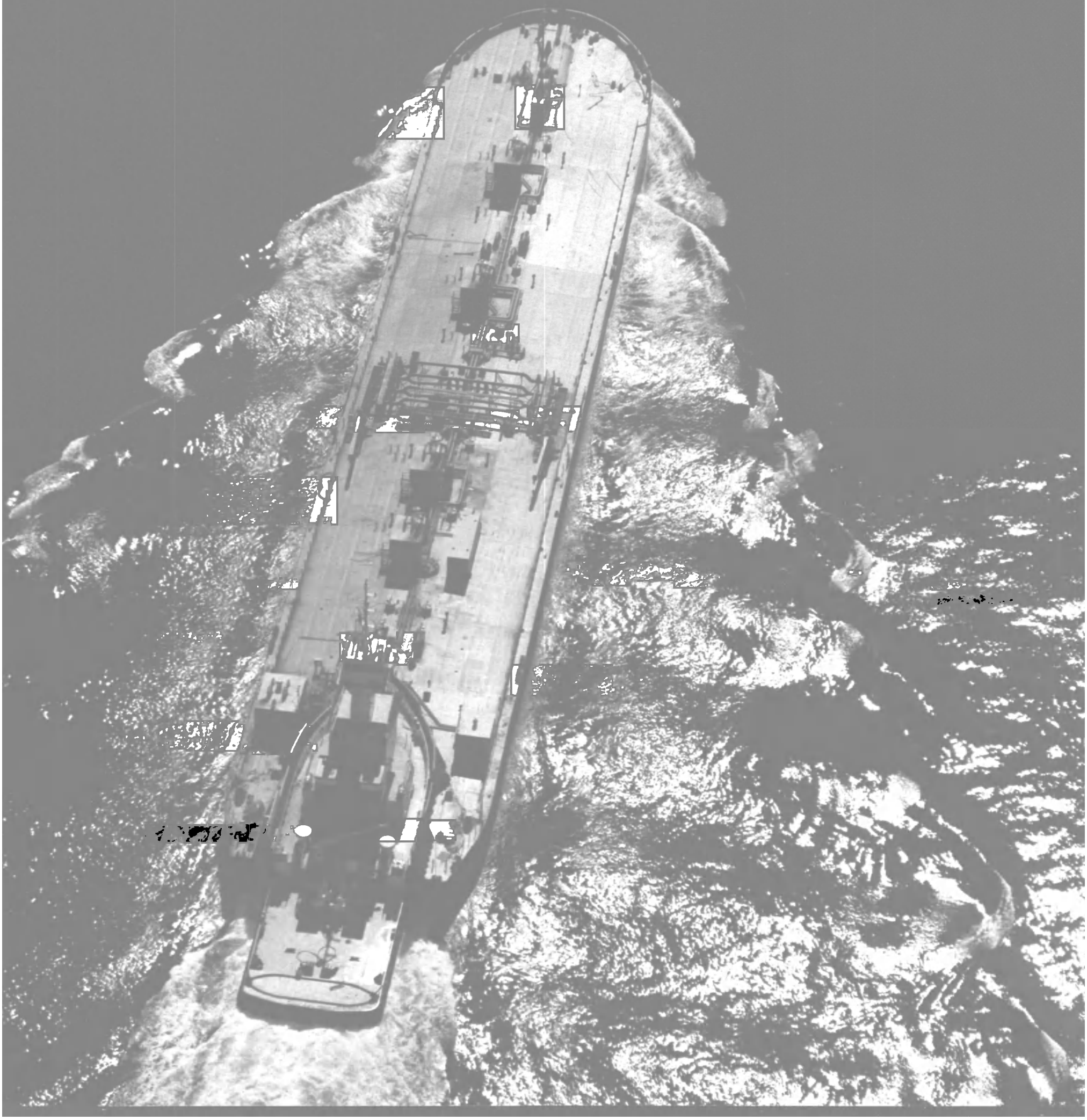
For further information and copies of the above presentations, circle the appropriate number on the Reader Service Card in the back of this issue.

Belcher Oil Company (Quality and Availability of Blended Marine Fuels in 1983)—**Circle 51; Alfa Laval, Inc.** ("The Alfa Laval Line-Up Past And Present")—**Circle 52; Drew Chemical Company** ("The Role Of Chemicals and Fuel Analysis in the Marine Industry")—**Circle 53; MAN/B&W, Alpha Propulsion Systems** ("Engines on the River")—**Circle 54; MaK** ("Heavy Fuel Operation with MaK Diesel Engines for Multipurpose Application and Marine Propulsion")—**Circle 55; Transamerica Delaval** (Exhaust Emission Control Techniques of Today's Large-Bore Medium-Speed Diesel Engines for Heavy Fuel Operation")—**Circle 56; Warstila Diesel** (Reliable Heavy-Fuel Engine Component Designs")—**Circle 57; Waukesha Engine** (The Waukesha AT25 Series Diesel)—**Circle 58; ACBL** (The ACBL Blended Fuel Program")—**Circle 59; Midland Ross** ("Midland's Heavy Fuel Oil Experience")—**Circle 60; Heartland Transportation** ("The Inland Waterways Division Pott Industries Inc. Blended Fuel Program ')—**Circle 61.**

Circle 113 on Reader Service Card ►

"The tugs' heavy-fuel engines save money. Gulf lubrication saves the engines."

J. Barry Snyder, President and founder,
Bulkfleet Marine, Houston, Texas.



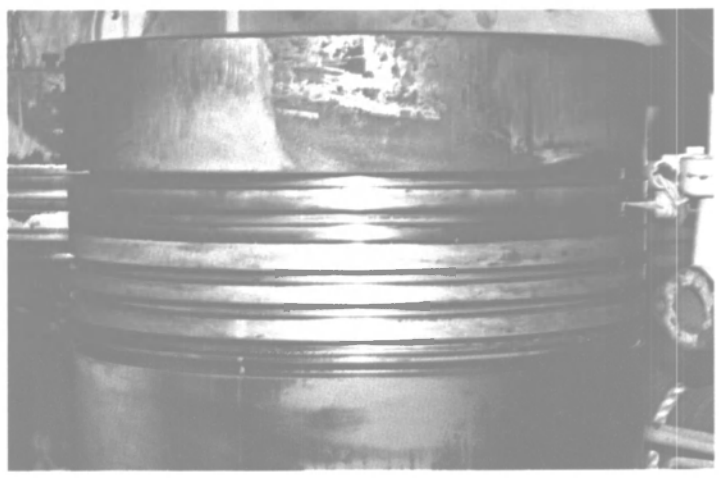
The M/V VALIANT, a deep-notch tug operating with the barge BULKFLEET PENNSYLVANIA, is powered by two Krupp MaK 6MU 551 AK 6-cylinder heavy fuel engines.

"When we designed the tug M/V. VALIANT, and her sistership M/V. VICTORY as deep-notch vessels to work in combination with the barges BULKFLEET PENNSYLVANIA and BULKFLEET TEXAS, we took a close look at the fuel situation for the future," says Barry Snyder, President of Bulkfleet Marine.

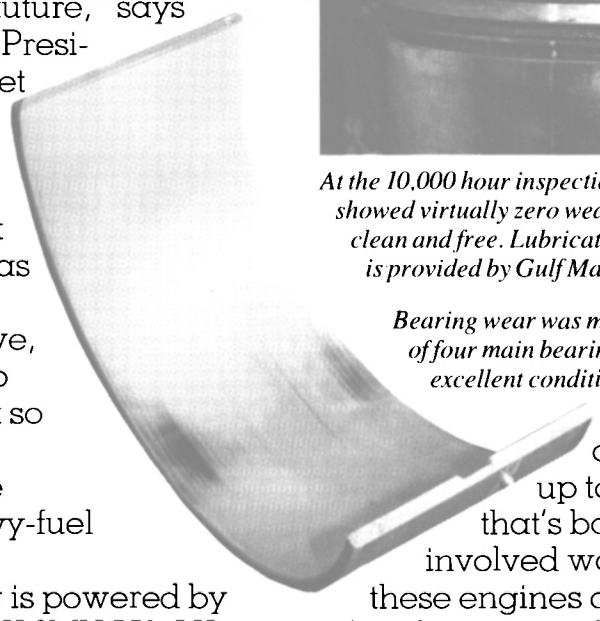
"It didn't take a crystal ball to see that No. 2 diesel was going to get more expensive, and tougher to find, in the not so distant future. That's why we specified heavy-fuel engines.

"Each tug is powered by two Krupp MaK 6MU 551 AK 6-cylinder engines, rated at 4,000 BHP at 420 RPM," he continues. We mix 15% No. 2 diesel with 85% bunker C to yield fuel of 1500 seconds Redwood 1 at 100°F, or 180 centistokes at 122°F.

"The MaK 551 engines are designed to be able to operate with a maximum fuel viscosity of 380 cSt, sulfur up to 4.3%, vanadium up to 400 ppm, alumina/silica up to 30 ppm and sodium up to 40 ppm. All that's basically an involved way of saying these engines can save us a lot of money on fuel."



At the 10,000 hour inspection the cylinders showed virtually zero wear, the rings were clean and free. Lubrication in these engines is provided by Gulf Marine engine oils.



Bearing wear was minimal. Inspection of four main bearings showed them in excellent condition.

James R. Colman, Bulkfleet's Engineering head supervised the recent engine inspection and says, "The secret to burning this low grade fuel is the right oil to protect the engines. You don't save any money if you're eating up engines. We get the protection we need from Gulf Marine engine oil. The results of our 10,000 hour inspection of the VALIANT'S engines prove it.

Between the two engines, we looked into eight cylinder heads and piston assemblies. The piston skirts were clean and smooth with zero wear. Cylinder liner wear was measured at 'nil' except for two liners which indicated one-tenth of a millimeter wear, well within acceptable boundaries. The piston rings were clean and free; maximum ring wear was two-tenths of a millimeter. We opened four main bearings and found them in excellent condition. That's a remarkable inspection for engines running this kind of fuel, and I think it's directly attributable to the Gulf lubricant."

"In fact," Colman concludes, "Gulf provides a complete range of lubricants for these vessels. And we get protection from every product, that makes for efficient operation. I'm convinced, these heavy fuel engines are the way to save money in bulk transport, and Gulf lubricants are the way to save these engines."

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Justin T. Rogers

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ACTINIA
Hitachi Zosen

The semi-submersible offshore drilling rig Actinia was delivered in 1983 to Actinia Shipping Corporation by the Ariake yard of Hitachi Zosen. The rig is Hitachi's SS-4000 type, based on an original design of Friede and Goldman of New Orleans. The unit is 270 feet long, 200 feet wide, 116 feet high, and has a variable deck load of 3,200 metric tons.

The Actinia is capable of operating in water up to 1,500 feet deep and of drilling to a maximum depth of 25,000 feet. It is designed to withstand waves up to 100 feet high and winds of up to 100 knots. An 8-point mooring system keeps the rig in position during drilling; four thrusters provide back-up during adverse weather conditions. The rig complies fully with the rules and regulations for operation in the U.K. sector of the North Sea.

AIR RIDE EXPRESS
Atlantic & Gulf Boat Building

Built under subcontract from Air Ride Marine, Inc. of Miami by Atlantic & Gulf Boat Building, Inc. of Port Everglades, Fla., the 65-foot crew/supply boat Air Ride Express entered service in mid-1983. The new vessel, which is owned by South Florida Offshore Services, Ltd. and operated out of Mobile to the offshore oil industry by Gulf Crew Transport of Pensacola, Fla., is a surface effect ship (SES) built to the proprietary Air Ride design that features a shallow pressurized air chamber under the hull.

Unlike other SES craft, the Air Ride Express has a rigid interconnected structure and requires no flexible seals. Above the waterline it looks similar to a conventional boat. The Air Ride design, which was developed by Air Ride Marine

(continued on page 20)

STEM TO STERN

Tug, trawler, or tanker. Fill all your auxiliary power needs with Cat Engines and Generator Sets. Your best power choice for lighting, communications, winches, pumps, compressors, thrusters . . . Auxiliary engines from 85-1600 hp (63-1194 kW) and marine generator sets from 55-1100 kW (60 Hz) or 50-930 kW (50 Hz). All certified for on-board use by every major marine society.

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Air Ride Express

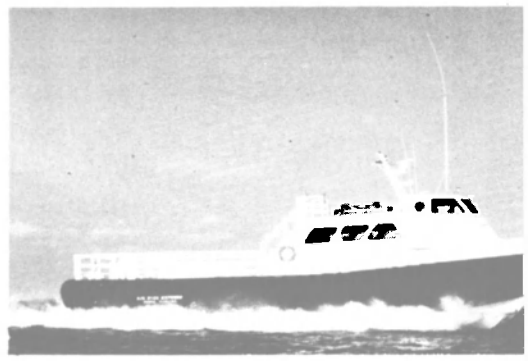
(continued from page 18)

president **Donald E. Burg,** allows surface effect technology to be utilized at lower construction and maintenance costs.

During sea trials the new vessel, which has a dry weight of 60,000 pounds, operated at 30 knots with a payload of 25,000 pounds including fuel. With a payload of 35,000 pounds, the boat ran at 27 knots. It has operated in following and cross seas up to 10 feet and in head seas of 5 feet at speeds in the 25-knot range with good passenger comfort. It has a capacity for 32 passengers and a two-man crew in air conditioned or heated accommodations. The cargo deck aft has an area of more than 400 square feet.

Key Power, Inc. of Miami supplied the engines, which include two GM Detroit Diesel 12V71TI diesels for main propulsion and a GM Detroit Diesel 6V53T engine to power the blower system. The main engines turn 34- by 44-inch Columbian propellers through Twin Disc 514 reduction gears having a ratio of 2.5:1. Fuel consumption is about 50 gallons per hour, giving the boat a normal operating range of 750 miles.

The Air Ride Express is the culmination of a three-year research and development effort conducted



by Air Ride Marine. The Miami company is currently working on the detailed design for a 50-knot, shallow-draft patrol boat; a 110-foot crew/supply vessel, and a 120-passenger ferry.

AIR RIDE EXPRESS
Major Suppliers

Main engines (2)	GM Detroit
Lift engine	GM Detroit
Reduction gears (2)	Twin Disc
Propellers (2)	Columbian
Generators	Kato
Generator engines	Perkins
Engine controls	Morse
Steering system	Hynautic
Fuel filters	Racor
Radar	Furuno
Loran C	Si-Tex/Koden
SSB radio	Raytheon
VHF radio	Motorola
Depth sounder	Datamarine

BLANCHE V

Iowa Marine Shipyard

Iowa Marine Shipyard of Keokuk, Iowa, has delivered the towboat Blanche V to Gibbons Marine of Beardstown, Ill. She is an IM-60 Class vessel with an overall length of 60 feet, beam of 24 feet, depth of 8 feet and draft of 6 feet. Propulsion is by twin Cummins KTA-1150-M diesel engines with a total output of 940 bhp at 1,800 rpm. These drive 64- by 50-inch Kahlenberg stainless steel propellers through Twin Disc MG-518 reduction gears with a 6:1 ratio.

Generators are 30-kw Lima-Mac driven by John Deere 4219 diesels. Iowa Marine president **Tom Edwards** says, "One of the things we have always attempted to do is provide equipment that is easily serviceable, and this John Deere engine is an old-line, widely used engine. Parts and service are available in just about every town where there is a John Deere dealer."

Steering is an Iowa Marine design, mechanical over hydraulic, full follow-up with each main engine driving a hydraulic gear pump. There are two steering and four flanking rudders, which give the

vessel exceptional handling capabilities.

The pilot house is equipped with a Regency MT-5500, all channel VHF radio, a Raytheon 400 hailer-intercom, two Carlisle & Finch incandescent searchlights, and full instrumentation and alarm systems.

Twin Nabrico 20-ton winches are enclosed in the forward deck locker for protection and to provide an unobstructed deck area. A raised deck is fitted to facilitate access to empty barges.

The vessel is equipped with a 12-volt automatic Jabsco bilge pump that discharges to stuffing box drains directly overboard, a Humphrey sanitary system, and a Dayton air compressor. The hull is constructed of ⅜-inch steel plate, with ¾-inch rounded corners and ½-inch plate over the stern sections.

The bilge system is designed to allow any compartment on the vessel to be pumped, and allows for discharge overboard, to the slop tank, or to the stern ballast tanks. By utilizing the sea cock, the engine room and the entire exterior of the boat can be washed down.

CHAMPION EXPRESS
Leevac Shipyards

The offshore supply vessel Champion Express was delivered by Leevac Shipyards of Jennings, La., to Offshore Express, Inc. of Houston. This is the first of two sister vessels ordered from Leevac by the owner, the second being the Diamond Express.

The Champion Express has an overall length of 165 feet, beam of 38 feet, and depth of 13 feet. She is powered by twin GM Detroit Diesel 16V149 engines providing a

total of 1,350 bhp at 1,800 rpm. The engines drive two 74-inch, 4-bladed, Avondale stainless steel propellers through Twin Disc MG 540 reduction gears having a ratio of 6:1.

Two 230-bhp, 8V71 Detroit Diesel engines power the 99-kw General Electric generators. The vessel is equipped with a 200-hp Jastram bow thruster providing a

(continued on page 22)

Shown below, the Actinia built by Hitachi Zosen. See page 18 of this issue.

Champion Express

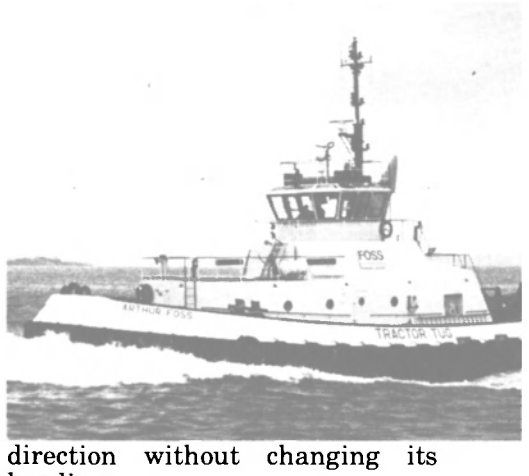
(continued from page 21)

thrust of 4,000 pounds. The steering system is by SSI.

The vessel's capacities include 44,000 gallons of fuel oil, 12,000 gallons of potable water, 132,000 gallons of ballast water, 3,000 cubic feet of dry mud, and 1,500 barrels of liquid mud. The cargo deck area measures 96 by 28 feet. Accommodations are provided for 17 persons.

Main engines (2)	Detroit Diesel
Reduction gears (2)	Twin Disc
Propellers (2)	Avondale
Bearings	Johnson
Generators (2)	General Electric
Generator engines (2)	Detroit Diesel
Panels	Treco
Engine monitors, steering	SSI
Bow thruster	Jastram
Pumps	Aurora, Viking
Air compressors	Quincy
Radars (2)	Furuno
SSB radio	Sailor
Loran C	Texas Instrument
Autopilot	Sperry

ARTHUR FOSS
Tacoma Boat Building



The tractor tug Arthur Foss, final vessel in a series of four built by Tacoma Boat Building Company of Tacoma, Wash., for Foss Launch & Tug Company of Seattle, was commissioned during 1983. Like the three sister vessels, the 3,900-bhp Arthur Foss features a cycloidal propulsion system that enables it to produce thrust in any direction without changing its heading.

The new boat can move sideways, turn a full circle in very limited space, and come to a complete stop in approximately its own length. The capabilities allow the tug to assist ships and tows in a minimum of time and with maximum safety.

The Arthur Foss has an overall length of 106 feet, beam of 38 feet, and draft of 17 feet 4 inches. Propulsion is provided by twin GM Electro-Motive Division 16-645-E6 diesel engines, each rated 1,950 bhp at 900 rpm. The two Voith-Schneider, vertically oriented cycloidal propellers have a blade orbit diameter of 3,200 mm (126 inches); each of the five blades is 2,006 mm (79 inches) long. The Voith-Schneider units were chosen after an in-depth, 2½ year study by Foss. The conceptual design for the tractor tugs was by the Foss design committee; The Glosten Associates of Seattle was the naval architect.

The tug's capacities include 50,550 gallons of fuel oil, 4,500 gallons of lube and hydraulic oil, and 5,400 gallons of fresh water. A crew of six operates the vessel.

Main engines (2)	EMD
Propellers, engine controls, and steering systems	Voith-Schneider
Generator engines (2)	Detroit
Engine monitors	Sea-Land
Sanitation system	Red Fox
Radar	Furuno
VHF radios (2)	Raytheon
Winches (2)	Intercon
Coatings	International
Fendering	Schuyler

EL AUDAZ
Bender Shipbuilding

Bender Shipbuilding and Repair of Mobile, Ala., has delivered the 225-foot El Audaz, the yard's fourth big tuna purse seiner in a four-boat order for Mexico. Immediately following her outfitting the El Audaz cast off with her sister ship Centauro Del Norte for fishing in the Pacific.

Main propulsion is provided by a medium-speed, Electro-Motive Diesel 20-645-E7 engine producing 3,600 bhp at 900 rpm. Power is transmitted to a 4-bladed, highly skewed Rice propeller through a Falk reduction gear. Main engine controls were supplied by Mathers.

Auxiliary power is provided by three Caterpillar D3408 diesels, each producing 285 kw at 1,800 rpm. The main hydraulic power source is also a Cat D3408, which develops 500 bhp at 2,100 rpm.

(continued on page 24)

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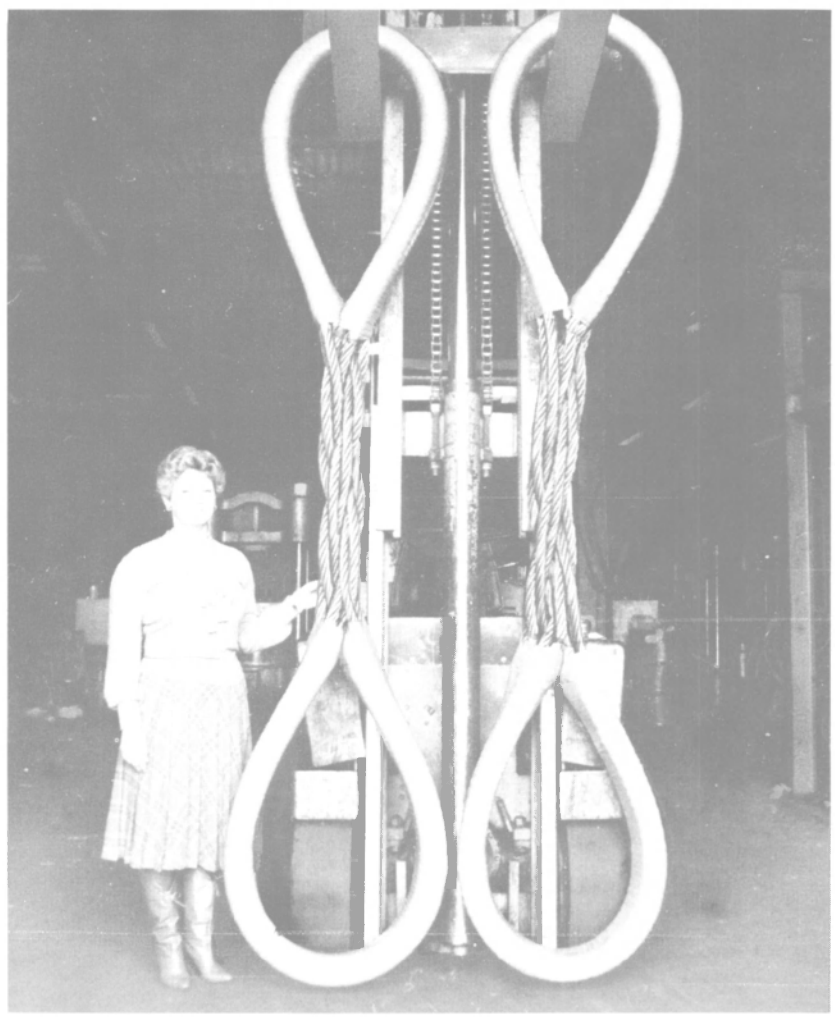

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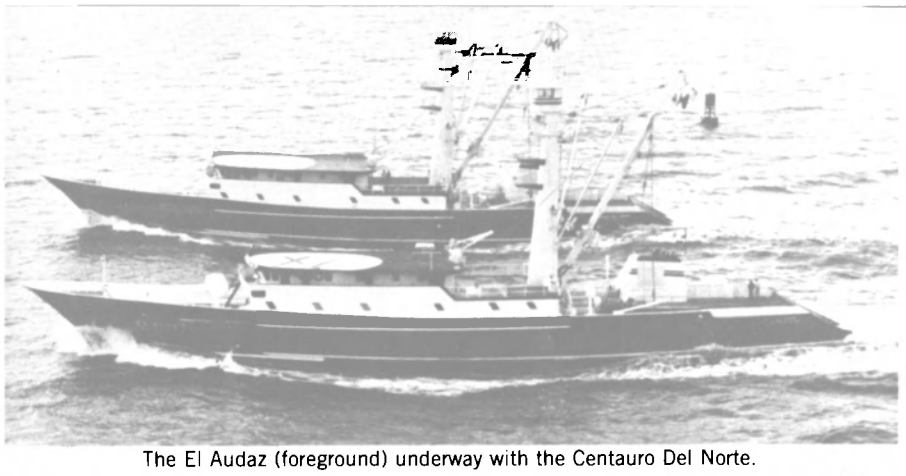

The El Audaz (foreground) underway with the Centauro Del Norte.

El Audaz

(continued from page 22)

Steering gear is hydraulic, a Wagner LAZ-16-35 furnished by W.E. Hough.

Four 100-hp Vilter compressors power the ammonia refrigeration system. The bow thruster is a Michigan/Jastram BU60 with a 49-inch propeller, powered by a Detroit 12V71 diesel engine with an output of 400 bhp at 2,100 rpm.

The main hydraulic systems were furnished by Marco. They include the WS 454 Super Seiner II seine winch, 3020 cork line winches, WO 332 brailing winch, and B56A power block. Miscellaneous Gearmatic winches are provided for vanging, topping, choking, and strapping.

Incorporated into the hydraulic system is a Slattery Alaska Marine deck crane on the forward deck and a Morris Whaley ring stripper. Navigation aids include a Sperry 8T autopilot and a Mark 37 gyrocompass.

Electronics, furnished by Honor Marine of San Diego and installed by Sassman Electronics of Mobile, include two Furuno FR1011 radars, Whelen strobe light, Furuno FE8130F echosounder, Taiyo ADF, Furuno VHF/ADF, Navidyne ESZP-3000 satellite navigation, Hull 2320A radiotelephone, Morrow SSB radio, Hull 922R/5 radio, Raytheon VHF radiotelephone system, Honor Marine public address system, Furuno FAX143 facsimile recorder, Bear Cat 300 scanning receiver, Sea Temp seawater temperature monitor, and Telcor windspeed indicator. A Krupp-Atlas sonar model 950 was also included in the electronics package.

Other equipment includes Crane Deming pumps, Buffalo Forge fans, Red Fox sewage treatment system, Westphalia (Centrico) centrifuges, Quincy air compressors, Argur alarm systems, Ansul engine room Halon fire suppression system, Cutler Hammer controllers, Waukesha stern bearings and seals, Hose McCann navigation light systems, International Paint coating systems, Engelhard Chloropacs, Everpure chlorinators, and Micros fresh water distillers.

The Bender-built tuna seiners have steel hulls and pilot houses of aluminum, reinforced for helicopter landings. Each boat is capable of carrying 1,200 tons of fish, 85,000/200,000 gallons of fuel, and 8,500 gallons of fresh water at a speed of 16 knots.

AMIR EXPRESS
Master Boat Builders

Saudi Tug Services, a joint venture company of McAllister Towing and Transportation and Olayan Financing Company, has taken delivery of four offshore supply vessels built by Master Boat Builders, Inc. of Bayou LaBatre, Ala.

The four new vessels—Amir Express, Khalifah Express, Malik Express, and Sultan Express—are on long-term charter to ARAMCO. Each has an overall length of 110 feet, molded beam of 26 feet, and molded depth of 10 feet 6 inches.

Main propulsion power is supplied by twin GM Detroit Diesel 16V71 engines, each with an output of 455 bhp at 1,800 rpm, driving through Twin Disc MG 518 reduction gears having a ratio of 5:1. Two 50-kw, 208/120-volt, 4-wire 60-cycle generators are driven by Detroit Diesel 4-71 engines at 1,200 rpm.

Each vessel is equipped with 60-inch-diameter, 4-bladed bronze propellers, Cutlass rubber stern tube bearings, and dual Electrol hydraulic steering system. Engine controls are by KoBelt Pneumatic Controls.

Deck machinery includes a Nautike 220 hydraulic pedestal crane and an electric, single-drum McElroy anchor-handling winch.

Electronic gear includes Furuno 701 radar, Hull 922 20-channel SSB radio, Datamarine Digital 3000 fathometer, Texas Instrument 9900 Loran C, and two Sailor 144 MAC VHF radios. Coatings were supplied by Devoe Coatings.

FRANK CANDIES
Champion Swiftships

Champion Swiftships, Inc. of Pass Christian, Miss., in the spring of 1983 delivered the first of a two-tug order, the 3,900-bhp Frank Candies, to Otto Candies, Inc. of Des Allemandes, La. The sister vessel, the Ben Candies, followed a few months later.

The Frank Candies has an overall length of 117 feet, beam of 34 feet, and depth of 17 feet. The tug's main propulsion plant comprises two GM Electro-Motive Diesel 16-645-E6 engines, each rated 1,950 bhp at 900 rpm, driving two 117- by 86.1-inch Coolidge propellers through two Reintjes model 2650 reduction gears having a ratio of 5:1.

Electronic equipment includes two Furuno FR711 radars, a Raytheon Ray 350 loudhailer, a Furuno LC70 Loran C, a Panasonic RF4900 shortwave receiver, two Apelco Clipper 82 VHF radios, a Hull 255 SSB radio, an Okeanos RS5000 satellite navigation unit, and a Datamarine 2650 depth sounder.

Other equipment includes a single-wildcat windlass by Markey, a TDSD32 Markey towing winch, and a Halon fixed fire-fighting system. Coatings were supplied by Ameron.

Main engines (2)	EMD
Reduction gears (2)	Reintjes
Propellers (2)	Coolidge
Shafts	Rabe
Bearings	Goodrich
Generator engines	Detroit Diesel
Engine controls	Wabco

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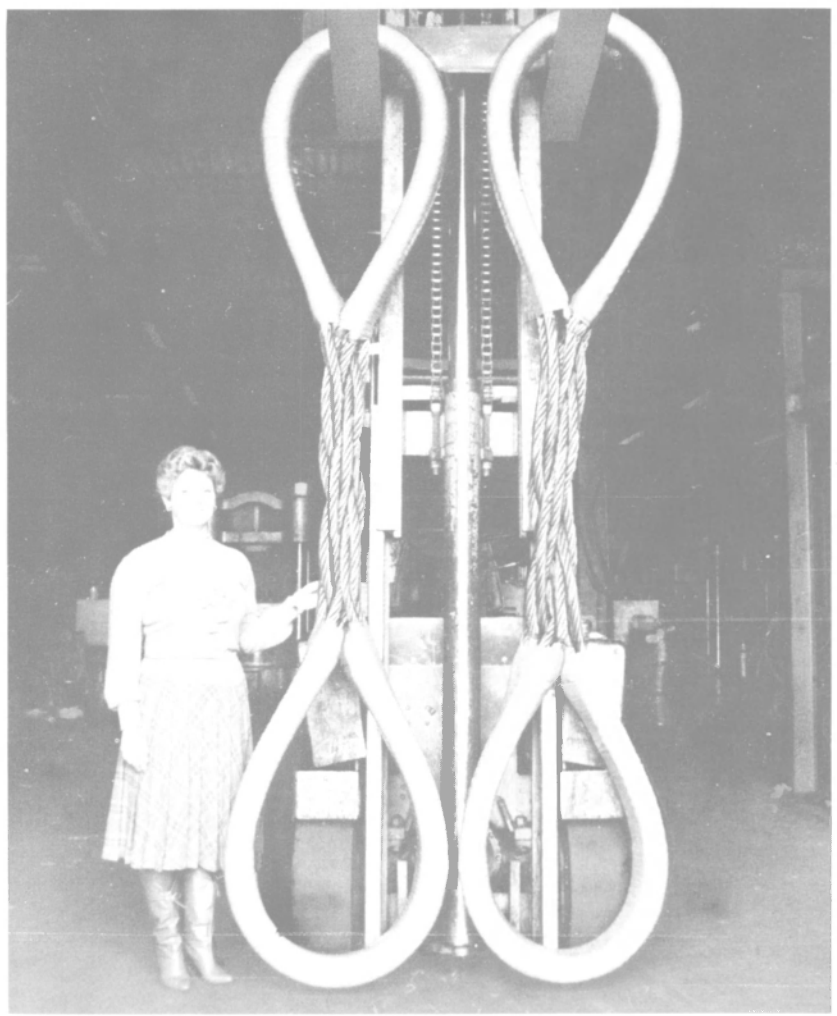

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But you want more than just fast delivery and low price. So Gator-Laid™ bodies are also more flexible, to assure you of easier handling. As a matter of fact, their loops are the most compact ever developed in a large lift sling, and they develop a 1/1 D to d body pin ratio. They can be made in shorter lengths too, and since each specified length is identical, their length tolerance is an unbeatable 0″

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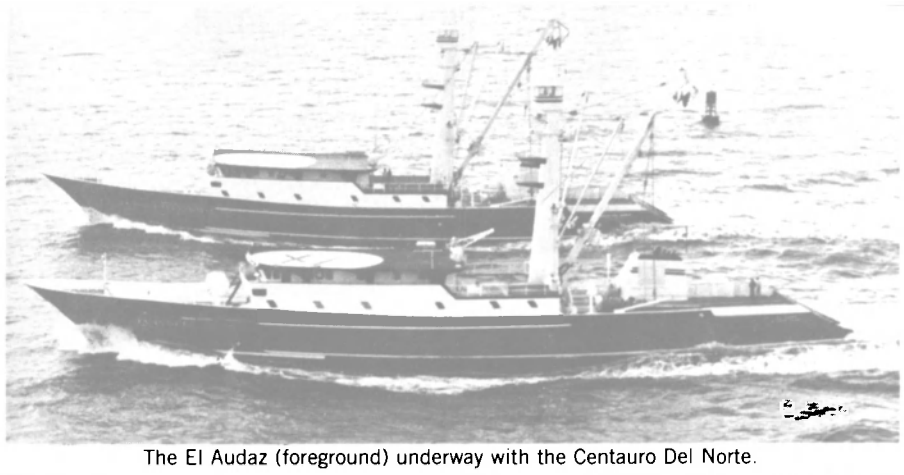

The El Audaz (foreground) underway with the Centauro Del Norte.

El Audaz

(continued from page 22)

Steering gear is hydraulic, a Wagner LAZ-16-35 furnished by W.E. Hough.

Four 100-hp Vilter compressors power the ammonia refrigeration system. The bow thruster is a Michigan/Jastram BU60 with a 49-inch propeller, powered by a Detroit 12V71 diesel engine with an output of 400 bhp at 2,100 rpm.

The main hydraulic systems were furnished by Marco. They include the WS 454 Super Seiner II seine winch, 3020 cork line winches, WO 332 brailing winch, and B56A power block. Miscellaneous Gearmatic winches are provided for vanging, topping, choking, and strapping.

Incorporated into the hydraulic system is a Slattery Alaska Marine deck crane on the forward deck and a Morris Whaley ring stripper. Navigation aids include a Sperry 8T autopilot and a Mark 37 gyrocompass.

Electronics, furnished by Honor Marine of San Diego and installed by Sassman Electronics of Mobile, include two Furuno FR1011 radars, Whelen strobe light, Furuno FE8130F echosounder, Taiyo ADF, Furuno VHF/ADF, Navidyne ESZP-3000 satellite navigation, Hull 2320A radiotelephone, Morrow SSB radio, Hull 922R/5 radio, Raytheon VHF radiotelephone system, Honor Marine public address system, Furuno FAX143 facsimile recorder, Bear Cat 300 scanning receiver, Sea Temp seawater temperature monitor, and Telcor windspeed indicator. A Krupp-Atlas sonar model 950 was also included in the electronics package.

Other equipment includes Crane Deming pumps, Buffalo Forge fans, Red Fox sewage treatment system, Westphalia (Centrico) centrifuges, Quincy air compressors, Argur alarm systems, Ansul engine room Halon fire suppression system, Cutler Hammer controllers, Waukesha stern bearings and seals, Hose McCann navigation light systems, International Paint coating systems, Engelhard Chloropacs, Everpure chlorinators, and Micros fresh water distillers.

The Bender-built tuna seiners have steel hulls and pilot houses of aluminum, reinforced for helicopter landings. Each boat is capable of carrying 1,200 tons of fish, 85,000/200,000 gallons of fuel, and 8,500 gallons of fresh water at a speed of 16 knots.

AMIR EXPRESS
Master Boat Builders

Saudi Tug Services, a joint venture company of McAllister Towing and Transportation and Olayan Financing Company, has taken delivery of four offshore supply vessels built by Master Boat Builders, Inc. of Bayou LaBatre, Ala.

The four new vessels—Amir Express, Khalifah Express, Malik Express, and Sultan Express—are on long-term charter to ARAMCO. Each has an overall length of 110 feet, molded beam of 26 feet, and molded depth of 10 feet 6 inches.

Main propulsion power is supplied by twin GM Detroit Diesel 16V71 engines, each with an output of 455 bhp at 1,800 rpm, driving through Twin Disc MG 518 reduction gears having a ratio of 5:1. Two 50-kw, 208/120-volt, 4-wire 60-cycle generators are driven by Detroit Diesel 4-71 engines at 1,200 rpm.

Each vessel is equipped with 60-inch-diameter, 4-bladed bronze propellers, Cutlass rubber stern tube bearings, and dual Electrol hydraulic steering system. Engine controls are by KoBelt Pneumatic Controls.

Deck machinery includes a Nautike 220 hydraulic pedestal crane and an electric, single-drum McElroy anchor-handling winch.

Electronic gear includes Furuno 701 radar, Hull 922 20-channel SSB radio, Datamarine Digital 3000 fathometer, Texas Instrument 9900 Loran C, and two Sailor 144 MAC VHF radios. Coatings were supplied by Devoe Coatings.

FRANK CANDIES
Champion Swiftships

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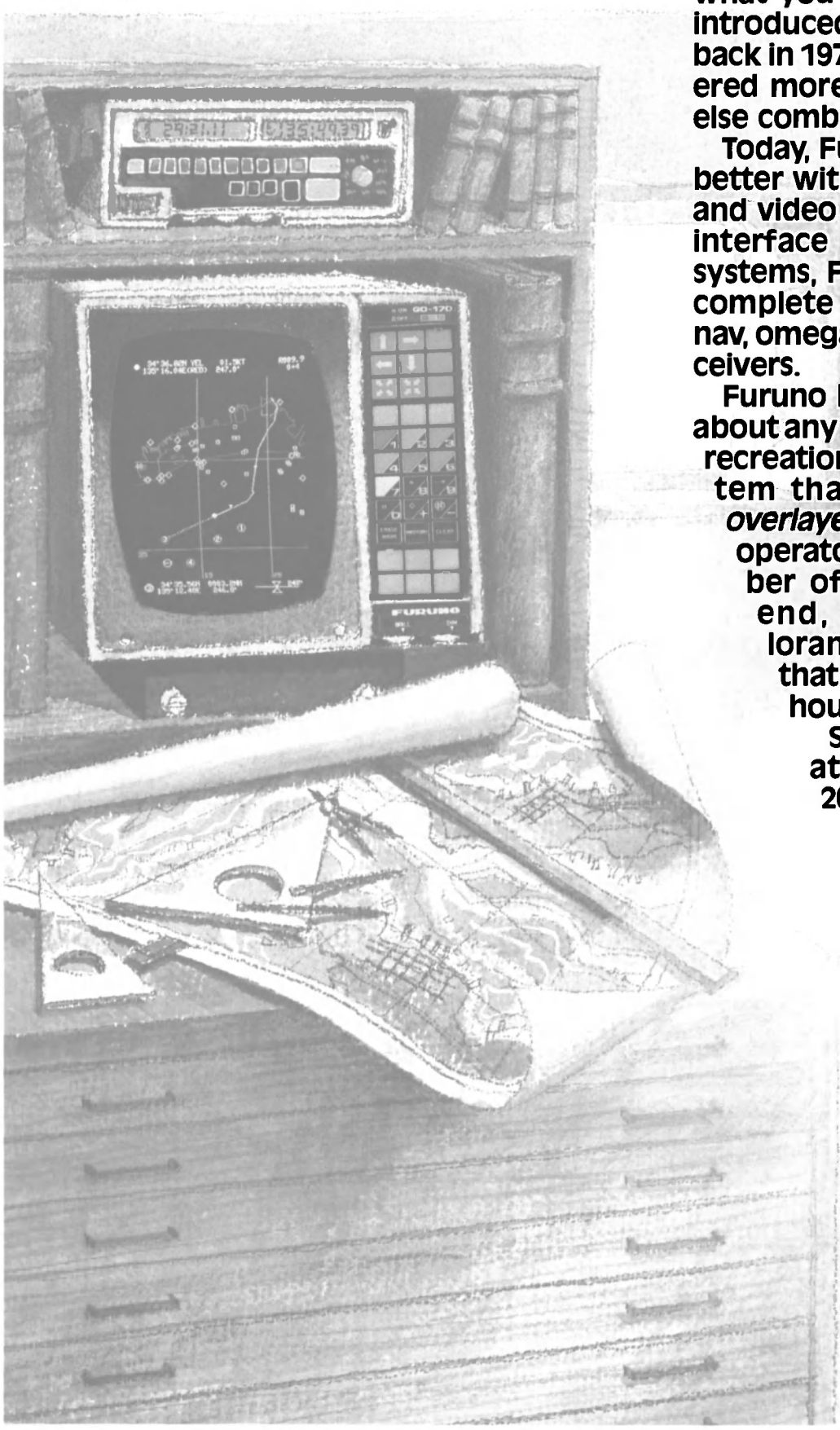
Other equipment includes a single-wildcat windlass by Markey, a TDSD32 Markey towing winch, and a Halon fixed fire-fighting system. Coatings were supplied by Ameron.

Main engines (2)	EMD
Reduction gears (2)	Reintjes
Propellers (2)	Coolidge
Shafts	Rabe
Bearings	Goodrich
Generator engines	Detroit Diesel
Engine controls	Wabco
Steering system	Sperry
Pumps	Marlow
Fire-fighting system	Halon
Sanitation system	Red Fox
Radars (2)	Furuno
Shortwave receiver	Panasonic
SSB radio	Hull
VHF radios (2)	Apelco
Loran C	Furuno
Depth sounder	Datamarine
Loudhailer	Raytheon
Satnav system	Okeanos
Windlass & winch	Markey
Coatings	Ameron

(continued on page 28)

FURUNO

Where the Plot Started



What you see in the illustration is our GD-170 color video plotter . . . what you don't see is that Furuno introduced video plotting to the U.S. back in 1979 and has probably delivered more of them than everyone else combined.

Today, Furuno helps you navigate better with a broad range of paper and video plotters. While these will interface with many navigational systems, Furuno can also provide a complete package with loran, sat nav, omega, or hybrid navigation receivers.

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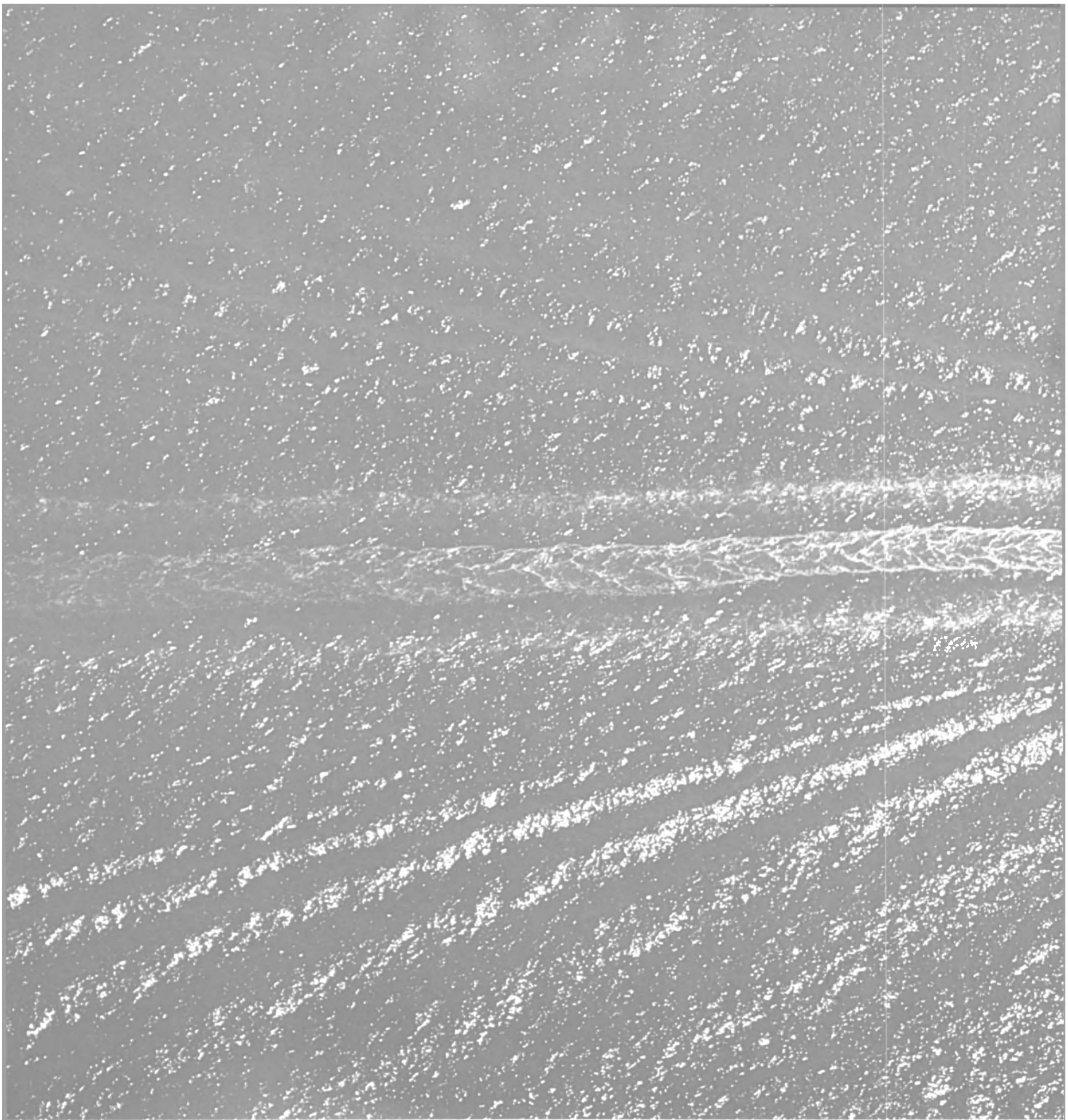

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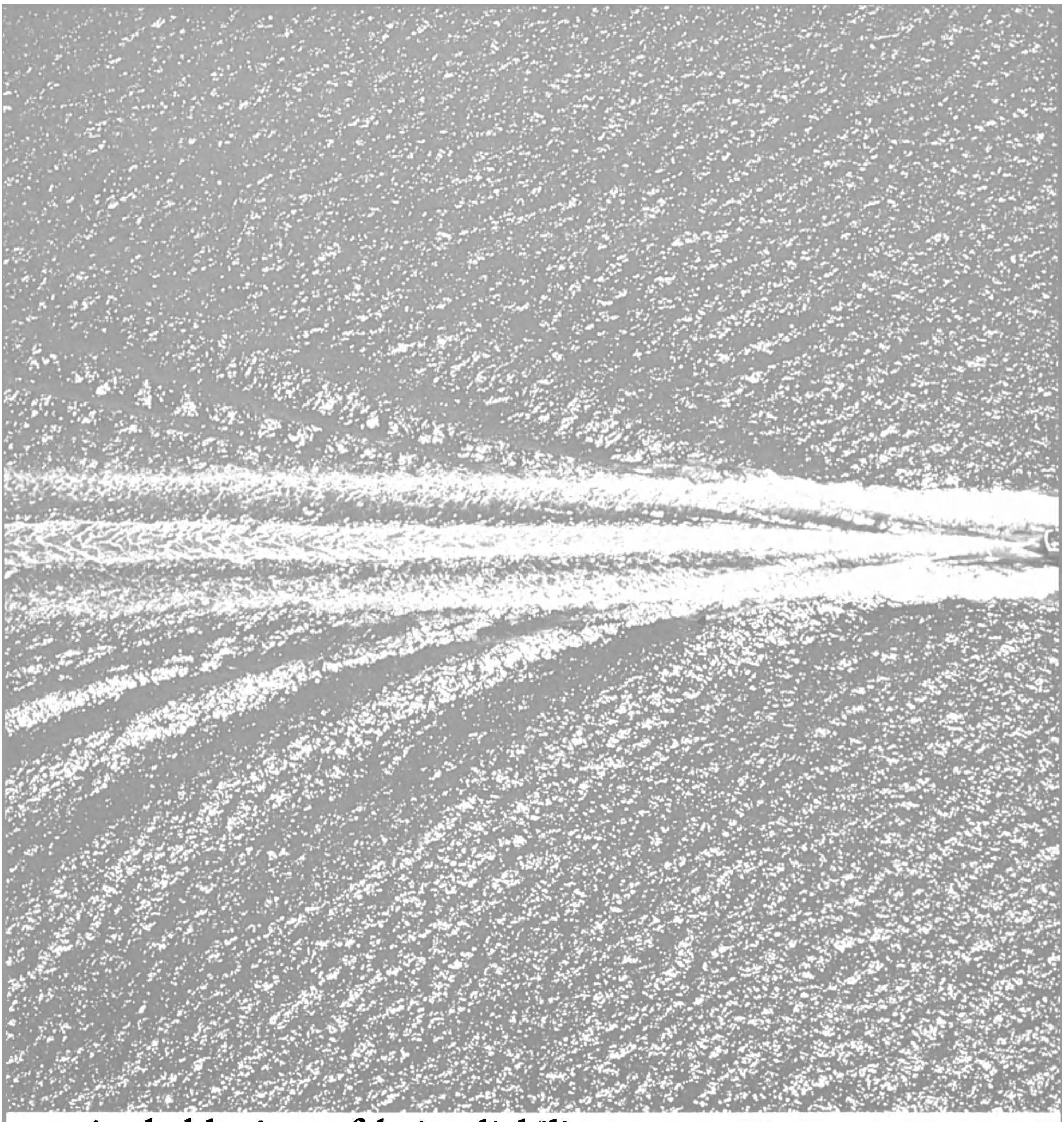

unmistakable signs of their reliability.

sign makes them easy to repair and service. In fact, our customers tell us that EMD engines consistently post the best in-service records of any engines in their fleets.

Taken together, the advantages of EMD engines add up to an overall benefit that can be described in simple terms: superior performance and superior economy. So contact us at the Electro-Motive Division, La Grange, Illinois 60525. Telex: 270041.

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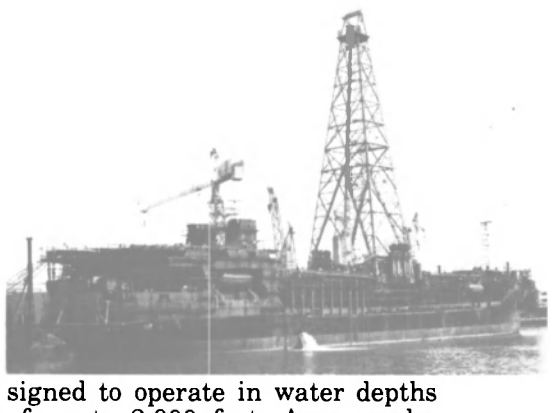
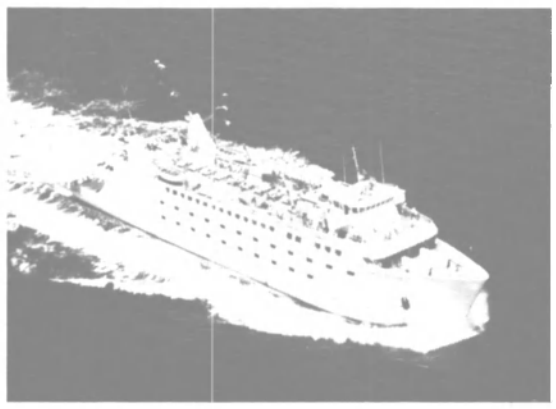
GLOMAR ROBERT F. BAUER and WESTERN PACESETTER IV
Far East Levingston

Far East Levingston Shipbuilding, Ltd. of Singapore in 1983 delivered a semi-submersible offshore drilling rig and a drillship. The drilling rig Western Pacesetter IV, said to be one of the largest exploration rigs in the world, was delivered to Western Oceanic Inc. of Houston. This semi is 260 feet long, 203 feet wide, and 116 feet deep. Twin ship-shaped pontoons support six caissons and the rectangular deck. The self-propelled rig has single-level machinery houses, two-level living quarters with helideck, and a substructure for the derrick.

This Friede and Goldman Pacesetter/North Sea Class rig is built to American Bureau of Shipping classification. It is designed to operate in water depths from 150 to 2,000 feet, and has accommodations for 90 persons.

The drillship Glomar Robert F. Bauer was delivered to Global Marine Drilling Company of Houston. Built to Global's design and American Bureau classification, the ship is 445 feet long, 35 feet wide, and 35 feet deep, with a deadweight of about 7,100 tons. Full-load design draft is 24.5 feet. The Bauer is designed to operate in water depths of up to 2,000 feet. Accommodations are provided for 97 persons; facilities include a six-bed hospital.





GRAND REPUBLIC
Offshore Shipbuilding

The Bridgeport & Port Jefferson Steamboat Company of Port Jefferson, N.Y., highlighted the celebration of its 100th anniversary in 1983 with the introduction of its new passenger/auto ferry Grand Republic. The 16-knot, 280-foot vessel was built by Offshore Shipbuilding of Palatka, Fla.

The new Grand Republic is built to the latest requirements of the American Bureau of Shipping and the U.S. Coast Guard. No wood or other flammable materials were used in the construction of the vessel, which is fitted with a Halon automatic fire-fighting system and a Wormald sprinkler installation for maximum safety.

McAllister vice president of engineering **Donald C. Hankin** designed the vessel, and working drawings were provided by Bold Craft Engineering of Jacksonville, Fla. In addition to carrying 1,000 passengers, 85 automobiles, and/or a combination of trucks and recreational vehicles, the Grand Republic is fitted out with a large cocktail area and bar as well as full restaurant facilities.

The two main engines for the twin-screw vessel are the latest model Caterpillar 3516TA diesels, fitted with 5:1 Reintjes reduction gears delivering 1,500 bhp to each shaft. Propellers are Columbian Bronze 82-inch-diameter, 4-bladed stainless steel. Ship's service and emergency generators are also powered by Caterpillar diesels.

The Grand Republic is fitted with a Schottel bow thruster with a 48-inch-diameter propeller, pow-

(continued on page 30)

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Since 1933, St. Louis Ship has been known throughout the Inland Waterways System for its Versatility and Performance, as well as for its Quality Construction and Quality Repairs. Long known for pioneering shallow draft marine technology, the company has been the leader in design improvements for river towboats and barges. The Hydrodyne Hull, introduced in 1963, has been continuously improved through the years to attain the optimum in fuel efficiency. Today, St. Louis Ship maintains the people and the equipment to do your next job the way you want it done—right. Please contact us at (314) 638-4000, today.

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Grand Republic

(continued from page 28)

ered by a 400-bhp Cat diesel through a Twin Disc reduction gear. All of the Caterpillar equipment, the Tug Mate machinery monitoring system, and the air controls with Reintjes and WABCO components were supplied by H.O. Penn Machinery Company.

Steering equipment consists of an SSI 4-station, electro-hydraulic system. The SKF OK shaft couplings were supplied by Bird-Johnson; shaft bearings were manufactured by Johnson Rubber and Cooper Bearing. Radars and VHF radio are by Raytheon, and the fathometer is from Datamarine.

GRAND REPUBLIC
Major Suppliers

Main engines (2)	Caterpillar
Reduction gears (2)	Reintjes
Propellers (2)	Columbian
Shaft bearings	Johnson/Cooper
Shaft couplings	SKF
Bow thruster	Schottel
Steering	SSI
Machinery monitoring	Tug Mate
Generators	Cat/Kato
Fire protection	Wormold
Pumps	Goulds/Viking
Cathodic protection	Engelhard
Sewage treatment	Omnipure
Air controls	Reintjes/WABCO
Radars (2) & VHF	Raytheon
Fathometer	Datamarine
Deck crane	Alaska Marine (Slattery)
Capstans & windlass	McElroy
Anchor	Baldt
Searchlight	Carlisle & Finch

IKALUK/MISCAROO
Nippon Kokan K.K./ Vancouver Shipyards

Beaudrill Ltd., a subsidiary of Gulf Canada Resources Inc. of Calgary, Alberta, took delivery at mid-1983 of the Ikaluk, first of two 14,900-bhp Arctic Class 4 ice-breaking anchor-handling/supply vessels for operations in the Canadian Arctic. She was built at the Tsurumi Shipyard of Nippon Kokan K.K. in Yokahama to a design by Robert Allan Ltd. of Vancouver, B.C. The sister ship, Miscaroo, was delivered about three months later by Vancouver Shipyards Company Ltd. of North Vancouver, B.C. Both vessels will constitute a vital part of Gulf Canada's drilling operations in the Beaufort Sea.

The new vessels are among the most powerful of their type in the world, and are said to be the first commercial vessels constructed to

the Canadian Coast Guard's high Arctic Class 4 Regulations. Designed to operate in conditions of minus 50 C, they will break level ice up to 1.2 meters (almost 4 feet) thick at a continuous speed of about 3 knots.

The propulsion plant consists of a geared diesel/C-P propeller combination. The four main engines are Wartsila Vasa 8R32 diesels rated 3,725 bhp each at 750 rpm. These engines, in pairs, drive two 3,750-mm (12.3-foot) Lips controllable-pitch, stainless steel propellers through two Lohmann & Stolterfohtt dual-input/single-output reduction gearboxes, model GVA 1400 SO, with a ratio of 4.5:1. Each gearbox incorporates an auxiliary drive for a 1,200-kva alternator.

Several unusual features enhance performance in ice. Among these are a hull form incorporating a forefoot wedge designed to deflect ice from the path of the vessel, and large bossings over the propeller nozzles and rudders to protect them from ice.

Maneuverability is improved by electrically driven thrusters located fore and aft. The bow thruster is a 1,200-hp Omnithruster model JT 1300, and the stern thruster is an 800-hp KaMeWa model 1650 B/AS with controllable-pitch propeller. The Omnithruster has been modified to incorporate an ice/hull lubrication system that ejects an air/water mixture along the forward half-length of the hull, which is coated with an epoxy paint, Inerta 160, to reduce hull/ice friction.

The Ikaluk and Miscaroo have an overall length of 78.85 meters, molded beam of 17.22 meters, molded depth of 9.70 meters, and design draft of 7.50 meters (258.7/56.5/31.8/24.6 feet).

A spacious wrap-around wheelhouse provides maximum visibility for both anchor-handling and icebreaking operations. Full ship control consoles are located center forward, in the forward wings, and center aft. Wing controls are located at the wheelhouse aft station and in a separate control room located above the main winch. Winch and anchor-handling operations are monitored by closed-circuit television.

Deck machinery includes a Burrard Iron Works HLQW quadruple-drum, anchor-handling/towing winch with a line pull of 150 tons; two Hydralift cargo cranes; three Burrard Iron Works CH6 deck capstans; and two Gearmatic 66 tugger winches, each with a line pull of 15 tons.

In addition, there are two Burrard Iron H7V anchor windlasses rated 20 tons at 10 meters per minute, and two Burrard HE hydraulic-driven pennant storage winches.

Ship's service electric power is provided by two Caterpillar 3412T diesel generator sets rated 395 kw at 1,800 rpm; a Cat 3404 diesel generator set rated 100 kw at 1,800 rpm provides harbor service.

Navigation and communications equipment includes: two Decca radars, model TM 1628 with 12-inch slave unit, and model TM 1266C; two Sperry gyrocompasses, MK 37; Wagner MK 4 autopilot; Honeywell Elas LAZ-72 fathometer; Magnavox MX 1105 satellite/Omega navigator; and a JMC 2215 automatic direction finder.

In addition, there are Marconi CH150S SSB radios, a Spilsbury FMX-95S VHF-FM radio, Wulfsberg WCS-300 VHF-AM radios, Sperry SRD-301B doppler log, Alden Marinefax IV weatherfax, and Simrad RW 105 and Marconi SM100 watch receivers.

Accommodations are provided for a crew of 22 persons, all in private cabins, as well as spacious lounges, recreation areas, and a sauna. Particular attention to reduction of vibration and noise has resulted in noise levels of less than 63 decibels throughout the accommodations while under full power.

KODIAK I
Halter Marine

The largest, most powerful, diesel-electric, anchor-handling tug/supply boat ever built in the U.S. was delivered in 1983 by Halter Marine, Inc. of New Orleans to the Penrod Drilling Corporation of Dallas. The Kodiak I is the first of two 12,280-bhp sister ships that are 225 feet long overall, with a beam of 52 feet, depth of 24 feet, and draft of 20 feet. She is also the first of Halter's new Sea Titan Class vessels that are designed to work just about anywhere in the world from the Arctic to the tropics. The Sea Titan design not only meets the requirements imposed by harsh, icy environments, but provides 35 tons of air conditioning to improve habitability in hot climates.

Main engines (4)	Electro-Motive
Main generators (4)	Electro-Motive
Reduction gears (4)	Philadelphia
Propulsion motors (4)	Reliance
Propellers (2) & shafts	Coolidge
Bearings	Johnson
Generator	International
Panels	General Electric
Engine controls	Ross-Hill
Engine alarms	EMI
Steering system	SSI
Bow thrusters (2)	Schottel
Stern thruster	Schottel
Thruster motors (3)	Reliance
Separators	Westfalia (Centrico)
Pumps	Aurora, Magnum, Mission, Viking
Fire monitor	Elkhart
Fire-fighting system	Kidde
Air compressors	Quincy
Sanitation system	Microphor
Air conditioning	Carrier
Distiller	Sweetwater
Lighting	Aqua-Signal, Carlisle & Finch Pauluhn, Phoenix
RDF	Si-Tex
Radar	Decca
SSB radio	Harris
VHF radio	Sailor
Satellite navigator	Decca
Gyrocompass, autopilot	Sperry
Loudhailer	Raytheon
Rudder angle indicator	SSI
Winches	Smatco, Beebe
Capstan, tuggers	Smatco
Windlass	Smatco
Coatings	Elinca, Porter

The design of the Kodiak I, which was tested before construction at the Maritime Research Institute in the Netherlands, features a molded hull rather than the traditional chine type. The molded hull is said to pound less and have better seakeeping characteristics. The high, tapered bow also helps to reduce pounding because of its reduced flare, which gives it a smoother entry into the sea without slamming and with a subsequent easy recovery.

The Kodiak I represents an entirely new design, including higher horsepower and kilowattage, increased cargo and pumping capacity, long range, rig anchor chain stowage, higher speed, fire-fighting and rescue capabilities, and excellent sea-keeping ability. All this was achieved while keeping the vessel under 500 gross tons.

Kodiak I's propulsion plant comprises four GM Electro-Motive Division 16-645-E7B diesel engines driving four 2,100-kw EMD generators. Together they produce 12,280

bhp at 900 rpm, or 8,400 kw. The generators feed ac power into a Ross-Hill silicon controlled rectifier unit, which converts the ac power into dc to power the four Reliance 2,500-hp propulsion motors. The power pool created allows the captain to draw as much power as is put in, and the power can be distributed wherever needed.

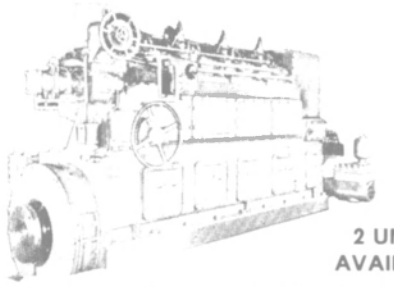
As the Kodiak I is designed for

(continued on page 36)

BRONZE HORIZONTAL 10HLV INGERSOLL-RAND CARGO PUMP

Ingersoll-Rand 10HLV — 14"x10". Bunker Fuel: 5150 GPM — 370' head — 1885 RPM. Sea Water: 6000 GPM — 352' head — 1885 RPM. Reduction Gears: G.E. type S-233 — Form AE — 700 HP — 6002/1685 RPM. TURBINE: G.E. D.P. 25 Class 4 — 700 HP — 6002 RPM — PSIG 775 lbs — 825 — inlet temp. 560° - 600° max. Exhaust pressure 179" Hg absolute.

NEW CLARK 500BHP DIESEL 4-CYL. — AIR STARTING



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500 BHP @ 400 RPM. 4-Cylinder straight inline type — 12½" X 16" — 2-stroke single acting — liquid cooled — direct reversible — CW rotation. With standard shaft-connected starting air compressor. 46,000 lbs., net weight—228" long—98" wide—132" high. Designed for heavy duty, rugged use, its extreme simplicity will result in lower operating and maintenance costs.

LOUIS-ALLIS M.G. SETS

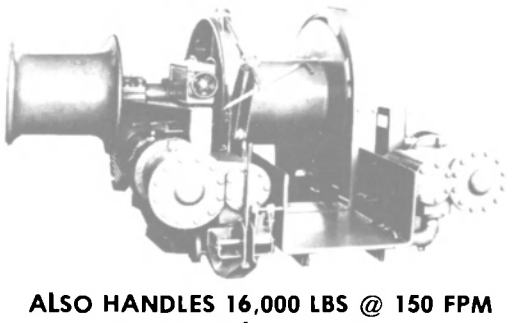
2.5 KW 120 Volt Single Phase 60 Cycle Output
120 Volt D.C. Input — 1800 RPM
or
230 Volt D.C. Input — 1800 RPM
NEW - UNUSED EX - U.S.N.

2½ KW—115 volts single phase A.C. output. GENERATOR: Type GNA—class 1G— Frame 28A—Form A—1800 RPM—5 KVA—2.5 KW 115 volts AC— 60 cycle —50% PF—43.4 amps. MOTOR: Louis Allis—Type GNA—Class E—Frame 25A—Form A—1800 RPM—115 volts DC—32 amps—shunt wound (with attached Ward-Leonard frequency regulator).

CAN FURNISH WITH 230 VOLT DC INPUT

STEAM MOORING WINCHES

12" x 14" — STEAM OR AIR DRIVEN
with foot brake & declutchable gypsy head
20,000 LBS @ 100 FPM—FIRST LAYER



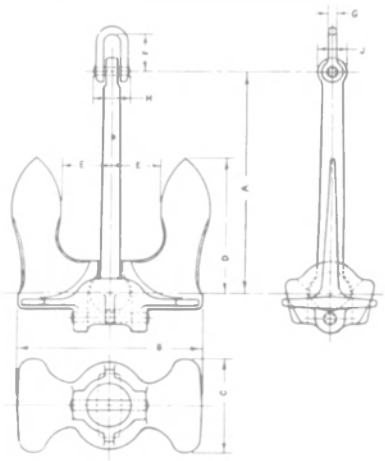
ALSO HANDLES 16,000 LBS @ 150 FPM
OR 50,000 LBS @ 8 FPM

Drum will show 1500 ft of 1⅛" wire in 9 layers. Steam inlet 3½"-4" exhaust — 171 PSI working pressure. BASE DIMENSIONS: 6' x 6' 3½" — overall 8' 4½" wide x 9' long. Mfg. by Friedrich Kocks — Bremen, Germany. Recently removed from ARCO "Challenger." Suitable for vessels 75000/200000 tons.

ALSO IN STOCK
12" x 14" Double Gypsy Unit
ALL UNITS CAN BE DEMONSTRATED RUNNING

NEW — UNUSED — LARGE

BALDT-TYPE ANCHORS
WITH CERTIFICATES

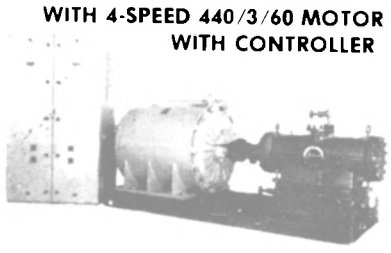


(1) — Stockless — 5050 kilograms (11,133 lbs.)
(1) — Stockless — 5100 kilograms (11,243 lbs.)

NEW — UNUSED

DANFORTH TYPE ANCHORS
WITH CERTIFICATES
1000 LBS.

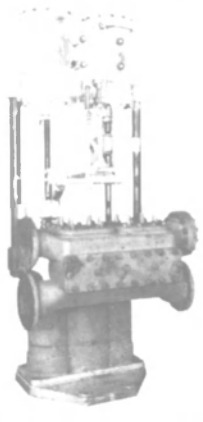
700 GPM @ 150 PSI
NEW — EX-USN
DE LAVAL MOTOR DRIVEN ROTARY HORIZONTAL PUMPS
WITH 4-SPEED 440/3/60 MOTOR
WITH CONTROLLER



Inlet 8" — outlet 6". Powered by 4-speed 440/3/60 motor — 100/75/50/37.5 HP — 1200/900/600/350 RPM — with Cutler-Hammer control. Weight 10,000 lbs. Inquire for complete details.

ALLIS-CHALMERS BRONZE BALLAST OR CARGO OIL PUMP

PUMP: 12" x 10" — 6000 GPM — 180' head — 340 HP — 1225 RPM. Impeller diameter 19.75". GE GEAR: Type S-233 — 5022/1225 RPM. GE TURBINE: GE Model 7TDPY125MR41 — 340 HP — 5022 RPM — inlet pressure 775 lbs. — 825 PSIG maximum — 600°TT.



DEAN BROS. ALL BRONZE STRIPPING PUMP — BILGE & BALLAST 12 x 10 x 18

Max. pressure 730 GPM @ 200 lbs — steam end 250 lbs. Serial 67735 — OA Dimensions: 43" wide — 39' deep — 104" high. Complete with spare unused bronze valve deck & spare liquid lines piston, steam end spares, rods, etc. This pump ready for immediate use — equal to new — little if any use.

NEW STEEL HATCHES AI
(SEE OUR CLASSIFIED AD

24" I.D. MAN-WAY 3-DOG HATCHES

18" Coaming. Available with T socket wrench or removable handwheel (can be welded in place) for top opening. Spring-loaded lid w/inside handwheel. Coaming 12mm thick, top 11mm. Bosmet drawing #67/56

20" ROUND HATCH

18" Coaming — 3 brass dog drop bolts. Coaming 12mm thick — top 11mm. Bosmet #68

QUICK-ACTING 4-DOG HATCHES

Heavily constructed. Handwheel operated. Handwheels top & bottom. Size A: 27" x 21" w/12mm coaming & 11mm top. Size B: 31" x 31" w/12" coaming. For ocean-going barges, tugs, etc.

GENERAL PURPOSE HATCH

15" X 23" X 5"
WITH
4 STEEL DOGS

TAN
EXPANSIC
36" Diameter — 26'
drop-bolts. Drawing

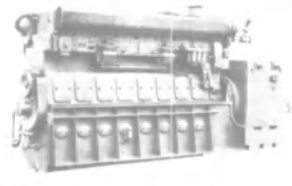
CARGO
69" x 75" x 12"
72" x 74" x 12"

QUICK-OPEN
Handwheel top & bo
24" with 5" coaming

FRONT

BACK

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.

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Main Office: (301) 53
CABLE: BOSIRON—BALTIMORE,

D DOORS IN STOCK
FOR MORE DOORS)

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TRUNK
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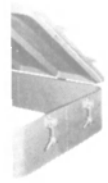


TCHES
48" x 48" x 9"
36" x 30" x 8"

3 HATCH
1. 4 Dogs. 16" x
awing #60-40

STORES
OADING
PORT
ge side port
uble door and
me. Clear open-
: 7'6" high X
" wide. 24 Dog
fitted with bar
ongback. Made
3/8" steel.
efully removed
m Alcoa "Sea-
be."

21" I.D. MAN-WAY
3-DOG HATCHES

10" Coaming. Available with T socket wrench or removable handwheel (can be welded in place) for top opening. Coaming 12mm thick, top 11mm. Basmet #64/55

FLUSH HATCHES

24" x 30" 30" x 30"
4 Dogs bottom — T-key top opener. 4" Maximum coaming. Coaming 8mm thick — top 7mm.

25" ROUND HATCH

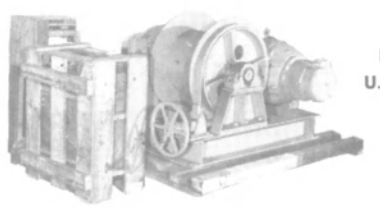
25" Diameter with 18" coaming. 4-Dog handwheel top and bottom. Quick-acting dogs. 11 mm x 12 mm steel.

NEW 18" & 24"
HATCH COVERS

Flush mounting watertight hatch with machined steel mounting ring. T-Handle is recessed and hand tightens against a strongback across mounting ring. Approx. weights, including mounting ring: 18" 60 lbs — 24" 100 lbs.

GENERAL PURPOSE WINCH
3500 LBS AT 200 FPM

NEW UNUSED



EX U.S.N.

A.C. Motor drive—25/12.5 HP—GE 440/3/60—40°C AB —1750 RPM—type KR—full load amps 32. Motor drives winch through Falk reduction gear. Has compressor hand brake.

I METALS CO.

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00 Marine Dept.: (301) 752-1077
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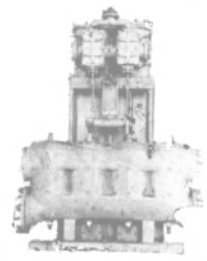
WORTHINGTON 16" X 14" X 18"
VERTICAL DUPLEX STRIPPING PUMP



1400 GPM @ 110 PSI — suction lift 11.5 ft. — steam back pressure 15 lbs. 14" Suction —10" discharge — 2½" steam — 4" exhaust. Overall width 6'8" — overall height 9'1½" — depth 3'9½". Wt. approx. 10,000 lbs.

RECONDITIONED 1980
ABS — READY TO GO

NEW U.S. MARAD-TYPE
AXIAL FLOW FANS

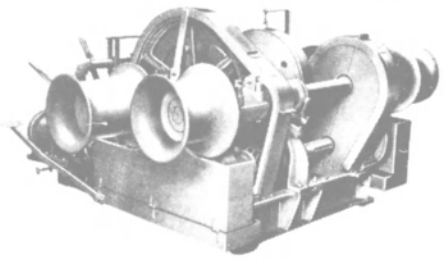
(3) 10,500 CFM Model AF-100, "Baldor" 5 HP motor — 440/3/60 — 40° — 1750 RPM — 7 amps.

(2) 40,665 CFM — size 43AF — 60 HP Baldor Motor — 440/3/60 — 1760 RPM — 75 amps — 50° rise — Frame 364TZ Ins. F

NEW NAVY 12,000 CFM
EXPLOSION PROOF
AXIAL FLOW FANS

Model A12A4X6 with 10/3 HP 2 speed motor.

7x12 10,000 LB AH&D
CARGO WINCHES

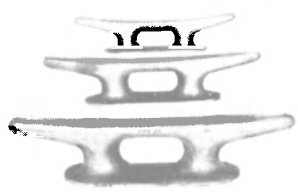


2-Speed — single drum — reverse throttle operation. LINE PULL: low gear 10,000 lbs — high gear 5,000. LINE SPEED: low gear 125 FPM based on 1st layer of 7/8" diam. rope — high gear 250 FPM based on 1st layer of 5/8" diam. rope. DRUM: 26" diam. — 20" long — 26" flange diam. Rope capacity of drum: 7/8" diam. rope in 6 layers — 650'; 5/8" diam: rope in 8 layers 1200'. Steam pressure at throttle 115 lbs. Operating weight 6450 lbs.

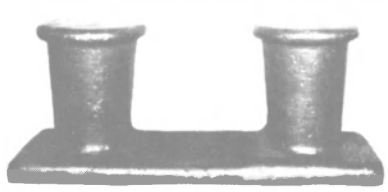
NEW CHOCKS - CLEATS - BITTS
CAST STEEL

OPEN CHOCKS

Overall length 2' 3¾" — top opening 6" — width 9"



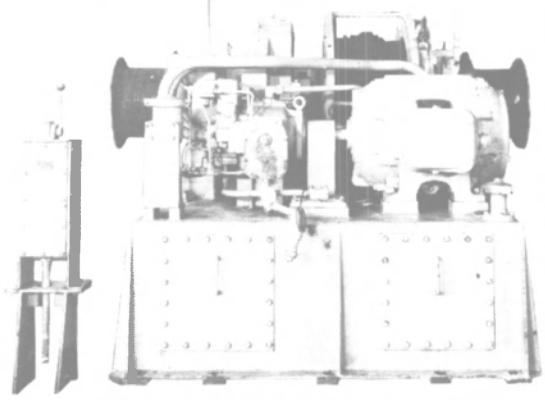
36" - 42" - 48" KEVEL CHOCKS



10" DOUBLE POLE BITTS

50 HP VARIABLE SPEED
ELECTRO-HYDRAULIC
SINGLE DRUM
CARGO WINCH
with deck controls

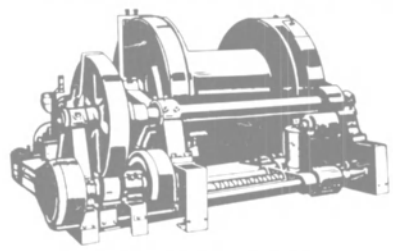
SELF-CONTAINED WITH PUMP MOTOR & RESERVOIR IN BASE



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.

PLANS ON REQUEST

LARGE STEAM
TOWING ENGINE
9 X 10 TWIN ENGINE DRIVE
Air or Steam — 125/250 PSI



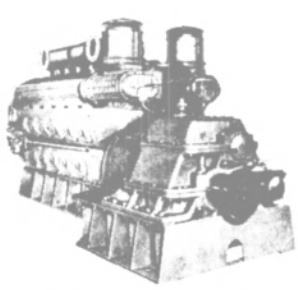
Heavy-duty Clyde with 36" diameter X 51" Face single drum. Flanges 68". CAPACITY: Up to 2800' of 2" wire rope. Normal line pull 40,000 lbs@ 50 FPM. Steam or air pressure required 125 to 250 PSI. Can be adapted to electric drive or increased steam or air pressure to a capacity of 82,000 lbs @ 20 FPM. Pawl holds 270,000 lb. pull from any layer. Equipped with level wind device. Approximate weight 30,000. DIMENSIONS: 12'6" wide—6'6" high. Write for details.

ALSO AVAILABLE

Large towing ring — 36" I.D.

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.

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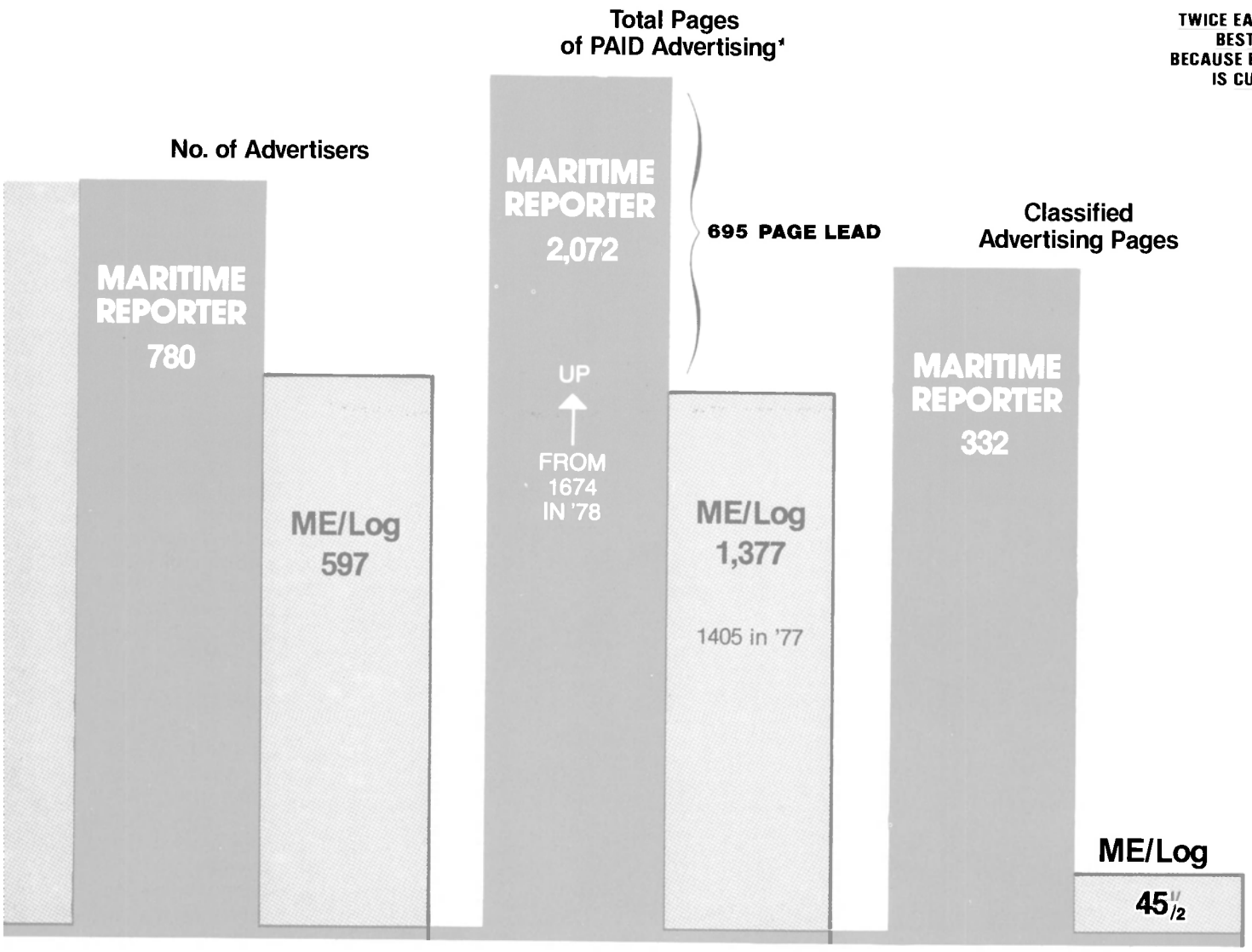

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Circle 127 on Reader Service Card

Kodiak I

(continued from page 31)

long voyage towing, she is fitted with a full complement of Smatco/Norwich deck machinery, including an electro-hydraulic, double-drum waterfall towing winch with a combined pull of 500 tons; two tugger winches, two double cable storage reels, two electro-hydraulic capstans, and an anchor windlass.

Maneuverability and station-keeping is enhanced by two bow thrusters and a stern thruster, all provided by Schottel and driven by Reliance electric motors. Kort nozzles surround the two 142-inch-diameter, 5-bladed stainless steel main propellers. A Flume passive stabilization system is installed to improve the vessel's stability.

JUSTIN T. ROGERS

St. Louis Ship

The river towboat Justin T. Rogers, built by the St. Louis Ship Division of Pott Industries for Midland Affiliated Company of Cincinnati, was delivered in early 1983. She is powered by a pair of M.A.N.-B&W 16U28L 4-stroke, medium-speed diesel engines that are capable of burning heavy blended fuels up to 2,100 seconds Redwood. While burning No. 2 diesel oil, the two engines develop a total of 8,364 bhp at 775 rpm; total output is 7,524 bhp at 750 rpm while burning heavy fuel.

Second of its class built by St. Louis Ship for Midland, the Rogers, along with sister vessel Jim Ludwig, are said to be the first modern U.S. river towboats built from the keel up to burn heavy fuel. Both vessels feature a state-of-the-art heavy fuel handling and cleaning system designed by Midland in conjunction with M.A.N.-B&W and Marine Consultants & Designers, Inc., naval architects and marine engineers of Cleveland.

The engines are connected through the new Falk MQR configuration 4,086:1 reverse/reduction gears to Coolidge 120- by 130-inch, 5-bladed, stainless steel propellers mounted in Kort nozzles. Engine controls are by Mather, and engine monitoring equipment was supplied by Pan American Systems. Electric power is supplied by two International Electric 200-kw generators driven by Detroit Diesel 8V92 engines.

An interesting feature of the Rogers is its exhaust waste heat recovery system, used to heat fuel bunkers and crew quarters, designed by the Engineering Controls Division of St. Louis Ship. The shipyard also supplied the F.A.S.T. sanitation system.

Electronic and other navigation equipment includes two Decca radars, RR1226 and RR1216A, Honeywell Elac depth sounder, Rivertronics swing indicator, Perko navigation lights, R.L. Drake MRT-55 VHF radio, Northern N55A SSB radio, three Carlisle & Finch searchlights, and Kahlenberg air horn.

Pumps were supplied by Aurora (fire), Gorman-Rupp (bilge), and Viking (FO transfer). Alfa-Laval provided the centrifugal separators, Va-Power the oil-fired boiler, and A. O. Smith the water heaters. Deck equipment includes a Schoellhorn-Albrecht capstan and four Patterson winches. Air compressors are by Quincy.

The St. Louis Ship "Hydrodyne" hull of the Justin T. Rogers has an overall length of 187 feet, a beam

(continued on page 38)

Marine Insurance. If it's Greek to your company, you could be in for a big surprise.

Understanding insurance—especially marine insurance—is a full-time job. So if you're at the helm of your own company, how can you be expected to keep up with the ins and outs?

At Adams & Porter, we know every bend, shoal and snag in the business. Marine insurance brokerage is where we made a name for ourselves 75 years ago.

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ADAMS& PORTER

We take the myth out of corporate insurance.

Justin T. Rogers

(continued from page 36)

of 47.8 feet, and a depth of 12 feet. Operating draft is just over 9 feet.

Midland's decision to build heavy-fuel boats was based purely on economics. The price and availability of fuels are two major factors in moving cargo competitively. Midland operates the Rogers on the lower Mississippi River between Cairo, Ill., and New Orleans. The new vessel is used to transport coal, grain, and other dry bulk commodities.

KALVIK/TERRY FOX

Burrard Yarrows

Burrard Yarrows Corporation headquartered in North Vancouver, B.C., Canada's biggest West Coast shipbuilder, in 1983 delivered two identical icebreaking, anchor-handling/tug-supply vessels to Gulf Canada Resources Inc. of Calgary, Alberta. Named Kalvik and Terry Fox, these vessels are reported to be the most powerful of their type in the free world. Kavlik was built at Burrard's Victoria Division on Vancouver Island and the Terry Fox was built at the Vancouver Division in North Vancouver. Design and supervision of construction was carried out by naval architects German & Milne Inc. of Montreal.

The 2,200-dwt vessels have an overall length of 288.7 feet, beam of 57.4 feet, depth of 32.8 feet, and operating draft of 26.25 feet. They carry crews of 18 persons and are designed for optimum performance in both open and ice-covered waters.

Each vessel is powered by twin TM510 Stork Werkspoor diesels with a total output of 23,200 bhp, driving through Lohmann & Stolterfoht single-reduction gearboxes to open, controllable-pitch Lips propellers. A 1,000-kw generator is clutched off each gearbox; in the icebreaking mode, these generators are dedicated to driving the Wartsila air bubbler system. Main engine controls are by ASEA. Ship's service electric power is provided by two 750-kw ac generators driven by Caterpillar diesels. A 200-kw emergency generator is also installed.

In addition to the large centerline rudder, steering is assisted by a 500-hp stern thruster supplied by Maritime Industries. The air bubbler system also functions as a bow thruster. A special coating, Inerta 160, covers the hull up to the main deck, protecting the hull and reducing hull-ice friction.

Particular attention has been given to the form of the forward part of the vessels to prevent ice from flowing under the hull and being ingested into the propellers. In addition, the bow design has been developed to maximize both level ice and ridge ice penetration performance. Special attention has been given to directional stability in the ice-ramming mode.

The hull is of double chine form and incorporates a semi-spoon bow, forward ice plow, and raked transom stern. A double skin arrangement provides both protection and the ability to operate at a constant draft by adjustment of the quantity of ballast in relation to quantites of fuel, cargo, etc. being carried.

To simplify construction, the hull is of fully developable form. This is particularly advantageous as the shell plating and hull support structure are of EH36 modified special quality steel.

A sophisticated towing and anchor-handling system has equipment arranged under cover for protection from Arctic weather. The towing system includes an 80-ton Van der Giessen towing winch and a friction brake capable of up to 390 tons of holding power. Anchor handling will be carried out with a double-drum, waterfall type winch, each drum capable of 200 tons pull.

The Kalvik and Terry Fox have been built to the highest class of Lloyd's Register of Shipping and to the Arctic Shipping Pollution Prevention Regulations for an Arctic Class 4 vessel, all to the approval of the Canadian Coast Guard.

KALVIK/TERRY FOX
Major Suppliers

Main engines (2)	Stork Werkspoor
Reduction gears (2)	Lohmann & Stolterfoht
Propellers (2)	Lips
Engine controls	ASEA
Steering, autopilot	Wagner
Stern thruster	Maritime Industries
Bubbler system	Wartsila
Generator engines	Caterpillar
Pumps	Pumps & Power
Winches	Van der Giessen
Radar	Decca
Satnav	Marinav
Doppler log, gyrocompass	Sperry

NAVASOTA

Patti Shipbuilding

Patti Shipbuilding of Pensacola, Fla., in early 1983 delivered the 100-foot oceangoing tug Navasota to Brazosport Towing Company of Freeport, Texas. Classed +Al + AMS Loadline, All Ocean Towing Service by the American Bureau of Shipping, the new vessel brings to 14 boats owned and operated by Brazosport Towing in coastal and international service.

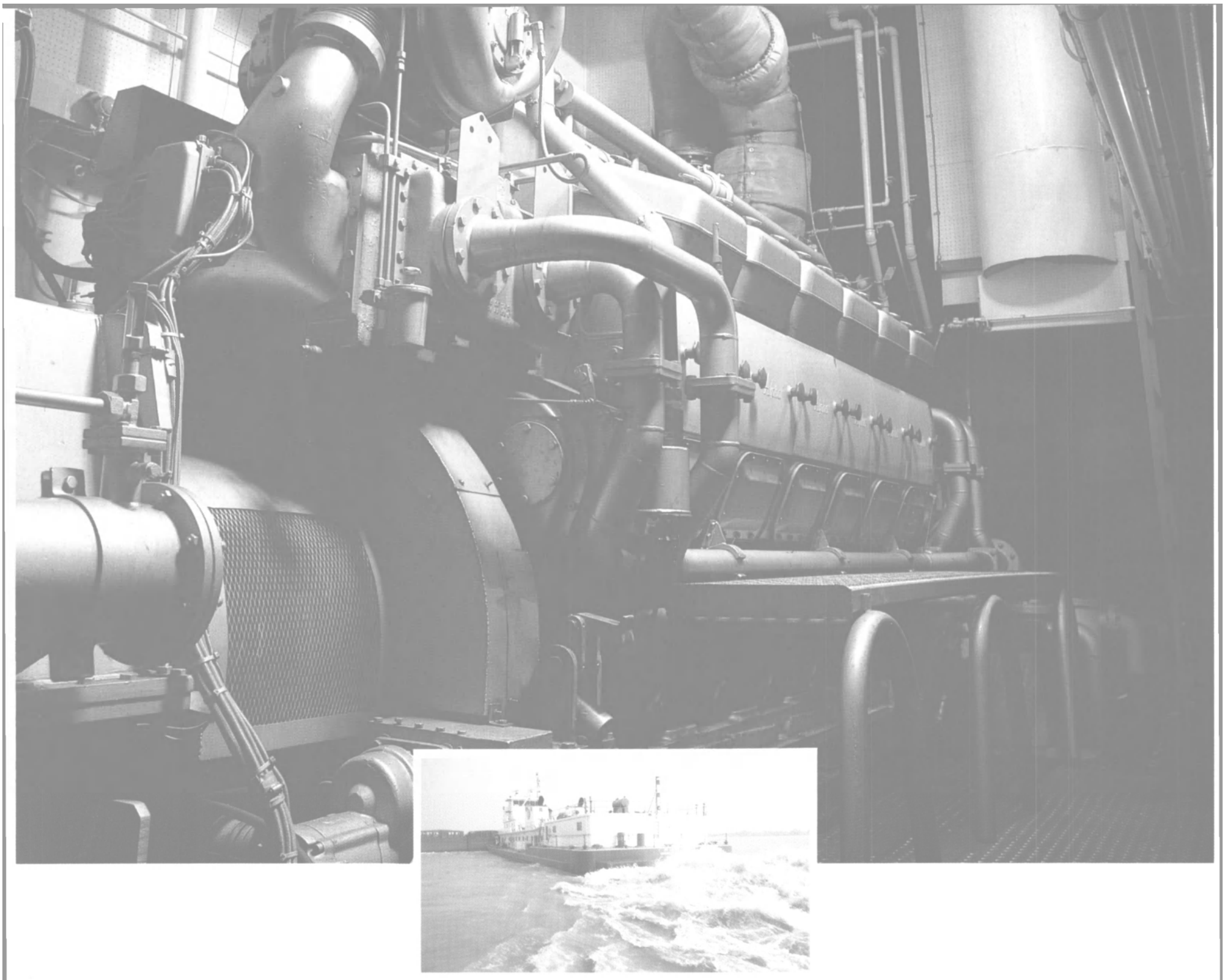
The Navasota is powered by twin Caterpillar D-399 diesels, each with a rated output of 1,125 bhp at 1,225 rpm, driving through Reintjes WAV 1400 4.95:1 reduction gears to Columbian 82- by 84-inch stainless steel propellers installed in Kort nozzles. The vessel recorded an impressive 13 knots on sea trials.

Electric power is supplied by two 55-kw generators driven by Caterpillar diesels. The main electrical panel was provided by Con-Select. Other equipment includes two Ingersoll Rand 242 air compressors with 80-gallon receivers, Racor 75-1000 fuel filters, Custom Hydraulic steering system with Mathers AD 12 air controls and SB 22 shaft brakes, a Gould fuel transfer pump with meter, two Gould bilge pumps, two Peabody Barnes fresh water pump systems, a Walker Electric Service alarm system, SSI Nav/Lite panel, McElroy anchor winch, and Smatco 46/34 DAW 100 towing winch.

Electronics include one 64-mile Si-Tex radar, a 24-mile Si-Tex radar, Plath Navigator Vlll autopilot, two Horizon 78 VHF radios, Raytheon Ray 350 loudhailer, Si-Tex 757 Loran C, Motorola Triton 40 SSB radio with Necode digital encoder/decoder, Magnavox satellite navigator, and Benmar RDF.

The Navasota's interior outfit has been constructed to a high standard, including mahogany trim in the pilothouse, staterooms, and galley as well as custom-built mahogany tables, desks, and cabinets. General workmanship throughout the vessel reflects this same high quality and attention to detail.

(continued on page 40)



ROLLING ON THE RIVER

Alpha heavy fuel engines are the most reliable and economical engines rolling on the river today. Built exclusively for marine propulsion, they burn cheaper, lower quality fuel and less of it.

Tests conducted by Midland/Ohio River Company on its four big Alpha-powered towboats proved considerable fuel savings when using No. 2 Diesel compared to the latest versions of conventional two-stroke engines in its fleet. Beyond that, the Alpha engines are routinely used for heavy fuel **up to 3500 seconds Redwood No. 1.**

Service and parts are readily available for these engines at strategic locations along the inland waterways, with immediate delivery on most items from our warehouse in Paducah, Kentucky.

Get the straight story from the people with the experience. Alpha — the right engines for today. And tomorrow.

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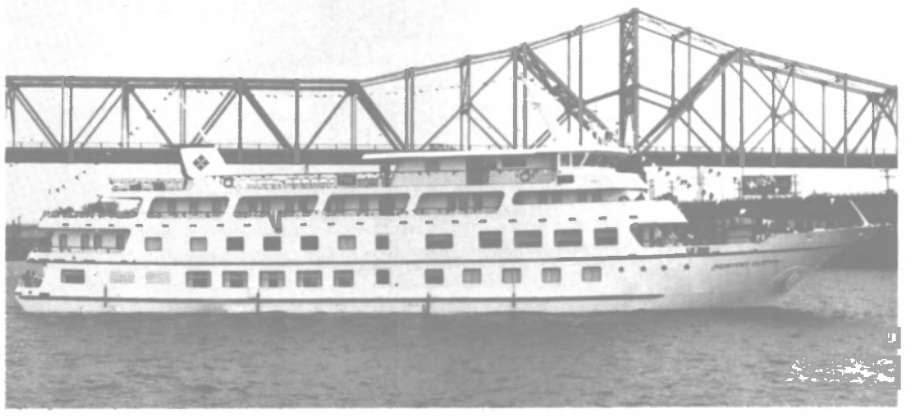

NEWPORT CLIPPER
Jeffboat

Jeffboat, Incorporated of Jeffersonville, Ind., recently completed the luxury cruise vessel Newport Clipper, first of its type ever built at the Indiana yard. Constructed for Clipper Cruise Line of St. Louis at a cost of about $9 million, the vessel will operate on seven-day cruises in areas along the U.S. Eastern Seaboard.

The hull of the Newport Clipper is constructed of ½-inch steel plate throughout except for the bow and stern which are 3/8-inch plate. Gross tonnage is 100 and displacement 1,000 long tons. Overall length is 207 feet, beam amidships is 37 feet, and draft is 7½ feet.

Propulsion power is provided by two GM Detroit Diesel 12V-71 engines, each rated 480 bhp at 2,300 rpm, providing an average cruising speed of 10 mph. The engines drive, through two Twin Disc 4.13:1 reverse/reduction gears, two Columbian four-bladed, stainless steel propellers having a diameter of 48 inches and 39-inch pitch. The console-mounted steering system supplied by SSI has full follow-up control. An Omnithruster bow thruster is powered by a 200-hp electric motor.

Electric power is supplied by three 225-kw generators driven by Detroit Diesel 12V-71 engines. The sanitation system is an Omnipure model RM812-27 type II. Raw water heat exchangers for engine cooling are mounted on each propulsion and generator unit.

In addition to the usual VHF and SSB communications equipment, the vessel is fitted with two radars, satellite navigator, and Loran C, all manufactured by Furuno.

The Newport Clipper's four passenger decks contain 51 staterooms, all outside and with large windows.

NICOR CLIPPER
Moss Point Marine

The Nicor Clipper, believed to be the largest offshore workboat ever built in the U.S., was delivered in the summer of 1983 by Moss Point Marine of Escatawpa, Miss., to Nicor Marine Inc. of New Orleans. The vessel has an overall length of 254 feet, beam of 44 feet, and depth of 16 feet. A unique stern ramp fabricated by the builder gives her roll-on/roll-off capability for carrying containers.

The vessel is powered by twin GM Electro-Motive Division 12-567C diesels, each with an output of 1,400 bhp at 835 rpm, linked to Falk reduction gears having a ratio of 2.968:1. Engine controls are by WABCO and engine monitoring by EMI. A Harbormaster BT-550 bow thruster will provide extra maneuverability around offshore structures. Electric power is provided by a set of 150-kw Delco generators supplied by George Engine Company.

The Clipper's capacities include 242,430 gallons of fuel oil, 24,780 gallons of fresh water, 1,300 barrels of liquid mud, and 6,000 cubic feet of dry bulk mud.

Electronic equipment, supplied and installed by Marine Electronics, include Furuno FR-1011 radars, Stephens SEA 106 and Sailor RT-144 radiotelephones, Texas Instrument TI 9000 Loran C, a Decca 801 satellite navigator, and Sperry gyrocompass and autopilot.

Deck equipment includes two McElroy towing winches and an HBL anchor windlass. Carlisle & Finch supplied the searchlights, Kalhenberg the air horns, and Hubbel the running and navigation lights.

The Nicor Clipper is classed by the American Bureau of Shipping and certified by the U.S. Coast Guard.

NORTH SOUNDER
Gladding Hearn

The North Sounder, said to be the largest self-propelled oil-spill skimmer in the U.S., was delivered in early 1983 by Gladding Hearn Shipbuilding Corporation of Somerset, Mass. The vessel is owned by Clean Sound, a nonprofit joint venture of 13 oil and oil transportation companies that was founded in 1971 to protect the waters of Puget Sound.

The vessel has an overall length of 73 feet, beam of 20 feet, full-load draft of 6 feet 3 inches, and displacement of 130 long tons. She is powered by twin Caterpillar 3408 DITA diesel engines, each rated 365 bhp at 2,000 rpm, linked to Twin Disc 3:1 reduction gears. Built at a cost of $1.6 million, the vessel joins a fleet of smaller skimmers, auxiliary boats, and barges that Clean Sound has stationed at ports throughout Puget Sound. The latest addition to the fleet is stationed at Bellingham, Wash.

Main engines (2)	Caterpillar
Reduction gears (2)	Twin Disc
Propellers (2)	Federal
Engine controls	WABCO
Generators	Northern Lights
Generator engines	John Deere
Steering system	Char-Lynn
Sanitation system	Microphor
Radar	Furuno
VHF radiotelephone	Cybernet
Depth indicator	Sandpiper
Crane	Scott
Windlass	Pine Hill
Oil-handling pump	Moyno
Coatings	Cathacote, Devran

The North Sounder is designed to recover 90 percent of an oil spill at rates up to 500 gpm. Its onboard recovered oil capacity is 12,000 gallons. When operating in the oil-spill recovery mode, the vessel's bow opens to reveal an escalator-like ramp leading from under the water surface and into the mid-hull area of the boat.

Several design changes developed by the Clean Sound staff have been incorporated into the North Sounder. The most significant is an improved method of recovering oily debris. This system was designed to cope with materials such as logs, branches, kelp, eel grass, and other floating debris.

The North Sounder was designed by JBF Scientific Corporation of Wilmington, Mass. JBF has designed more than 100 oil-skimming vessels, including 50 harbor skimmers for the U.S. Navy. Clean Sound's new skimmer is a JBF model DIP 5001A.

Because of her traditional hull design, the vessel can respond to oil spills at speeds up to 10.6 knots. During normal skimming operations, she runs at 1 to 2 knots in conditions up to Sea State 3. The vessel can work alone or with long containment booms attached to the bow in a "V" configuration to funnel oil slicks to the recovery system.

(continued on page 42)

North Sounder

(continued from page 41)

The recovery system consists of two conveyor units. The debris collection unit is a stainless steel conveyor that leads up to the debris collection equipment. The oil-handling unit is a powered, 37½-foot-long by 6-foot-wide PVC belt that loads oil into the vessel's cargo tanks. The belt is driven by a Char-Lynn hydraulic motor. The dynamic inclined plane (DIP) conveyor is located in the forward half of the hull, behind the debris conveyor.

PEMEX 652
Matsumoto Shipyards

The aluminum-hulled fireboat Pemex 652 was delivered at mid-1983 by Matsumoto Shipyards of Vancouver, B.C., Canada to Pemex, Mexico's national oil company. This is the first of two sister ships of a new design ordered by Pemex for use in the extensive Gulf of Mexico oil tracts owned and managed by the company.

These two Pemex fireboats are among the largest in the world. Each contains about 170 tons of aluminum plate and 30 tons of aluminum extrusions supplied by Alcan Canada Products, Ltd.

The 500-gt Pemex 652 has an overall length of 150 feet, a beam of 32 feet and a height from the deck to the top monitor of 40 feet. Operating draft is 11.8 feet, cruising range is 250 miles, and top speed is 16 knots.

The vessel is powered by two MTU diesel engines, each with an output of 1,725 bhp at 1,400 rpm. Two Reintjes reduction gears transmit the power to the two Osborne propellers.

Twin Worthington pumps powered by separate 1,200-bhp MTU diesels are capable of drawing sea water, mixing it with a 3-percent AFFF foam solution, and spraying it onto fires at a rate of up to 25,000 gpm. The three main monitors (nozzles) manufactured by the Swedish Foam Fire Extinguishing Company can each handle 5,200 gpm. Cranes can position two more Stang monitors 75 feet above the water surface to handle 2,600 more gpm. The vessel carries 6,000 gallons of foam concentrate to mix with the water.

The hull of the fireboat is constructed of a special Alcan alloy that includes magnesium and manganese. Pemex specified aluminum 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 fire-fighting power of the Pemex 652 is controlled from the bridge, which also contains the latest in navigation equipment, radiotelephone, depth sounder, radar, loudhailer, 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 fire-fighting equipment to be positioned quickly and to the best advantage.

PEMEX 652
Major Suppliers

Main engines (2)	MTU
Reduction gears (2)	Reintjes
Propellers (2)	Osborne
Engine controls	Kobelt
Pumping engines (2)	MTU
Generator sets (2)	Caterpillar
Thrusters (2)	Schottel
Steering gear	Wagner
Cranes & davits	Kingsway
Anchor windlasses	Harrison & Robbins
Pumps	Jabsco, Paramount Rotoking, Worthington
Internal fire-fighting (Halon)	Svenska
Inflatable rafts	Beaufort
Radar, echosounder, gyrocompass	Sperry
VHF & SSB	Canadian Marconi
Fenders	Seaward
Coatings	International Paint

ROWAN GORILLA I
Marathon LeTourneau

The Rowan Gorilla I, largest offshore jackup drilling rig ever built, was delivered in December 1983 by Marathon LeTourneau to Rowan Companies, Inc. of Houston. Designed by Marathon and built at its Marine Division in Vicksburg, Miss., it is the first of the new Gorilla Class jackup designed for operating in hostile offshore areas.

Because of restrictive bridge clearances, the rig was towed from Vicksburg to Belle Chasse, La., minus its full length of legs and its drilling derrick. After final outfitting the rig left Belle Chasse under tow of the Chignecto Bay and the Mahome Bay (photo), 11,000-bhp vessels that will serve the rig as both tugs and supply vessels.

The Rowan Gorilla I is scheduled to begin its first drilling assignment offshore eastern Canada in mid-January for a consortium of Canada-based oil companies including ATS Exploration Ltd., Bow Valley Industries, Ltd., and Husky Oil Operations Ltd.

Fully outfitted with its three

(continued on page 46)

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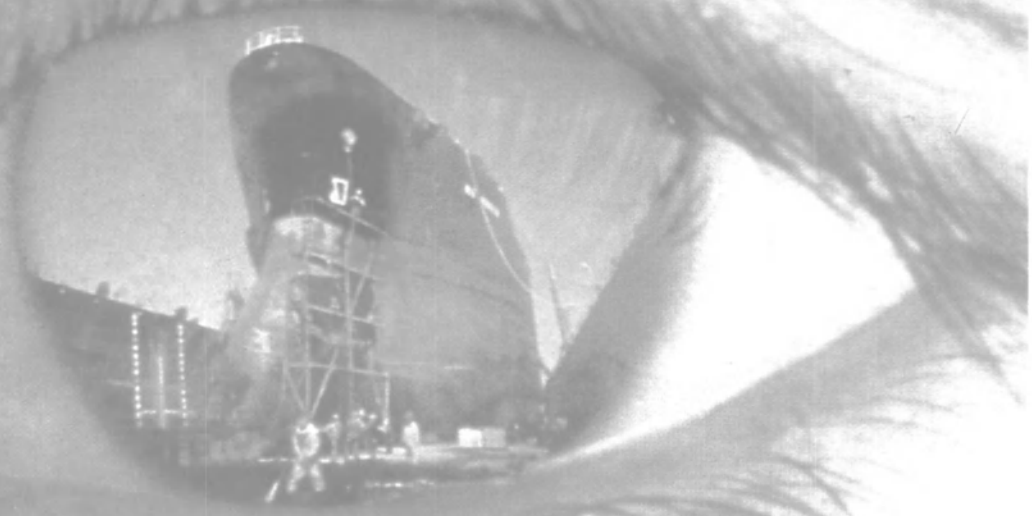

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SHIPYARDS AND THE JONES ACT

Herman J. Molzahn, Vice President—Shipyard Operations
American Waterways Shipyards Conference of the
American Waterways Operators, Inc.

Herman J. Molzahn

When President **Reagan** was campaigning for office in 1980, he said, "Should our shipbuilding capacity continue to decline, American mobilization potential will be seriously undermined because a large reduction in a skilled shipbuilding workforce today makes any increase tomorrow very difficult. This is a dangerous threat to our national security, jobs, and a key U.S. industry."

Sitting on the President's desk when he took office was a report from the conservative Heritage Foundation addressing national maritime policy. Among the suggestions made by this group was a recommendation to acquire foreign ships for subsidized U.S. operation. It further suggested that Jones Act trades be opened to foreign-flag ships.

The first suggestion, to allow subsidized U.S. operators to acquire foreign-built vessels, has been implemented and the damaging result to the major shipyards is all too clear—that segment of the shipbuilding industry has been exported overseas.

On May 20, 1982, we heard another promise from the Administration. The then Secretary of Transportation, **Drew Lewis,** announced the initial elements of the Reagan Administration's National Maritime Policy, and therein, the sanctity of the Jones Act was affirmed. Everyone hoped that this statement would introduce a new element of long-term stability into the Jones Act, which is extremely important to those who serve the domestic trades.

This stability is again being threatened, for at the November 1983 Annual Meeting of the Society of Naval Architects and Marine Engineers (SNAME), **Warren G. Leback,** Deputy Administrator of the Maritime Administration, Department of Transportation, coauthored a heavily annotated paper titled "The Jones Act: Foreign Built Vessels and the Domestic Shipping Industry." The paper ostensibly expresses the personal views of the authors that foreign-built ships be allowed to participate freely in the U.S. domestic trades. The authors argue that "... if the domestic ship-building industry is competitive with foreign shipyards, (the entry of foreign-built ships into the Jones Act) would have no adverse effect on that industry."

Further, they propose constructing a fleet of break-bulk vessels over a ten-year period to sustain the shipbuilding base. They recommend that: "A program for constructing twenty vessels per year for the ten-year period would support four major shipyards. These, coupled with the five major shipyards in naval construction, would provide the shipbuilding base."

Edward Renshaw, Chairman of the Board, St. Louis Ship, and a past Chairman of the American Waterways Shipyard Conference (AWSC), challenged these proposals. In his discussion paper which he presented at the SNAME Annual Meeting, Mr. **Renshaw** stated, "During World War II, St. Louis Ship built L.S.T.'s and tugs for the war effort. We were but one of the scores of small inland, river, coastal, and Great Lakes shipyards deeply involved."

This was not the only attack on the Jones Act in recent years. Legislators on Capitol Hill have been barraged by various interests to give legislative exemptions from the Jones Act for the carriage of passengers, iron ore, coal, petroleum, liquid natural gas, lumber, and other commodities on foreign-flag ships. Applications for waivers have been submitted to the federal agencies so that foreign-flag ships could operate on a temporary basis. And the AWSC has uncovered and blocked attempts to bring foreign-built barge sections into the United States for final assembly.

The "Jones Act" is used inaccurately to refer to the entire body of U.S. cabotage or coastwise laws which limit, in various ways, the right to engage in the maritime commerce of the United States. However, the Jones Act applies only to the transportation of "merchandise," not people. Other coastwise laws pertain to the carriage of passengers and to towing, fishing, and offshore services on the outer continental shelf.

From the very beginnings of our existence as an independent nation, the United States has adopted a policy of reserving its domestic trade for its own ships. The basic principles that guided our forefathers are still valid today. A strong domestic merchant marine and shipbuilding base should be promoted for the economic good of the country and as an adjunct to national security forces.

Special interests are pulling this country in so many directions that we often lose sight of the basics which are necessary for our national survival. The shipbuilding industry must take a stand to preserve the laws which provide the cornerstone for its existence. This cannot be done by the actions of several companies acting individually. It must be accomplished, if at all, by those companies joining forces to take coordinated actions against attacks on the industry.

One such organization exists for the smaller U.S. shipbuilders. It is the American Waterways Shipyard Conference, formed in 1976 by a group of shipyard executives. After the 1972 amendments to the Longshore Act were passed, they were convinced that the days of "each yard for itself" were over.

The smaller or second tier shipyards have the most to lose if the U.S. built provisions of the Jones Act are abolished. Not another tugboat, towboat, crewboat, supply boat, barge or any other small vessel would be built in the United States.

This complex network of laws makes this second tier of the shipbuilding industry possible in today's climate of foreign-subsidized or government-owned shipyards. A quote from **Theodore Roosevelt** never had more meaning than it does today for this segment of the shipbuilding industry represented by the American Waterways Shipyard Conference: "Every man owes a part of his time and money to the business or industry in which he is engaged. No man has a moral right to withhold his support from an organization that is striving to improve conditions within his sphere."

The major shipyards have lost their commercial business. Will the same thing happen to the smaller yards? Not if the shipyards realize that there is strength in numbers and support their trade association which is waging the battles to preserve the industry.

George Curry Appointed President Of Henschel

George U. Curry

Henschel Corporation of Amesbury, Mass., a unit of General Signal, has announced the appointment of **George U. Curry** as president. He succeeds **George E. Coorssen,** who has retired.

Mr. **Curry** is a graduate of Purdue University and joined Henschel in 1954. He is an electrical engineer and has held several positions with the company, including vice president of engineering since 1966. He is a member of The Society of Naval Architects and Marine Engineers, American Society of Naval Engineers, and the Marine Transportation Committee of the IEEE.

Henschel Corporation is a leader in the design, development, and manufacture of ship control and interior communications equipment and systems.

New Brochure Available From IMO Pump Division Of Transamerica Delaval

IMO Pump Division of Transamerica Delaval Inc., has just published a new 14-page illustrated brochure on their line of IMO® three-screw and GTS® geared, twin-screw marine cargo pumps.

IMO three-screw pumps are intended for dedicated barges and tankers. They can handle cargoes from JP-5 and light diesel oil to molasses, tars, and heavy asphalts, with flows up to 3,500 gpm (5,000 bbl/hr).

GTS (Geared Twin Screw) pumps are designed for multi-cargo vessels where maximum cargo versatility is required and tanks are frequently Butterworthed. Cargoes can range from water solutions and other chemicals with the lightest viscosity to heavy asphalts and tars. Capacities range upwards to 8,500 gpm (12,000 bbl/hr).

For a free copy of the new brochure,

Circle 39 on Reader Service Card

Southwest Marine Gets $20.8-Million Contract For Navy Oiler Maintenance

Southwest Marine, San Francisco, Calif., is being awarded a $20,852,111 cost-plus-award-fee contract for the AOR-1 Class phased maintenance program. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

Krupp MaK Establishes Canadian Subsidiary In Halifax And Montreal

Krupp MaK Maschinenbau GmbH, a leading diesel engine builder, recently established Krupp MaK Canada Inc. in Dartmouth near Halifax, Nova Scotia. This is the company's second subsidiary in North America; the other is Krupp MaK Diesel Inc. in Glenview, Ill., near Chicago.

Krupp MaK has gained such a market share of medium-speed diesels for marine propulsion sold in Canada that the company decided to expand its service and spare parts organization. Nearly 150 MaK engines are operated in Canada, mainly on the East Coast; in 1983 alone 24 engines were delivered to that area.

In addition to the service center in Halifax, MaK will establish a sales office in Montreal.

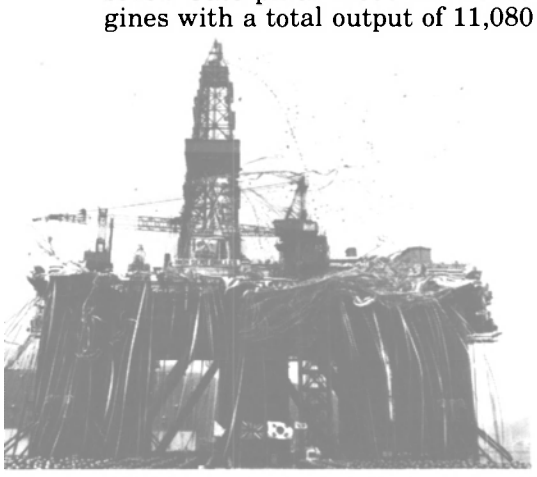
Rowan Gorilla I

(continued from page 42)

507-feet-tall legs and 160-feet-tall drilling derrick, a Gorilla rig comprises approximately 16,000 tons of steel. Its triangular hull is 297 feet long, 292 feet wide, and 30 feet deep. The rig's large size provides nearly one acre of deck space for storage of consumables used during drilling. This ample storage capacity along with certain design features make the rig compatable with hostile offshore areas where it can continue to drill even if the flow of supplies from shore were interrupted.

Classed +A1 by the American Bureau of Shipping and built in accordance with Mobile Offshore Drilling Unit Regulations established by the U.S. Coast Guard, Canadian Coast Guard, U.K. Department of Energy, and Netherlands Department of Mines, the Gorilla rig is designed to survive up to 90-foot waves and 82-knot winds while drilling in 328 feet of water.

The rig has power to spare, with seven Caterpillar D399 diesel engines with a total output of 11,080 bhp at 1,225 rpm driving seven generators producing a total of 7,210 kw. Power for the Gorilla's propulsion assist system is provided by eight electric motors with a total output of 6,800 hp connected through gearboxes to two 112-inch propellers in Kort nozzles. These motors are mounted on the machinery deck on either side of the drilling slot. When using a 10,000-bhp tug, the assist thrusters will increase the towing speed by about two knots.



Living accommodations are provided for 80 persons, as well as a six-bed hospital, dual galley, dining room, and recreation facilities. The rig's survival system consists of two 50-man and two 34-man Whittaker enclosed capsules, U.S. Coast Guard approved and fitted with internal communications systems. A heliport cantilevered out over the bow has a diameter of 83 feet and 52,500-pound impact load.

Two other Gorilla Class rigs are now under construction, one at Marathon's rig yard in Singapore and one at the Vicksburg yard.

SANTA FE RIGS
Daewoo Shipbuilding

Daewoo Shipbuilding and Heavy Machinery Ltd. in Korea delivered in the last quarter of 1983 a second semi-submersible drilling rig to Santa Fe Drilling Company of Orange, Calif. Both Santa Fe rigs are self-propelled, Friede and Goldman L-907 Pacesetter types, and were constructed at a price of $80 million each. These rigs are capable of 25,000 feet in water depths up to 1,500 feet. Living quarters are provided for 96 persons.

Since opening a little more than two years ago, Daewoo's Okpo Shipyard has delivered eight drilling rigs of two types. In addition to the two built for Santa Fe Drilling, the yard has constructed two semi-submersibles for Reading & Bates Drilling Company of Houston, and one each for Houlder Offshore Drilling Company and Atlantic Drilling Company, both of the U.K.

A semi-submersible rig for Korea Drilling Company is now under construction at the Okpo yard. With this rig's delivery in the spring of 1984, Korea Drilling will be the first Korean company to own a drilling rig it operates. The rig will be used to explore Korea's continental shelf and other national coastlines.

SEDCO 602
Promet Private Ltd.

A medium-sized, semi-submersible drilling rig, the Sedco 602, was delivered recently by Promet Private Limited shipyard in Singapore. The rig is owned jointly by Sedco, Inc. of Dallas and Occidental Exploration & Production Company of Bakersfield, Calif., and Houston.

Designed by Earl & Wright, the Sedco 602 can operate in water depths of 25 to 180 feet. The mooring tensioner riser and drill fluid systems have been designed for exploratory and development drilling to 20,000 feet. The design of this semi-submersible makes it particularly useful in parts of the world where drillships are inefficient and the cost of using huge semi-submersibles uneconomical.

The rig's main deck measures 170 by 170 feet. It has living quarters for 88 personnel; other accommodations include a hospital and a recreation room with cinema area. Sophisticated equipment on board includes a closed circuit television system and a satellite communications installation. The rig is fitted with two cranes having booms of 100 feet and lifting capacities of 50 tons. A helideck can support the weight of a fully loaded Sikorsky S-61N helicopter.

The Sedco 602 is classed by the American Bureau of Shipping and is built to requirements of the U.S. Coast Guard and the Intergovernmental Maritime Organization. It began operating in the Philippines and will then go to China. This rig is the third semi-submersible built by Promet; in the first half of 1983 the Singapore yard delivered two similar rigs of the Sedco 600 series.

SEDCO 712/714
Hyundai Heavy Industries

Seven semi-submersible drilling rigs were delivered to Sedco Inc. of Dallas between November 1982 and July 1983. Delivery of these new offshore rigs brought the Sedco drilling fleet up to 42 units; the company reported that all rigs were under contract.

Four of the Sedco 700 Class and three of the Sedco 600 Class were delivered by three shipyards in the Far East. The first of the new deliveries, the Sedco 711, was completed in November 1982, just 24 months after the order was placed with Hyundai Heavy Industries of Ulsan, Korea. The Sedco 712 and the Sedco 714 were also built at Hyundai—the first time in Sedco's history that three of its rigs have been under construction at one shipyard at the same time.

Total contract value for the three

(continued on page 48)

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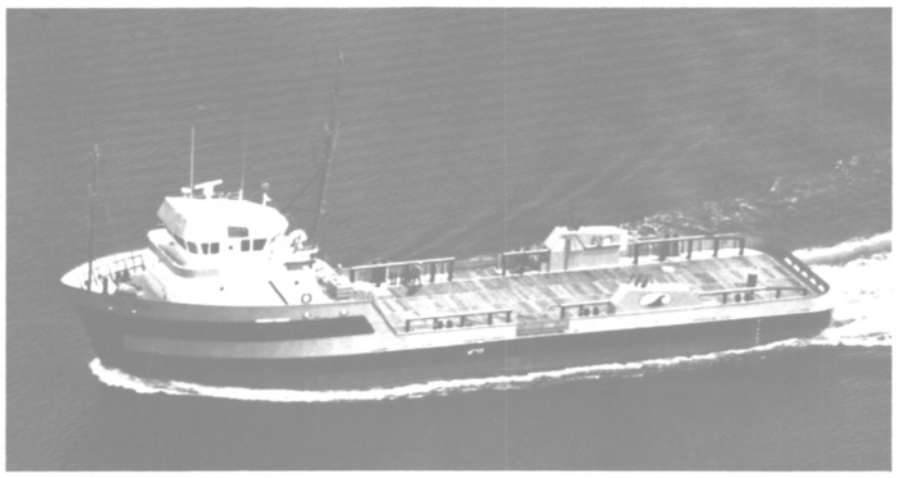
SEDCO 712/714

(continued from page 46)

rigs was $330 million. Upon delivery each of these three rigs began five-year drilling contracts; the Sedco 711 is working for British Petroleum.

The Sedco 700 Class rig is designed to withstand the harsh conditions of the upper North Sea where drilling operations continue in 40-foot waves and 50-knot winds. These self-propelled units can withstand 100-foot waves.

Of the remaining four Sedco semi-submersibles, three were built by Promet (Pte.) Ltd. in Singapore and one at Mitsui Engineering & Shipbuilding Company in Japan.



TRINITY RIVER

Eastern Marine

Eastern Marine, Inc. of Panama City, Fla., in early 1983 delivered the supply vessel Trinity River to Transportation Resources, Inc. of Houma, La. The vessel is the fourth in a five-vessel contract; the sister vessels are the Leaf River, Pine River, Roaring River, and Tellico River.

The Trinity River has an overall length of 166 feet, beam of 38 feet, depth of 13 feet, and loaded draft of 11 feet. A clear deck cargo area 110 by 28 feet can carry up to 550 long tons of supplies.

The vessel is powered by two GM Detroit Diesel 16V-149 engines delivering a total of 1,800 bhp at 1,800 rpm through Twin Disc reduction gears. She can achieve a speed of more than 12 knots. A Schottel S-152L bow thruster is driven by a GM Detroit Diesel 8V71 engine with an ouput of 230 bhp at 1,800 rpm.

Electric power is provided by two Delco 85-kw generators driven by Detroit Diesel 6V71 engines. Electronic equipment includes Furuno radar, Stephens SSB radio, Cybernet International VHF radio, Micrologistics Loran C, and Impulse depth indicator.

Eastern Marine is a growing company that has earned a reputation in recent years as a builder of high-quality vessels. The company opened its Panama City yard in 1978. This 13-acre facility has more than 1,300 feet of water frontage, and is used primarily to construct small- to medium-sized boats. In 1981 Eastern Marine opened another yard in Allanton, Fla., 15 miles east of Panama City. This second yard, with 135 acres and 5,200 feet of water frontage, is used to build larger vessels.

In addition to the Transportation Resources vessels, Eastern Marine received a contract from Seahorse Inc. of Morgan City, La., to build eight 192-foot anchor-handling/tug-supply vessels at the Allanton yard.

Bell Aerospace Awarded $4.8 Million By Navy To Speed LCAC-1 Delivery

Bell Aerospace Textron, New Orleans, has been awarded a $4,822,852 face value increase to a previously awarded cost-plus award-fee contract for acceleration in delivery of an air cushion landing craft (LCAC-1) by two and one half months. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

Charles Garman Named Western Sales Manager For Stork-Werkspoor

Charles A. Garman has been named as Western area sales manager for the U.S. by Stork-Werkspoor Diesel bv (SWD). Mr. **Garman** has opened an office in Seattle and will cover the Western U.S. and Alaska for the firm. SWDiesel engines are offered in models ranging from 300 to 2,000 bhp specially designed to operate on both high grade distillate fuels, and on heavy and lower grade fuels.

SWDiesel began operating in the U.S. in 1983, establishing a sales and service office in New Orleans and assigning an SWDiesel executive, **Joop Zwart,** as sales manager for the North American continent. Mr. **Zwart** is dividing his time between the U.S. and the SWDiesel home office in Zwolle, Netherlands.

Mr. **Garman,** who was educated in engineering and business at Everett Community College and the University of Washington, previously was West Coast sales manager for Wartsila Power U.S.A., and director of marketing from Tacoma Boat Building, Inc.

The SWDiesel office has been established at 2405 N.W. Market Street, Seattle, Wash. 98107; telephone (206) 789-8383.

Omnithruster Establishes New Manufacturing Facility In Canada —Literature Available

PV/JT1100, 1,000-hp module thruster.

Omnithruster Inc. has recently established a Canadian manufacturing facility in Sarnia, Ontario. The new Mark II Omnithruster series and Omnithruster ice lubrication systems will be fabricated at that plant.

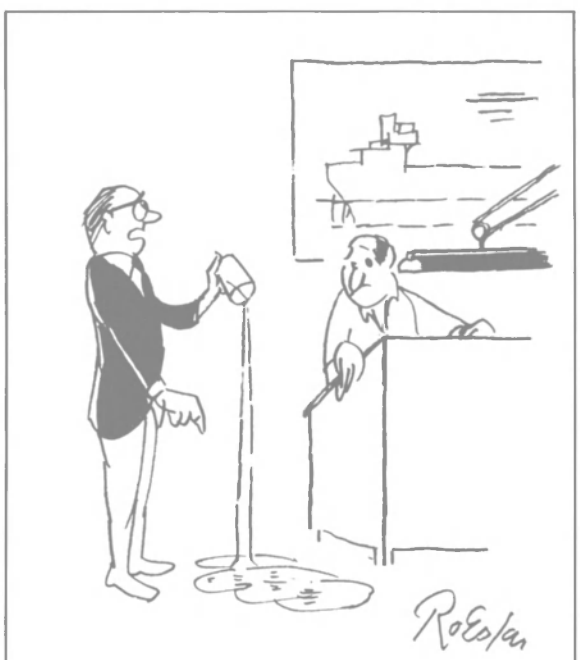
Omnithruster president **Charles M. Aker** said: "The equipment is to be produced from Canadian raw materials and with Canadian labor. The only components to be furnished from our plant in Santa Fe Springs, Calif., are the control systems. These will be installed during the final assembly and the complete system will be tested prior to shipment from the Sarnia facility."

Omnithruster manufactures a complete line of hydrojet maneuvering, propulsion, and ice management systems ranging from 50 to 3,000 horsepower in single units. Systems are installed in ships worldwide, including tankers operated by Shell Canada, Imperial Oil, and Exxon; in barges operated by Chevron Canada and A.B. McLean; in Gulf Canada icebreakers; and in geophysical vessels, fishing boats, etc.

Omnithruster-Canada will coordinate its manufacturing, installation, and repair activities through commercial offices located in Sarnia as well as in Montreal and Vancouver.

For further information and free literature,

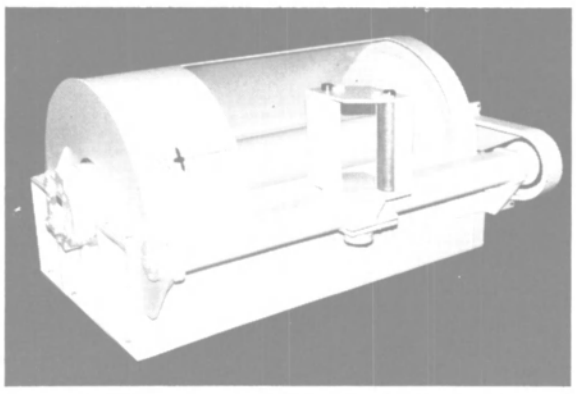
Circle 36 on Reader Service Card



Propulsion Systems Introduces New Line Of Trawl Winches— Literature Available

Propulsion Systems, Inc. of Kent, Wash., recently introduced six new trawl winch models. The new product line includes net reels and fully automated electronic controls.

The winches start at model R-625 for 1,000 fathoms of 5/8-inch cable and extend up to model R-1250 for 1,000 fathoms of I¼-inch cable. The automated controls feature synchronized cable tension monitoring between the two winches to maintain optimum net position during conditions such as heavy seas, vessel maneuvers, and in the presence of underwater currents.



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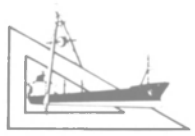

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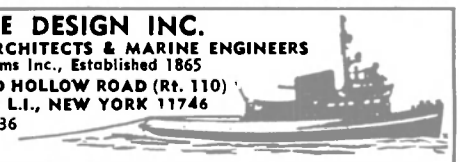

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Mr. **Fox** joined Amhoist in 1959 and held a series of management positions before being named president in 1973. He was elected chief executive officer in December 1974, and in 1982 was named chairman and CEO.

Mitsui Delivers First Of Four Bulk Carriers To Egyptian Owner

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The bulk carrier, first of four sister ships ordered from MES by the same owner, is equipped with five electro-hydraulic deck cranes for greater cargo-handling efficiency, and such fuel-conserving features as an energy-efficient, low-speed diesel engine and Mitsui Integrated Duct Propeller. The main engine is a Mitsui/B&W type 6L67GFCA diesel with a maximum continuous output of 11,400 bhp. Using 85 percent of the maximum rating, the ship's service speed under full load is 14.8 knots.

Other features include electro-hydraulic, single-pull type hatch covers, and a cargo stowage computer that permits rapid computation of the trim and stresses on the hull. Her electronic equipment includes a satellite navigation and position-finding system and a Loran C receiver. The Abydos has been built to Lloyd's Register of Shipping classification.

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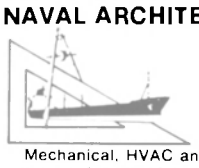

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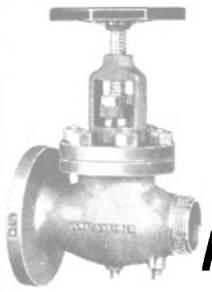

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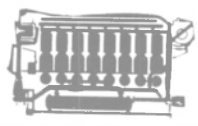

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Stork-Werkspoor Engines Will Power Exxon Tugboats

Stork-Werkspoor Diesel by (SWD) has thus far sold eight of the Dutch company's F240 engines for use by United States towing firms. **Joop Zwart,** U.S. sales manager, said that three tugs being built for the Exxon Corporation will each be equipped with a pair of 9-cylinder, F240, 2,000-bhp engines. Shaver Transportation Company of Portland, Ore., will replace two older SWD diesels in the firm's tug Columbia, with the newer 6-cylinder F240, 1,270-hp turbocharged engines for service on the Columbia/Snake river systems.

Morrison-Knudsen Company, the international construction firm that is supervising the project, placed the order for the Exxon engines. The tugs, which will be built in the Damen Shipyards, Gorinchem, Netherlands, will be used in Columbia, South America. The tugs were designed by The Glosten Associates, Seattle naval architects.

Charles Garman, recently appointed SWD sales manager on the U.S. West Coast, also said that a similar engine would be installed in the Ilduso Fisheries' trawler MAR-GUN. The vessel will be re-engined at Pacific Fisherman, Inc., in Ballard, Wash.

Meanwhile, SWD has begun deliveries of the first of ten 18-cylinder TM410 diesels to General Dynamic's Quincy Shipbuilding Division in Massachusetts. The engines will be used in five roll-on/roll-off prepositioning supply vessels for the U.S. Navy. A pair of TM410 engines will give each ship 27,600 bhp of propulsion power.

Vincent Drummond Tibbetts 1913–1983

Vincent D. Tibbetts, president of Boston Fuel Transportation, Inc., died recently at the age of 70. Mr. **Tibbetts** was born in East Boothbay, Maine, in 1913 and moved to Boston in 1932. In 1937 he started his own fuel transportation business with a 3,000-gallon barge and a 100-hp towboat. In 1941 he became president of Esterhill Boat Service. When Esterhill was acquired by Boston Fuel Transportation in 1953 he became part owner and vice president. In 1969 he became president of Boston Fuel and a director of Reinauer Transportation Companies of New York.

At the time of his death Mr. **Tibbetts** was operating a fleet of 23 tankers, barges, and towboats. He was a member of the American Waterways Operators, Inc., Boston Marine Society, Maritime Association of Boston, and The Propeller Club of the United States.

Barge-Mounted Nine-Story Hotel Proposed By NKK

A Japanese shipbuilder has unveiled a concept for constructing a nine-story, first-class hotel on a barge that could then be towed to any coastal area in the world. Nippon Kokan (NKK) reports it has solved all of the technical problems involved in the construction of the floating hotel, and has already completed a design model to use in worldwide marketing.

The movable hotel, weighing some 15,000 tons, involves a special barge that forms the foundation for the 360-room hotel, which also incorporates three conference rooms, public areas, restaurant and entertainment areas, and outdoor swimming pool.

A spokesman for NKK America Inc. in New York said that inquiries have already been received, especially from developing countries where shortages of land, skilled workers, equipment, and material make first-class hotel construction difficult.

The idea for the barge-mounted "export" hotel has been under study for two years by NKK and Tokyu Construction Company. According to NKK, construction at one of the company's shipyards insures high quality and labor skill, and the barge technology is already developed to permit towing of the structure to its final destination at a speed of five knots. A further benefit, NKK notes, is that the hotel could be moved to different locations to accommodate special expositions or summer and winter resort areas.

New Design Cranes Installed On Navy's Auxiliary Drydocks

New type diesel-electric cranes have been installed on Navy's floating drydock USS Competent at Pearl Harbor.

Vital to the nation's defense capability is the improvement of repair and maintenance procedures and the modernization of facilities. When the Naval Sea Systems Command called for improvement of the crane system on its medium auxiliary floating drydocks, Crane Con Products of Seattle responded with design and production of four wing wall cranes. According to a Crane Con spokesman, these cranes were the first of this type to be designed and manufactured to the revised miliary specification MIL-C-17949B, Electro-Mechanical Shipboard Cranes. The first two cranes of the contract were completed in early 1983, and the second pair around midyear, well ahead of schedule.

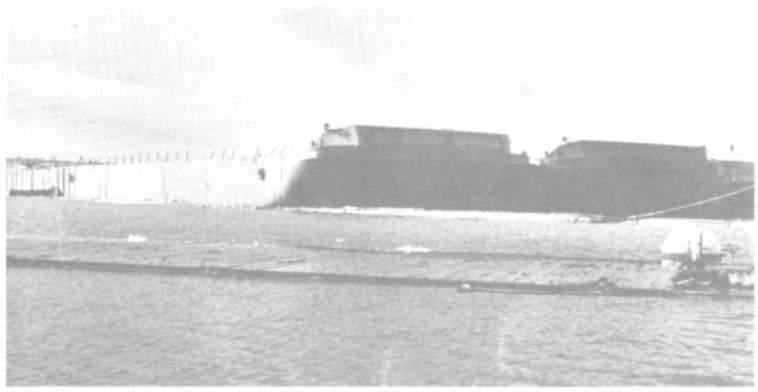
The $6.6-million contract included design, manufacture, and delivery of the cranes to the drydock USS Competent (AFDM-6) at Pearl Harbor and the USS Sustain (AFDM-7) at Norfolk. The self-contained, diesel-electric cranes utilize a static, stepless electric control system providing infintely variable speed selection and load float control for precise, steady positioning. Each crane's rated capacity is 45,000 pounds at 25-foot radius; maximum outreach is 65 feet from center of rotation.

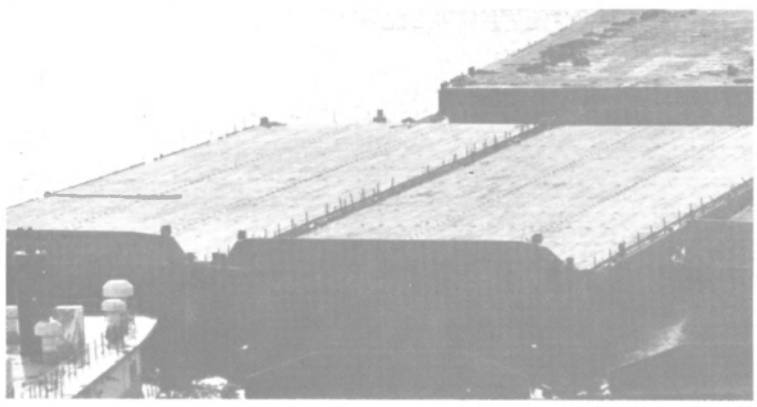
The cranes operate on 14-foot gauge track, traveling a distance of 460 feet, almost the full length of the dock. Total operating gross weight of each crane is 265,000 pounds. "This is the first major project completed in our new Seattle manufacturing plant," said Con Crane president **Lyle Harlson.** "It is a major step in the expansion into crane manufacturing, repair, and refurbishing, in addition to production of our automatic brakes, wheel chocks, and other crane safety equipment."

AUCTION

(U.S. MARSHAL)

4 — 285' BARGES

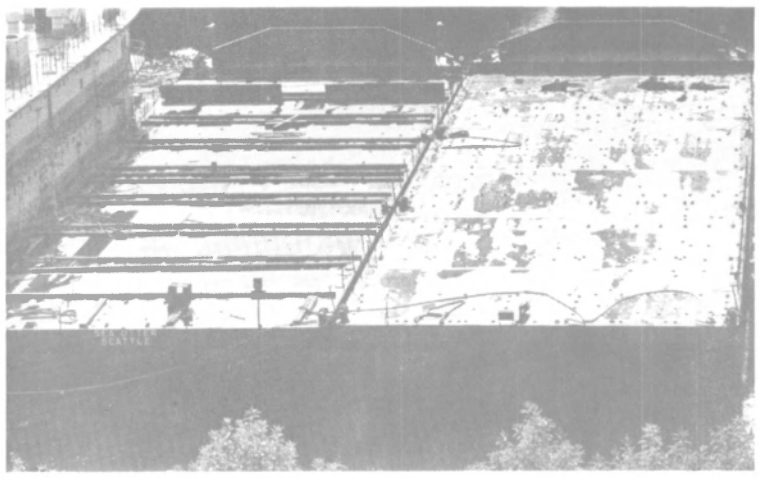




Length	285'	Deck	3/4" plate
Breadth	78'	Side Shell	3/4 & 5/8" plate
Depth	18'	Bottom	5/8 & 1/2" plate
Built	1982		
Class	Maltese Cross A-1 Ocean Service ABS Cert. good thru '86/'87 on 3 barges		

Flat deck cargo barge of all welded steel construction with raised forecastle and 6'4" breakwater. Shaped spoon bow, vertical sides, radiused bilge and square raked stern fitted with hydra-lift skegs. A centerline bulkhead combined with five transverse bulkheads divides the underbody into twelve watertight compartments. No. 1 and No. 4 compartments port and starboard are fitted with sea chests and are ballastable. The barges have a 6" wood wear deck and heavy tow pads on the bow.

2 — 230' BARGES



Length	230'	Deck	5/8" plate
Breadth	60'	Side Shell	5/8" plate
Depth	15'	Bottom	1/2" plate
Built	1981		
Class	Maltese Cross A-1 Ocean Service ABS Certificate good thru 1986		

Flat deck cargo barge of all welded steel construction with a molded spoon bow, perpendicular sides, radiused sheer and bilge and raked stern fitted with anti-yaw skegs. The fore and after rakes are divided into three compartments and a centerline bulkhead from frame 6 to frame 26 combined with five transverse bulkheads divides the underbody into fourteen watertight compartments. A breakwater mounted on the raised forecastle extends across the bow and heavy towing pads are mounted port and starboard.

SALE INFORMATION

The barges will be sold individually to the highest bidder at open auction at 10:00 a.m. on February 1, 1984 at:

The Cliff House
6300 Marine View Drive
Tacoma, Washington 98422

Bidders must provide cash or a certified or cashier's check payable to the U.S. Marshal for 10% of bid at time of sale. Balance due three business days after sale.

Barges will be sold "as is, where is" and should be picked up after complete settlement has been made.

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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, at no cost for one year in all 24 issues, only to companies with continuing advertising programs in this publication, whether an advertisement appears in every issue or not. Because it is an editorial service, unpaid and not part of the advertisers contract, MR EN assumes no responsibility for errors. **If you are interested in having your company listed in this Buyers Directory Section, contact John C. O'Malley at (212) 689-3266.**

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Hertz Equipment Rental Corp., 7 Entin Rd., Bldg # 2, Parsippany, NJ 07054
Marine Travelift, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235
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
Argo Marine, 140 Franklin St., New York, NY 10013
Marine Technical Associates, 195 Patterson Avenue, Little Falls, NJ 07424
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, Wash. 98134
DECKING—GRATING
International Grating, Inc., 7625 Parknurst, Houston, TX 77028
Selby, Battersby & Company, 5220 Whiby Ave., Philadelphia, PA 19143
J.E. Steigerwald Co., Inc., 5515 Belair Rd., Baltimore, MD 21206
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
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, NY 11231
Haynes Corporation, P.O. Box 179, Jackson, MI 49204
Van der Horst Corp. of America, 314 Penn Ave., Olean, NY 14760
DIESEL ENGINE—Spare Parts & Repair
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, NY 11231
ELECTRICAL EQUIPMENT
Argo Marine, 140 Franklin St., New York, NY 10013
Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217
Valad 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
Cleonodan A/S, N. American Agents, American United Marine Corp., 5 Broadway, Route 1, Saugus, MA 01906
EQUIPMENT—Marine
American General/Levin Corp., 445 Littlefield Ave., So. San Francisco, CA 94080
Argo Marine, 140 Franklin St., New York, NY 10013
ASEA Stal-Laval Inc., 525 Executive Blvd., Elmsford, NY 10523
Band-It Division, Houdaille Industries, Inc., P.O. Box 16307, Denver, CO 80216
Thomas Coudon Associates, 6655 Amberton Dr., Baltimore, MD 21227
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
Stal-Laval Turbin AB, S-612 20 Finspong, Sweden
EVAPORATORS
Alfa-Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
Aqua-Chem Inc., P.O. Box 421, Milwaukee, WI 53201
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130
FANS—VENTILATORS—BLOWERS
American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Argo Marine, 140 Franklin St., New York, NY 10013
Hartzell Fan, Division of Castle Hills Corp., 901 S. Downing St., P.O. Box 919, Piqua, OH 45356
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
InterTrade Industries, 15301 Transistor Lane, Huntington Beach, CA 92649
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Samson Ocean Systems, Inc., 99 High St., Boston, MA 02110
Seaward International, Inc., 6269 Leesburg Ave., Falls Church, Va. 22044
FILTERS
Dahl Manufacturing, Inc., 2521 Railroad Ave., Ceres, CA 95307
Wm. W. Nugent & Co., P.O. Box 948, Skokie, IL 60076
FINANCING—Leasing
A.G. Becker Paribus Inc., 2 First National Plaza, Chicago, IL 60670
Yegen Marine, P.O. Box 25504, Ft. Lauderdale, FL 33320
FIRE PROTECTION, DETECTION, & ALARM SYSTEMS
EEV, Inc., 7 Westchester Plaza, Elmsford, NY 10523
Walter Kidde, Walter Kidde Dr., Wake Forest, NC 27586
Wormald Fire Systems, One Stanton St., Marinette, WI 54143
FUEL OIL/ADDITIVES—Analysis & Combustion Testing
Ferrous Corporation, 910-108th N.E., P.O. Box 1764, Bellevue, WA 98009
Fuji Trading (America) Ltd., 17 Battery Place, New York, NY 10004
Rolfite Products Inc., 300 Broad Street, Stamford, CT 06901
FURNITURE
Bailey Carpenter & Insulation Co., 74 Sullivan Street, Brooklyn, N.Y. 11231
Comfort-Mate, Inc., 7988 NW 56th Street, Miami, FL 33166
GALLEY EQUIPMENT
Argo Marine, 140 Franklin St., New York, NY 10013
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
Camlock Flange Sales Corp., 60 Inip Dr., Inwood, NY 11696
Hayward Marine Products, 900 Fairmount Avenue, Elizabeth, NJ 07207
Marine Moisture Control Co., 60 Inip Dr., Inwood, N.Y. 11696
MacGregor-Navire International, Box 8991, S-402 74 Goteborg, Sweden
MacGregor Navire U.S.A. Inc., 135 Dermody St., Cranford, NJ 07016
Julius Mock & Sons, Inc., 20 Vesey Street, New York, NY 10007
J.E. Steigerwald Co., Inc., 5515 Belair Rd., Baltimore, MD 21206
HEAT EXCHANGERS
Alfa-Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
American Standard Inc., Heat Transfer Div., Buffalo, NY 14240
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130
HULL CLEANING
Butterworth Inc. (USA), 3721 Lapas Dr., P.O. Box 18312, Houston, TX 77223-9989
Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX England
Gulf International Divers, P.O. Box 1342, Gretna, LA 70052
Performance Hull Cleaning Services, Inc., P.O. Box 655, New Orleans, LA 70059-0655
Phosmarin 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
HYDRAULICS
Aeroquip Corp., 1130 Maynard Road, Jackson, MI 49202
HRS, Inc., 3334 Victor Court, Santa Clara, CA 95050
Hydronautics, 6338 Lindmar Drive, Goleta, CA 93017
INERT GAS—Generators—Systems
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
R.A. Fulton & Company Insurance Services, 100 California St., San Francisco, CA 94111
Midland Insurance Co., 160 Water St., New York, N.Y. 10038
United States P&I Agency, Inc., 80 Maiden Lane, New York, NY 10038
JOINER—Watertight Doors—Paneling
Bailey Distributors, Inc., 74 Sullivan St., Brooklyn, NY 11231
Isolamin Panels, c/o Consafe, Inc., P.O. Box 40339, Houston, TX 77040
Mosonite Commercial Division, Dover, OH 44622
Megadoor Inc., 441 Lexington Ave., Suite 903, New York, NY 10017
Walz & Krenzer, Inc., 400 Trobold 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
Keuffel & Esser/Kratos, 20 Whippany Rd., Morristown, NJ 07960
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
LINE BLINDS
Stacey Fetterolf Corp., P.O. Box 103, Skippack, PA 19474
MACHINE TOOLS
Republic-Lagun Machine Tool Co., 1000 E. Carson St., Carson, CA 90749
MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING
AMT Inc., 2400 N.W. 39th Ave., Miami, FL 33142
Amermarine USA Inc., P.O. Box 9205, Baltimore, MD 21222
American General/Levin Corp., 445 Littlefield Ave., So. San Francisco, CA 94080
Essex Machine Works, Essex, CT 06426
Jered Brown Brothers Inc., 1300 Coolidge, P.O. Box 2006, Troy, MI 48007-2006
Scotchman Industries, Inc., P.O. Box 850, Philip, SD 57567-0850
METALS
Boyou 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
Adams & Chute, Huntingtown Road, Newtown, CT 06470
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
Del Breit Inc., 326 Picayune Place (Suite 201), New Orleans, LA 70130
Bretagne ACB Corp., 344 Camp St., Suite 1000, New Orleans, LA 70130
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
Century Engineering, Inc., 32 West Rd., Towson, MD 21204
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
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
ECO Inc., 1036 Cape St. Claire Center, Annapolis, MD 21401
Parker C. Emerson & Associates, 17935 Cardinal Drive, Lake Oswego, Oregon 97034
Encon Management & Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706
Express Engineering Inc., 4122 87th Ave. N.W., Gig Harbor, WA 98335
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., 66 Long Wharf, Boston, MA 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
J.J. Henry Co., Inc., Two World Trade Center—Suite 9528, New York, N.Y. 10048
Hi-Test Laboratories, Inc., P.O. Box 226, Buckingham C.H., VA 23921
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
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 Power Associates, 447 Mission Blvd., Suite 235, San Diego, CA 92109
Marine Technical Associates, Inc., 95 River Rd., Hoboken, NJ 07030
George E. Meese, 194 Acton Rd., Annapolis, Md. 21403
Metritape Inc., P.O. Box 2366, Littleton, MA 01460
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
Northern Marine, P.O. Box 1169, Traverse City, MI 49685
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
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)
STV/Sanders & Thomas, Inc., 1745 Jefferson Davis Hwy., Arlington, VA 22202
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
J.F. Stroschein Associates, 666 Old Country Rd., Garden City, NY 11530
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
VeVeY Engineering Works Ltd. U.S. Rep: Carl G. Brimmekamp & Co., Inc., 102 Hamilton Ave., Stamford, CT 06902
Thomas B. Wilson, Associates, 1258 North Avalon Blvd., Wilmington, CA 90744
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
CMC Communications Inc., 5479 Jetport Industrial Blvd., Tampa, FL 33614
Cybernet International, Inc., 7 Powder Horn Dr., Warren, NJ 07060
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
Harris Communications (RF Communications), 1680 University Avenue, Rochester, NY 14610
Hose McCann Telephone Company, Inc., 9 Smith Street, Englewood, NJ 07631
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
Perko Inc. (Lights), P.O. Box 6400D, Miami, FL 33164
Racal-Decca Marine, Inc., 4200 23rd Avenue West, Seattle, WA 98199
Radar Devices, Inc., 2955 Merced Street, San Leandro, CA 94577
Radio-Holland USA, Inc., 6033 South Loop East, Houston, TX 77033
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
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., 535 Madison Ave., New York, NY 10022
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

Alfa Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
Biospherics Incorporated, 5001 Forbes Blvd., Lanham, MD 20801
Butterworth Inc. (USA), 3721 Lapas Dr., P.O. Box 18312, Houston, TX 77223–9989
Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
Centrico, Inc. (Westfalia Separators), 100 Fairway Court, Northvale, NJ 07647
Dahl Manufacturing, Inc., 2521 Railroad Ave., Ceres, CA 95307
Microphor, Inc., P.O. Box 490, Willits, CA 95490
Marine Moisture Control Co., 60 Inip Dr., Inwood, NY 11696
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
Argo Marine, 140 Franklin St., New York, NY 10013
Bareco, 6910 East 14th St., Tulsa, OK 74112
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
Grow Group, Inc., 200 Park Ave., New York, NY 10017
Hempel Marine Paints, Inc., 65 Broadway, New York, NY 10006, 2425 Fountainview, Suite 340, Houston, TX 77057, P.O. Box 10265, New Orleans, LA 70181
nternational Paint Company, Inc., 2270 Morris Avenue, Union, NJ 07083
Jaegle Paint Co., Inc., 1912 Darby Rd., Havertown, PA 19083
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
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., 60 Inip Dr., Inwood, NY 11696
Hydro-Craft, Inc., 1821 Rochester Industrial Dr., Rochester, MI 48063
Knights Piping Inc., 5309 Industrial Rd., 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
Selkirk Metalbestos, Box 19000, Greensboro, NC 27419
Stauff Corporation, 21-31 Industriat Park, Waldwick, NJ 07463

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
Bombardier, 1051 Dickson, Montreal, Quebec, Canada H1N 2H7
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
Daihatsu Diesel (USA) Inc., 1211 Ave. of the Americas, New York, NY 10036
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
Lips Propellers, 3617 Koppens Way, Chesapeake, VA 23323
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
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 76 Ave. So., Kent, WA 98032
SACM (Societe Alsacienne De Constructions Mechaniques De Mulhouse) 1, Rue De La Fonderie, Boite Postale 1210, 68054 Mulhouse Cedex, France
Schottel of America, Inc., 8375 N.W. 56 St., Miami, FL 33166
Karl Senner, Inc., P.O. Box 10055, New Orleans, LA 70181
Skinner Engine Company, P.O. Box 1149, Erie, PA 16512
Sulzer Brothers, Dept. Diesel Engines, CH-8401 Winterthur, Switzerland
Transamerica DeLaval 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, Solina, 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
Welco Industries, Inc., 9027 Shell Rd., Cincinnati, OH 45236
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

Argo Marine, 140 Franklin St., New York, NY 10013
Jim's Pump Repair, 48-55 36th St., Long Island City, NY 11101
Megator Corporation, 562 Alpha Drive, Pittsburgh, PA 15238
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
Vita Motivator Company, 200 West 20th St., New York, NY 10011
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
Norton Chemplast, 309-150 Dey Rd., Wayne, NJ 07470
Samson Ocean Systems, Inc., 99 High Street, Boston, Mass. 02110
Tubbs Cordage Company, P.O. Box 709, Orange, CA 92666
Wall Industries, Inc., P.O. Box 560, Elkin, NC 28621

RUDDER ANGLE INDICATORS—STEERING

Hy-Drive America Corp., 3629 Vernon Blvd., Long Island City, NY 11106
Marine Drive Systems, 519 Raritan Center, Edison, NJ 08817
Robertson, 135 Fort Lee Rd., Leonia, NJ 07605

SAFETY EQUIPMENT

Elkhart Brass Manufacturing Co., Inc., P.O. Box 1127, Elkhart, IN 46515
Wormald Fire Systems, One Stanton St., Marinette, WI 54143

SANITATION DEVICES—Pollution Control

Argo Marine, 140 Franklin St., New York, NY 10013
Envirovac Inc., 1260 Turret Dr., Rockford, IL 61111
Marine Moisture Control Co., Inc., 60 Inip Dr., Inwood, L.I., N.Y. 11696
National Sanitation Foundation, P.O. Box 1468, Ann Arbor, MI 48105

SCAFFOLDING EQUIPMENT—Work Platforms

McCausey Lumber Co., 7751 Lyndon, Detroit, MI 48238
Patent Scaffolding Co., One Bridge Plaza, Fort Lee, NJ 07024
Trus-Joist Corp., P.O. Box 60 Boise, ID 83704

SHAFT SEALS, REVOLUTION INDICATOR EQUIPMENT

Bird-Johnson Co., 100 Norfolk St., Walpole, MA 02081
Crane Packing Company, 435 Regina Dr., Clarksburg, MD 20734
EG&G Sealol, Engineered Products Div., Marine Products Group, Warwick, RI 02888
Electric Tachometer Corp., 68th & Upland St., Philadelphia, Pa. 19142
Penco Division/Hudson Engineering Co., P.O. Box 68, Bayonne, NJ 07002

SHIPBREAKING—Salvage

The Boston Metals Co., 313 E. Baltimore St., Baltimore, Md. 21202
Fred Devine Diving & Salvage, Inc., 6211 N. Ensign, Swan Island, Portland, OR 97217
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, Ore. 97201

SHIPBUILDING EQUIPMENT

Pearlson Engineering Co., P.O. Box 8, Kendall Branch, Miami, FL 33156
Total Transportation System Inc., 813 Forest Dr., Newport News, VA 32606
Total Transportation Systems (International) A/S, Bjornegarden, P.O. Box 28, N5201, Oslo, Norway

SHIPBUILDING STEEL

Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., Martin Tower, Bethlehem, PA 18018
Tiline, P.O. Box 729, Albany OR 97321
Welded Beam Company, P.O. Box 280, Perry OH 44081

SHIPBUILDING—Repairs, Maintenance, Drydacking

Alabama Maritime Corp., P.O. Box 3026, Mobile, AL 36652
Amsterdam Drydock Company, Post Box 3006, 1003 AA, Amsterdam, Holland
Asmar Shipyards Co., Astilleros y Maestranzs de la Armada, Prat 856, Piso 14, Casilla 1,50-V, Valparaiso, 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., Martin Tower, Bethlehem, PA 18018
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
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 Rd., Tomago NSW Australia 2322
China Shipbuilding Corp., 3 Chung Kong 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 International (America) Corp., 437 Madison Ave., New York, NY 10022
Daewoo Shipbuilding & Heavy Machinery Ltd., Ayangni, 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
Hoboken Shipyards, Inc., 1301 Hudson St., Hoboken, NJ 07030
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 Spezia, 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 Road, P.O. Box 2169, Singapore 0409
Koch Ellis Barge & Ship Service, P.O. Box 9130, Westwego, LA 70094
Kone Corp., P.O. Box 6, SF-05801, Hyvinkaa, Finland
Leevac Corporation, P.O. Box 2607, Morgan City, LA 70381
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134
M.A.N. GHH Sterkrade, P.O.B. 110240, D-4200 Oberhausen 11, West Germany
McDermott, Incorporated, 1010 Common Street, New Orleans, LA 77227
Main Iron Works, Inc. P.O. Box 1918, Houma, LA 70361
Marinette Marine Corporation, Marinette, WI 54143
Marystown Shipyard Limited, P.O. Box 262, Marystown, Newfoundland, Canada A0E 2M0
Jos. L. Meyer GmbH & Co., P.O. Box 2990 Papenburg 1, West Germany
Misener Industries, Inc., 5353 Tyson Avenue, P.O. Box 13625, Tampa, Fla. 33681
Mitsubishi Heavy Industries, Ltd., 5-1, Marunochi 2-chome, Chiyoda-ku, Tokyo, 100 Japan
Monark Boat Co., P.O. Box 210, Monticello, Ark. 71655
Moron 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
North Florida Shipyards, P.O. Box 3863, Jacksonville, FL 32206
O.A.R.N. (Officine Allestimento-Riprazioni Navil, 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
Progressive Shipbuilders & Fabricators, Inc., P.O. Box 9130, Houma, LA 70361
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 Rauma 10, Finland
Samsung Shipbuilding & Heavy Industries Co., Ltd., Samsung Main Bldg. 250, 2Ka, Taepyong-ro, Chung-ku, Seoul, Korea
St. Louis Ship, 611 East Marceau St., St. Louis, MO 63111
Savannah Shipyard Co., P.O. Box 787, Savannah, GA 31402
Schiess Defries, Postfach 111146, Schiess-Str. 61, D-4000 Dusseldorf 11, West Germany
Service Machine Group, Inc., P.O. Box 2664, Morgan City, LA 70381
Southbay Boat Inc., P.O. Box 13308, San Diego, CA 92113
Southern Oregon Marine Engineering and Construction, P.O. Box 1220, Coos Bay, OR 97420
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
Todd Shipyards Corp., 1 State St. Plaza, New York, N.Y. 10004
Tracor Marine, P.O. Box 13107, Port Everglades, Fla. 33316
Union Dry Dock & Repair Co., Foot of Pershing Road, Weehawken, N.J. 07087
Veralme Estaleiros Reunidos Do Brosil S.A., Rua Buenos Aires, 68, Rio de Janeiro—RJ—Brazil
Vickers Cockatoo Dockyard Pty. Ltd., P.O. Box 162 Milsons Point, N.S.W 2061, Australia
Zidell Explorations, Inc., 3121 S.W. Moody Street, Portland, OR 97201

BUYERS DIRECTORY

(continued)

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Pilotage Consultants, Inc., P.O. Box 2046, New Hyde Park, NY 11040
SILENCERS
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130
SMOKE INDICATORS
Robert H. Wager Co., Inc., Passaic Avenue, Chatham, N.J. 07928
STUFFING BOXES
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
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 Inc. (USA), 3721 Lapas Dr., P.O. Box 18312, Houston, TX 77223-9989
Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
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
Marine Moisture Control Co., 60 Inip Dr., Inwood, NY 11696
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
TOWING—Barges, Vessel Chartering, Lighterage, Salvage, etc.
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
Suderman & Young Co., Inc., 918 World Trade Bldg., Houston, Texas 77002
Turecamo Coastal & Harbor Towing Corp., One Edgewater St., Clifton, Staten Island, N.Y. 10305
VALVES AND FITTINGS
Camlock Flange Sales Corp., 60 Inip Dr., Inwood, NY 11696
Clow Corporation, 1211 West 22nd St., Oak Brook, IL 60521
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
Jamesbury Corp., 640 Lincoln Street, Worcester, MA 01605
Marine Moisture Control Co., 60 Inip Dr., 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
Pittsburgh Brass Manufacturing, Sandy Hill Rd., R.D. 6 Box 387-A, Irwin, PA 15642
Stacey Fetterolf Corp., P.O. Box 103, Skippack, PA 19474
Stockham Valves & Fittings, Box 10326, Birmingham, AL 35202
Tote Temco, Inc., 1941 Lansdowne Road, Baltimore, MD 21227
Union Flonetics, P.O. Box 459, Clinton, PA 15026
Robert H. Wager Co., Inc., Passaic Avenue, Chatham, N.J. 07928
Waukesha Bearings Corp., 405 Commerce St., P.O. Box 798, Waukesha, WI 53186
Westran Corporation, Valve Components Group, 4025 Rememberance Rd., N.W., Grand Rapids, MI 49504
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
VIBRATION ANALYSIS
DLI Engineering Corp., 253 Winslow Way West, Bainbridge Island, WA 98110
WATER PURIFIERS
Alfa Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
AquaGlobal, 50/60 Inip Dr., Inwood, NY 11696
Bull & Roberts, Inc., 785 Central Ave., Murray Hill, NJ 07974
Drew Chemical Corporation, One Drew Chemical Plaza, Boonton, NJ 07005
Everpure, Inc., 660 N. Blackhawk Dr., Westmont, IL 60559
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130
WELDING
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 FAIRLEADS
Braden Winch Co., 800 East Dallas, Broken Arrow, OK 74012
CONMACO, Inc., 820 Kansas Ave., P.O. Box 5097, Kansas City, KS 66119
Fritz Culver, Inc., P.O. Box 569, Covington, LA 70434
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
Smith Berger Marine Inc., 516 So. Chicago St., Seattle, WA 98108
Stanspec Corp., 13600 Deise Ave., Cleveland OH 44110
Superior-Lidgerwood-Mundy Corp., 1101 John Avenue, Superior, WI 54880
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
Atlantic Cordage Corp., 60 Grant Ave., Carteret, NJ 07008
Delco Wire & Cable, Inc., 257 Rittenhouse Circle, Keystone Industrial Park, Bristol, PA 19007
Seacoast Electric Supply Corp., 225 Passaic St., Passaic, NJ 07055
Seacoast Electric Supply Corp., 1505 Oliver St., Houston, TX 77007
Tri-Mark, Inc., 8585 Industry Park Drive, Piqua, OH 45356
WIRE ROPE—Slings
AISCO, 60 Grant Ave., Carteret, NJ 07008
Atlantic Cordage Corp., 60 Grant Ave., Carteret, NJ 07008
Bethlehem Steel Corp., Martin Tower, Bethlehem, PA 18018
A.L. Don Company, Foot of Dock Street, Matawan, NJ 07747
I & I Sling Company, 2626 Market Street, Dept. D, Aston, PA 19014
ZINC
The Platt Bros. & Co., Box 1030, Waterbury, CT 06721
Smith & McCroken, 153 Franklin St., New York, N.Y. 10013

Avco Lycoming Delivers First Production Engines For Navy's New LCACs

At Avco delivery ceremony were (L to R): **John J. Kelly,** vice president and general manager, New Orleans Operations, Bell Aerospace Textron; Capt. **Charles Piersall,** USN, project manager, Amphibious Ship Acquisition Project; and **Donald K. Farrar,** president, Avco Corporation.

In a recent ceremony held at Avco Lycoming's Stratford (Connecticut) Division, the company marked the initiation of production deliveries of TF40B marine gas turbine engines for the U.S. Navy's Landing Craft Air Cushion (LCAC) amphibious assault vehicle program. Officials of the Navy, LCAC prime contractor Bell Aerospace Textron, and Avco were on hand for the initial shipments of production engines.

The LCAC is an amphibious air cushion vehicle that can travel at speeds up to 50 knots and can quickly transport troops, equipment, and weapons from support ships located over the horizon to dry ground beyond the beach.

LCACs are expected to replace the Navy's current fleet of landing craft, which are of World War II design, dramatically improving the ship-to-shore capability of the Navy and Marine Corps.

Calumet Tug 'Curly B' Repowered With Cummins Diesel Engines

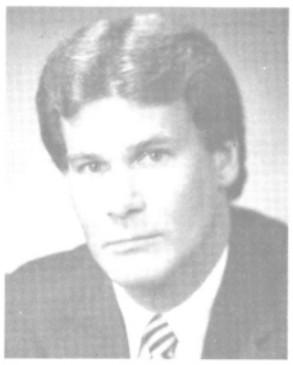
Calumet Marine Towing Corporation of Chicago recently overhauled and repowered the renamed 90-foot tug Curly B, ex Waverly formerly owned by Souix City New Orleans Barge Line. A pair of Cummins KTA-2300-M provide the refurbished boat with a total of 1,880 bhp with which to tow barges and dock ships in Great Lakes harbors. Other new equipment includes two Twin Disc MG-540 6.18:1 reduction gears, twin Kalhenberg propellers and shafts, Mathers engine controls, and Wagner steering system.

Hackenberger Appointed Marketing Director For Tacoma Boat Division

In a move aimed at strengthening marketing and sales efforts in its Northern Line Division, Tacoma Boatbuilding Company of Tacoma, Wash., has announced the appointment of **Claus Hackenberger** as director of marketing for that Division. Northern Line is a leading manufacturer of marine equipment, including winches, cranes, capstans, gearboxes, and propellers, and provides a full range of machine shop services to the industry.

Mr. **Hackenberger** has held various engineering management positions at both Tacoma Boat and Northern Line Machine, and holds master's degrees in mechanical, structural, and civil engineering from the University of Darmstadt in Germany.

Heath Named Coal Sales Manager For Pott's Inland Waterways Division



Geoffrey A. Heath

The Inland Waterways Division of Pott Industries Inc. of St. Louis, a Houston Natural Gas Corporation company, has named **Geoffrey A. Heath** manager-coal sales, it was announced by **C.M. Jones Jr.** vice president-coal sales. Pott Industries Inc. is the parent company of Federal Barge Lines, Inc., United Barge Company and Cora Coal Terminal.

Mr. **Heath** will be responsible for the marketing of barge services for coal shipments in the Upper Ohio River area, as well as in West Virginia, Ohio, Kentucky, and Tennessee. Prior to joining the Inland Waterways Division, he was sales manager/field representative for Derby Coal Company, after previously working as a coal development representative for C&O Railway.

MarAd Approves Title XI To Aid In Refinancing Of ACL's $3.7-Million Cruise Vessel

The Maritime Administration has approved in principle an application by American Cruise Line, Inc. of Haddam, Conn., for a Title XI guarantee to aid in refinancing the construction cost of the 96-passenger cruise vessel M/V America. The vessel has an overall length of 165 feet, molded beam of 36 feet, and is powered by a 900-bhp diesel engine.

The America has operated between ports along the inland and coastal waterways on the U.S. East Coast since her delivery in February 1982. The vessel was built by Chesapeake Shipbuilding, Inc. of Salisbury, Md.

The Title XI guarantee covers $2,622,000, or 75 percent of the $3,775,966 cost of the vessel.

New Fuel Management System From Pandel —Literature Available

A computer-based fuel management system, the FMS-3, was introduced recently by Pandel Instruments, Inc. of Grand Prairie, Texas. This system compares the fuel burned versus the speed made for vessels in the 4,000-bhp range and up. It consists of two major components: flow and temperature sensing devices, and the main computer unit with the system display.

The system monitors individual engine fuel burns and vessel speed, and the computer calculates the fuel burned per mile of operation. Performance charts for the individual vessel may then be constructed to allow operation at known efficiency levels. The system is configured to function with marine diesel engines using low-pressure fuel supply pumps and return fuel circuits. The FMS-3 has hardware and software correction factors for fuel heating during recycling, aeration of the return fuel, and flowmeter calibration.

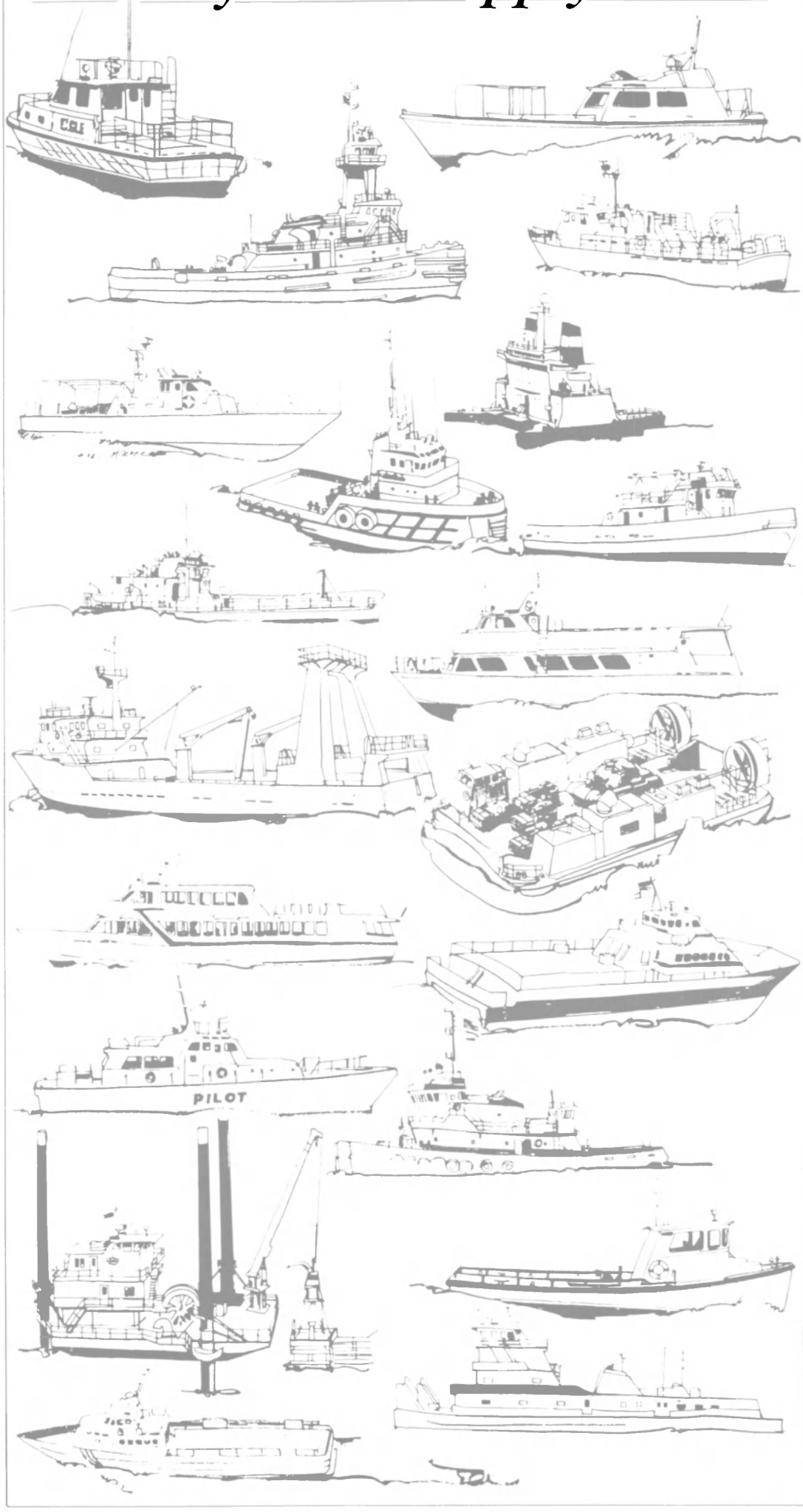
Speed inputs to the FMS-3 come from either the vessel's on-board knot log or from the Pandel Channel-Scan™ remote depth sounder. System outputs are displayed on a 12-inch CRT that is equipped with an amber display format, which presents no degradation of night vision.

Display formats are readily changed in system software to meet any particular fleet requirements. Several of these systems are now operating successfully on the Inland Waterways.

For more information and free literature on the FMS-3,

Circle 31 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.

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Season after season, Simrad earns the maritime fleet's trust at sea.

The maritime business is no piece of cake. Especially when it comes to electronics. Why, you don't even begin to earn trust until at least five of the seven seas have passed under your keel. Which is reason enough to build every piece of our maritime gear to withstand the rigors of non-stop, whirlwind passages.

ADF TD-C328

Like our Navigation Sounder, the ED 161.* Its powerful transmitter insures flawless recording. And its depth alarm is loud enough to crank the heads of a few mates in the event it should ever go off.

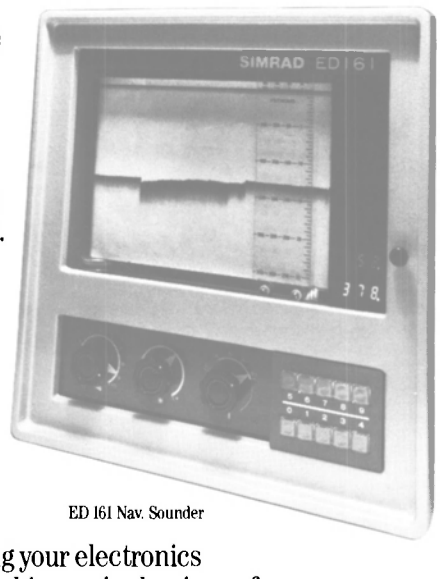
In the Shortwave Marine Band ADF department, the TD-C328H ATS is our recommendation, plus a few others.* Reliability is critical and therefore inherent. In addition, its distance indicator will remind you of just how far you've come and how far you've yet to go.

Distress-wise, our FCC approved RW-105 Watch Alarm Receiver carries out the dutiful job of monitoring 2182 kHz impeccably. A built-in digital watch automatically lifts the mute during long periods of silence and also kicks-in when receiving two-tone alarm signals.

*Complies with SOLAS and IMCO recommendations.

RW-105 Watch Receiver

And of course, there are many other products we'd like to have shown you but can only talk about. Like our NL Doppler Speed Log. One of, if not, the least expensive doppler log systems to install. Or our TF series FAX machines — the 753 and 788 — are as state-of-the-art as money can buy. And the last line for your consideration: our Loran C's. They are, without question, the most accurate and simpliest Loran C's available today.



ED 161 Nav. Sounder

So whether you're taking your electronics back to square one or just yanking a single piece of gear, consider one of the most trusted names on any sea.

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Circle 154 on Reader Service Card

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All too often, the fire turns into a major disaster. Why? Because poorly designed and maintained fire protection systems fail to operate the way they were supposed to. Whether the reason is neglect or unqualified personnel performing maintenance, the result is the same. A small fire becomes a big headline.

Wormald Fire Systems can help prevent that from happening.

We're part of the world's largest fire protection company. And coincidentally, the company most experienced in marine fire protection. With marine professionals at or near all the world's major shipping ports, we can respond quickly to your needs... wherever your ships are being built or serviced.

We'll work closely with naval architects to design, fabricate and install effective fire alarm, detection and suppression systems. Or we'll meet your ships at a particular port and conduct a thorough inspection of on-board fire protection systems. In some cases, we can service those systems at the same time. Or arrange for more extensive servicing to be performed at the ship's next port of call.

For a free booklet on how we can help protect your ships from disasterous fires, contact John Goudreau, Wormald Fire Systems, One Stanton St., Marinette, WI 54143. Phone (715) 732-4423 or telex Wormald 26-3440.

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Ask Wormald about fire protection.

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