MARITIME REPORTER
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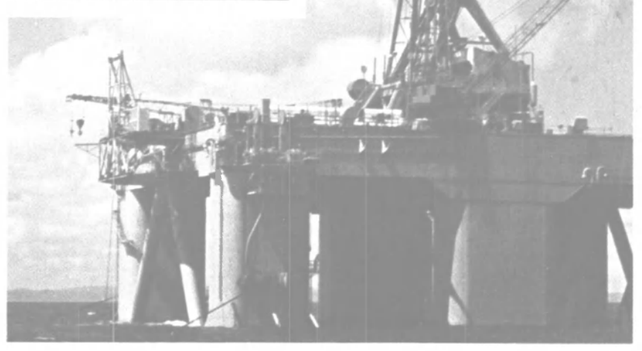
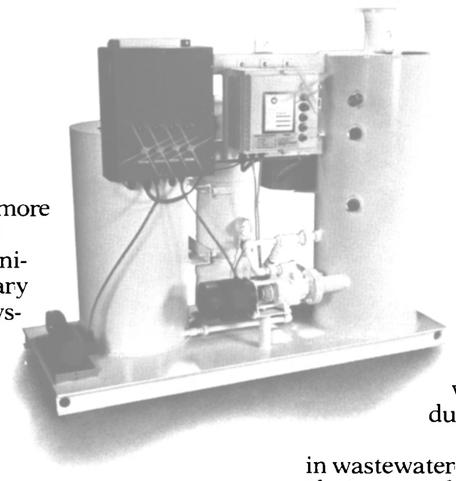


1981 YEARBOOK

JUNE 1, 1981

Straight flush.



Omnipure® will do more than just suit you. It will amaze you. Because Omnipure is not just an ordinary wastewater treatment system. Now you can say bon voyage to holding tanks forever.

Utilizing an electrocatalytic process, it takes only seconds to produce a quality effluent. Which means no on-board storage, no chemical additives, no sludge removal and practically no maintenance.

Omnipure is a Type II Marine Sanitation Device which is U.S. Coast Guard certified. It requires very little space, is lightweight, and can accommodate crews of 6 to 250. What's more, since Omnipure is skid-mounted and prewired, installation is reduced from days to hours.

Avoid the dirty work in wastewater treatment systems and make it a straight flush with Omnipure. Give Bill Collet a call at (713) 665-7370. Or you can write 6101 Southwest Freeway, Suite 100, Houston, TX 77057. Telex: 76-2764.

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Division of Sigma-Chapman, Inc.

Model 12M812-27: 6'3"Wx5'9"Hx3 6"D; 120 man unit; 3,600 gal/day.

Norshipco To Overhaul Navy LSD Under $14.9-Million Contract

Norfolk Shipbuilding and Dry-

Come Hell Or High

MARITIME REPORTER
AND
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1981 YEARBOOK

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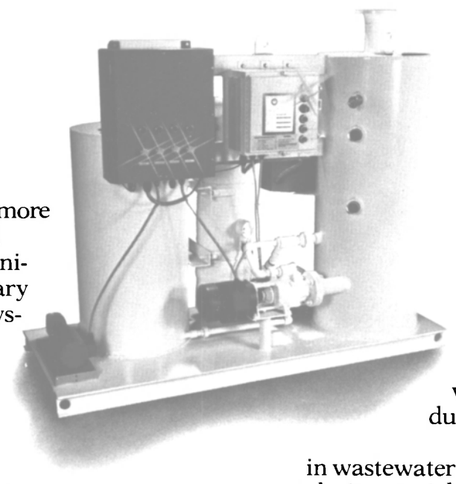

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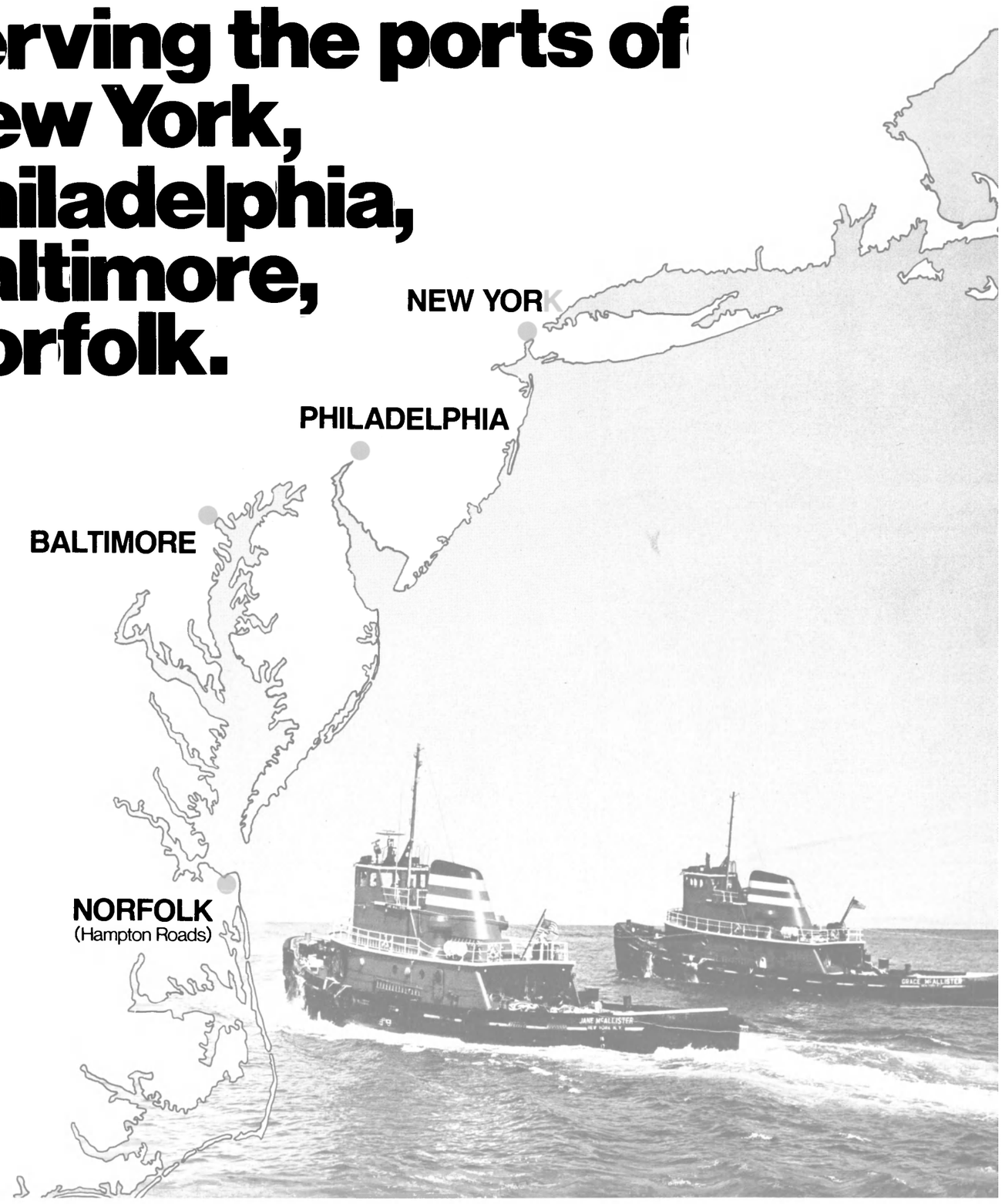

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Norshipco To Overhaul Navy LSD Under $14.9-Million Contract

Norfolk Shipbuilding and Drydock Corporation, Norfolk, Va., is being awarded a $14,934,000 formally advertised, firm fixed price contract for the regularly scheduled overhaul of the dock landing ship USS Spiegel Grove (LSD-32). The Supervisor of Shipbuilding, Conversion and Repair, USN, Portsmouth, Va., is the contracting activity. (N62678-76-C-0036)

MarAd Approves Title XI On Two Jackup Vessels To Cost $20.6 Million Total

The Maritime Administration has approved in principle an application by Houtech Limited I, Houston, for a Title XI guarantee to aid in financing the construction of two jackup offshore workover and drilling vessels.

The rigs are mat-supported and capable of drilling in water up to 73 feet deep. They will be operated primarily in the Gulf of Mexico. The builder, Bethlehem Steel Corporation, Beaumont, Texas, expects to deliver both vessels by next November.

The total Title XI guarantee for the two vessels covers $20,600,000, or slightly less than the allowable 75 percent of their $28,176,000 combined estimated cost.

New Edition Of Rules For Steel Vessels Now Available From ABS

The American Bureau of Shipping (ABS) has just published the 1981 edition of *Rules for Building and Classing Steel Vessels*. The Rules covered in the volume are applicable to steel vessels of 200 feet (61 meters) and over in length. The new edition includes revisions to requirements for fire extinguishing systems and additional requirements for emergency sources of power to bring the Rules in line with the International Convention for Safety of Life at Sea 1974, which went into force May 25, 1980.

The 1981 edition costs $30 in the United States. Orders may be placed with the Book Order Section, American Bureau of Shipping, 65 Broadway, New York, N.Y. 10006, or from local ABS offices in the U.S. and overseas.

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Brochure Available On Gilkes Self-Priming Pumps For Marine Market

The Gilkes Series 'M' Gilmec self-priming pump is one of the most widely used self-priming pumps in the marine world today. With their record for quality and reliable service over an extremely long life, they are fitted as standard seawater cooling pumps by many of the world's leading manufacturers of marine diesel engines for the workboat market.

The Series 'M' Gilmec pump has been designed specifically for the marine market, not just another industrial pump adapted to meet a market where reliability is all important. The pumps are constructed in all bronze materials that have been proved over many years to be the best to withstand seawater erosion and corrosion. The shaft is made in stainless steel and runs in heavy-duty ball and roller bearings designed for a minimum life of 25,000 hours under the worst conditions.

These pumps are said to be ideal for all shipboard applications such as bilge pumping, firefighting, deck wash, fuel oil and ballast transfer, fish washing, etc. The pumps can be supplied as bare shaft units, or complete with clutch pulleys, clutch couplings, electric motors, diesel engines, etc.

For further information and a free copy of brochure,

Write 15 on Reader Service Card

Tacoma Boat Awards $2-Million Contracts To Sea-Mar Electronics

Contracts in excess of $2 million have been awarded Sea-Mar Electronics, Seattle, by Tacoma Boatbuilding Company. The contracts are for a communications/Raytheon radar package aboard ocean surveillance ships currently under design for construction by Tacoma Boat for the U.S. Navy.

Henschel Changes Name Of Its Oklahoma Unit To Tulsa Division

Henschel Corporation, a unit of General Signal, has announced a new name for its division located in Oklahoma. Formerly called Henschel/Nelson, it is now known as Henschel's Tulsa Division. In new offices and manufacturing space, this Henschel division continues under the direction of **Joe Pertolsky,** vice president and general manager. It is a leading supplier of naval switchboards for combat systems, interior communications, and power distribution. Marine electrical hardware is produced at its operations in Homer, La.

The executive offices of Henschel Corporation and its president, **George E. Coorssen,** remain in Amesbury, Mass. The Henschel staff and facilities in Amesbury continue the design, development, and production of ship control and interior communication equipment and system for both naval and commercial ships.

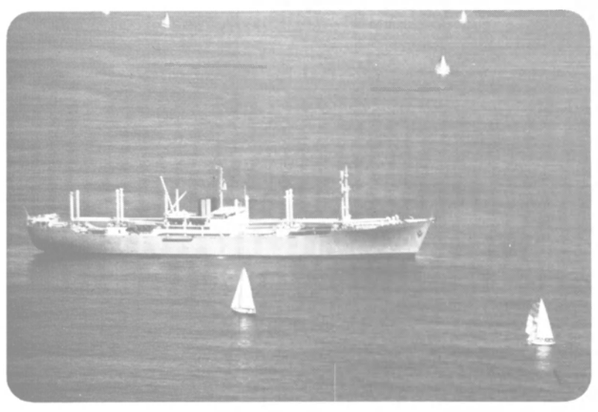
Atlantic Marine To Build Cat-Powered Drill Barge For Mecom Company

Atlantic Marine, Inc. of Ft. George Island, Fla., has been awarded another contract to construct an inland SCR mechanical drill barge for the John W. Mecom Company of Houston. Atlantic Marine recently delivered a similar unit to the Mecom Company.

The drilling unit of the 200-foot by 54-foot by 14-foot barge is powered by Caterpillar D399 diesel engines. Outfitting of the barge will be completed at the Mecom facility at Hitchcock, Texas. Contract schedules call for the drill barge to be delivered to Mecom in October 1981.

Atlantic Marine, located at the intersection of the St. Johns River and the Intracoastal Waterway, was established in 1964. The Jacksonville area shipyard constructs steel-hulled fishing boats, workboats, and specialized vessels for offshore and river use.

Marine Auxiliary Steam

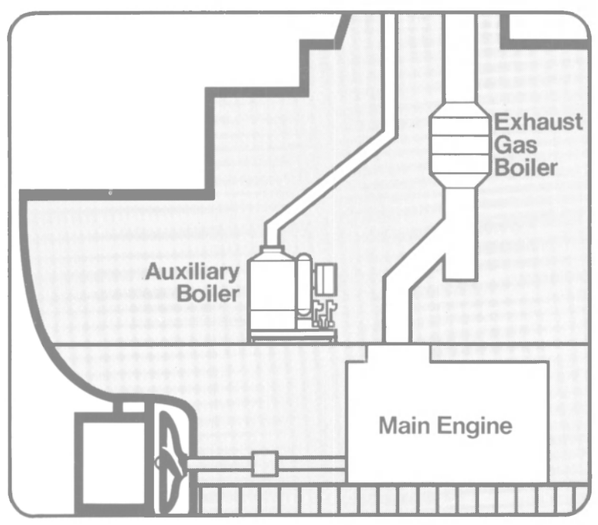


If fuel economy, dependability and compactness are among your requirements when you specify marine auxiliary boilers, you should investigate Clayton Steam Generators and Waste Heat Boilers.

Our units have gone to sea on more than 2,000 vessels and function efficiently to provide steam for heating, cooking and housekeeping. They occupy substantially less space and are lighter in weight than conventional boilers. And they are safer because shells, drums or headers are located outside the fire zone, thus eliminating steam explosion hazards.

The list of design features is highlighted by the fuel saving capabilities of our units. We deliver 80-85% efficiency within a range of 20-100% of rated load. In addition, our fast start-up response yields a full head of steam in just a few minutes from a cold start, saving more fuel.

Because of our many years of experience in the international market, Clayton is able to provide uniformly high quality equipment in addition to sales and service throughout the world. We welcome the opportunity to quote on your next maritime project.



Among those attending Hempel reception were (L to R): **George Mara,** vice president, Roland Marine, Inc.; **Per V. Meulengracht,** president, PVM Enterprises; **Rod Vulovich,** senior naval architect-ship construction, Sea-Land Service, Inc.; **J.C. Hempel; Finn Olander,** president, Hempel's Marine Paints, Inc. USA; and **Richard J. Baumler,** vice president-ship construction, Sea-Land Service.

Whitehall Reception Honors J.C. Hempel

A reception honoring **J.C. Hempel,** founder of the Hempel Group of Companies, was held recently at the Whitehall Club in New York City. The event, which was attended by friends of the Hempel Group in the marine and container industries, took place during Mr. **Hempel's** annual visit from Denmark. Hosting the reception was **Finn Olander,** president of Hempel's Marine Paints, Inc. USA.

EMD-Powered 'Gulf Condor' Delivered By Quality Shipyards

Gulf Fleet Marine Corporation, headquartered in New Orleans, recently took delivery of the Gulf Condor (shown above), a new 120-foot by 34-foot by 16-foot, 4,200-bhp class tug, built in Houma. La., by Quality Shipyards, Inc., another Gulf Fleet company.

The Gulf Condor is powered by twin GM EMD-12-645-E6 diesel

engines through 5:1 Reintjes 1850 gears and is equipped with Kort nozzles. Its towing/anchor handling package consists of an Intercon DD 200 double drum winch with capacity of 2,500 feet of 2-inch cable on each drum, as well as an Intercon stern roller with hydraulic tow pins. The vessel is also equipped with an Intercon anchor windlass with a 750-pound anchor.

The vessel is capable of maximum speeds of 12 knots, and can sustain a bollard pull of 110,000 pounds. She is classed by the American Bureau of Shipping as +A-1, AMS, Full Oceans Towing Service, and has an International Load Line.

The Gulf Condor is the second of eight vessels to be delivered to Gulf Fleet during 1981; another 11 vessels are scheduled for delivery in 1982. Gulf Fleet owns and operates 105 offshore tugs, towing/supply vessels, supply vessels, deck barges, and utility vessels and provides, on a worldwide basis, a wide range of marine transportation services to the offshore petroleum and construction industries.

Gulf Fleet Marine is one of the Houston Natural Gas Corporation (HNG) group of companies. HNG's other lines of business include construction and repair of barges and towboats, inland waterways transportation, intrastate natural gas transmission, oil and gas exploration and production, coal mining and production, and the marketing of industrial, medical, and specialty gases.

New Brochure On Marisat Terminal Available From Japan Radio Company

A 12-page full-color brochure describing the company's JUE-15A model Marisat mobile terminal is now available from Japan Radio Company, Ltd. This unit is the third generation of JRC terminals designed specifically for the Marisat system. According to the manufacturer, it represents the technical and operational knowledge gathered from ship installations all over the world, plus the latest advances in electronic technology.

The JUE-15A uses the same proven design and production techniques of its predecessor, the JUE-5A, with improvements in performance, and design features for further reliability, easier installation, operation, and maintenance.

For a free copy of the JUE-15A brochure,

Write 26 on Reader Service Card

FELS To Construct Semisubmersible Rig For Western Company

Far East-Levingston Shipbuilding Ltd. (FELS) has signed a contract to construct a semisubmersible drilling platform for Western Company of the U.S. Scheduled for delivery in mid-1983, the self-propelled drilling vessel will have dimensions of 260 feet by 200 feet by 116 feet and a twin ship-shaped hull supporting six caissons and a rectangular elevated deck.

The deck will have single-level machinery houses, two-level quarters with helideck, and a substructure with derrick. The quarters will have facilities to accommodate 92 offshore personnel, and will be provided with both cooling and heating systems. Three revolving cranes will be installed, and the vessel will be moored by four double-chain windlasses with eight anchors.

The vessel will be fabricated to meet all regulatory requirements of the American Bureau of Shipping and the U.S. Coast Guard, and is designed to operate in water depths from 150 feet to 1,500 feet. It will be built to take a maximum deck load of 4,000 long tons with capability of surviving storm conditions at a draft of 50 feet under 100 knots steady wind, 1.5 knots current, and 100 feet maximum wave height.

At present, Western Oceanics, Inc., a subsidiary of Western Company, is having two of their jackups built in FELS. The jackups, which form part of the six Friede and Goldman L-780 design jackups currently under construction in FELS, will be among the first jackups of this design to be operational in the world. They will be christened Apollo I and Apollo II.

Oosterhuis Talk Describes Decline In Fuel Quality—Free Copies Available

Herman H. Oosterhuis, president of Oosterhuis Industries, Inc., believes that the quality of fuel keeps going down, the decline in quality being widespread in some areas and worse in others. In a talk at a technical session of the Workboat Show held in New Orleans, Mr. **Oosterhuis** said that the United States has long been blessed with clean, low-sulphur diesel fuel.

"Apparently, this era is now coming to an end, and is causing problems for many high-speed engine users. Most lower-horsepower, high-rpm diesel engines that are designed for operating on gas oil and ASTM No. 2 diesel are seriously affected," he pointed out.

In an excerpt from his well-received talk, he pointed out that American manufacturers have done wonders, particularly during the past decade, with improving on fuel efficiency of steam plants. "It nevertheless appears that the U.S. merchant marine is now heading for at least partially switching over to diesel engines capable of burning heavy fuel, and the industry is catching up rather rapidly.

Herman H. Oosterhuis

"They have been historically steam-oriented, contrary to overseas, where the diesel has been king for more than half a century. U.S. engine manufacturers of higher-horsepower, medium-speed engines already have experience with heavy fuel, and assembly in the U.S. of big-bore diesels has recently become a fact," he said.

Mr. **Oosterhuis** pointed out that the interest shown by the U.S. Maritime Administration for heavy-fuel engines, and the fact that more and more engineers will become thoroughly familiar with the operation of heavy-fuel diesels will, no matter how remote it may sound, in the long run be beneficial to the workboat industry.

Mr. **Oosterhuis,** who is a native of Holland, is a graduate of the Amsterdam Marine Engineers College.

For a free copy of the Oosterhuis talk,

Write 11 on Reader Service Card

Blocker Seeks Title XI On Drilling Barge To Cost $13.78 Million

Blocker Drilling & Marine Company, Houston, has applied to the Maritime Administration for a Title XI guarantee to aid in financing the construction of a posted drilling barge. The applicant is a subsidiary of Blocker Energy Corporation.

J. Ray McDermott & Co., Inc., New Iberia, La., is building the barge, scheduled for delivery in November. The vessel will be operated in inland and coastal waters up to 20 feet deep. If approved, the guarantee would cover $10,200,000, or up to 75 percent of the vessel's $13,780,000 estimated cost.

Economic Impact Report Available From NTIS

Copies of the Maritime Administration report, "Economic Impact of Maritime Industries on the U.S. Economy — An Interindustry Analysis," are now available through the National Technical Information Service, 5285 Port Royal Road, Springfield, Va. 22161. The order number is PB-81-184277; the price is $27.50.

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Introducing the Butterworth Systems MARINE LIQUA-BLASTER® SHIP MAINTENANCE SYSTEM.

A 10,000-psi jet of water promises to revolutionize routine on-board maintenance... especially rust and scale removal of surfaces to be painted.

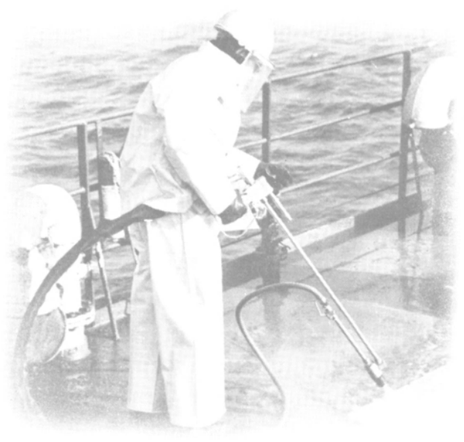
Butterworth Systems now offers a modern alternative to the age-old chipping hammer. It's their MARINE LIQUA-BLASTER* ultra-high pressure water-blasting equipment.

Diesel powered pump of a MARINE LIQUA-BLASTER onboard a vessel.

Especially developed for shipboard use at sea, the MARINE LIQUA-BLASTER unit uses a diesel or electric powered pump to generate a 10,000-psi jet of water that is directed by a fail-safe, hand-held gun at the surface being descaled.

"White-metal" cleaning.

On a badly rusted surface, "water only" blasting removes scale and debris, leaving a surface that is acceptable for standard maintenance painting. If a moderate amount of sand is automatically added to the water jet, a surface can be "white-metal" cleaned more effectively and more efficiently than it would be with dry-sand blasting in a shipyard. With the MARINE LIQUA-BLASTER unit, a rust inhibitor can be added to protect the "white-metal" surface against oxidation before painting.



Better than dry-sand blasting.

Because of the high velocity of the water/sand jet, the sand impacts a rusted surface with a much greater force than with regular dry-sand blasting. The end result is faster cleaning using less sand.

Sand can cause sparking, so it should only be used in non-explosive environments.

Other shipboard cleaning.

In addition to descaling rusted surfaces, a MARINE LIQUA-BLASTER unit can be used for a number of other on-board cleaning jobs. These include cleaning condenser and boiler tubes, oil spray from machinery, galley grease filters, clogged ports, and the like. For these jobs, as well as rusted surfaces, a variety of guns, lances, round and fan jet nozzles are available.

Proven on-board use.

The experience on a 69,742-DWT tanker, is typical of other vessels that have used MARINE LIQUA-BLASTER equipment. Here, it was first used to clean a badly rusted 550-square-meter poop deck. The job was done as routine maintenance with interruptions for bad weather and all-hands tasks. In a little over two weeks the poop deck was "white-metal" cleaned and freshly painted.

Doing the same job in a shipyard would have cost $13,750 at $25 per square meter not including the incremental lay up time to accomplish this task.

Heavily rusted deck (below), after water blasting (left), and "white-metal clean after water-sand blasting (right)."

Get all the facts.

For full details and a copy of an eight-page report, "Shipboard Cleaning and Descaling with Ultra-high Pressure Water Blasting", write or call today.

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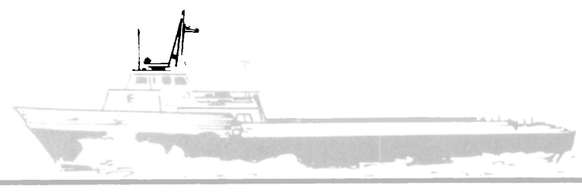
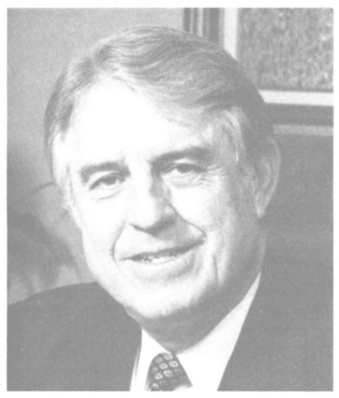


A TIME OF GREAT EXPECTATIONS, ENTHUSIASM AND EXCITEMENT

By John P. Laborde,
Chairman, President And Chief Executive Officer
Tidewater Inc.



John P. Laborde

Taking a long hard look at the future without resorting to crystal ball gazing of any kind, it's fair to say the offshore oil and gas support service industry in general and Tidewater Inc. in particular stand at the threshold of a magnificant business environment. It is my firm belief that the long term will reflect substantial growth, progress and profitability, not only for our marine fleet, which is the world's largest by a substantial margin, but also for our compression service and oil and gas businesses. Let's take a look at the current arena for our marine business and see if the facts lead to the conclusion suggested.

In recent months, we have witnessed a firming utilization for our fleet of approximately 400 vessels and are now experiencing the strongest sustained demand in the 25 years since we first began operations in the Gulf of Mexico early in 1956. The demand is consistent in most, but not all, areas of the globe where our fleet is currently deployed.

As followers of the industry know, capital spending for exploration and development worldwide has resulted in a 99-percent utilization rate for mobile drilling rigs worldwide. More rigs are being built today than in any other industry period. New production facilities are also on the rise, up 84 percent over 1979. We are also optimistic that there will be more lease sales at more frequent intervals, and are hopeful that further favorable action by the new Administration will continue a strong domestic offshore program that will keep apace with the current foreign demand. This level of exploration, development and production activity should result in maximum utilization of our fleet and usher in a period of great expectations and enthusiasm for the long term.

The Tidewater fleet is active in 28 areas of the globe with on-the-ground management that supports day-to-day operations for our charterers, who are primarily national oil companies and their contractors, international major oil companies, and drilling contractors.

We have responded to the surge in capital spending in exploration and development worldwide by acquiring existing equipment and by building new vessels. The number of vessels in our fleet has remained relatively constant for several years but we maintain an active, ongoing program of upgrading, modernization and replacement. During the last fiscal year ending March 31, 1981, we acquired or committed to construction 40 vessels which aggregated a total capital commitment of approximately $83 million. This is the largest annual capital commitment for marine equipment in Tidewater's history. If our current plans are realized, the capital commitment for fiscal year 1982 will exceed 1981 commitments.

In general, we have found that current shipyard costs are too high and charter rate structures in some operating areas have been too low to allow us to build all types of new equipment and expect it to currently yield appropriate returns. However, we are beginning to see rates improve to a level which will provide adequate returns and consequently we continue to examine new construction possibilities.

Tidewater has long enjoyed a position of leadership within the marine services industry. A greater number of vessels and a wider variety of specialized vessel types deployed to more locations around the globe than any single competitor have been important factors contributing to the company's leadership position. Another key factor has been the company's strong financial position, which has provided muscle to withstand industry-wide difficult times, to respond to special vessel needs of our customers, and has permitted us the flexibility to make a wider range of business decisions quickly.

The 40 vessels that were acquired or committed to construction prior to the close of the past fiscal year are becoming available precisely when they will be needed most by the offshore oil and gas industry. And it goes without saying they will also be competitive in most operating areas of the world.

The present approximate value of our fleet, based upon acquisition cost as of March 31, 1981, including wholly owned and joint venture equipment, is $364 million. Included in the fleet make-up are towing/supply and supply vessels, offshore tugs, crewboats, utility vessels, inland tugs, barges, crane vessels and other specialized equipment.

Nearly half of the number of vessels in the fleet (77 percent of aggregate fleet value) consists of towing/supply and supply vessels in the medium horsepower range, with the supply vessels forming the focal point of the company's current expansion program. The new vessels are equipped with an improved pumping system that provides liquid mud and other chemicels, in addition to fuel and water, to offshore drilling rigs.

Vessels in the class are fitted with twin Caterpillar D-399 engines which deliver 2,250 continuous horsepower, a speed of 12 knots, and are particularly suited for jackup drilling operations and other relatively shallow water exploration and development programs. Equipped with the latest communication and navigation devices, they have air conditioned and heated quarters. The deck area is 114 feet by 34 feet, with below-deck storage that accommodates 4,000 cubic feet of bulk storage.

Along with the strong demand for new and acquired equipment, construction prices have shot up. Typically, a basic 180-foot straight supply boat with no towing gear and an open deck, could now cost at least $3.75 million. A larger towing/supply vessel with winch, roller, and more power in the engine room could cost an additional million dollars or more. And as the industry moves farther offshore, larger, more powerful and higher-cost vessels will be required to support it.

There also has been a trend to "extra" or "special" equipment on our vessels. All or most transport drilling fluid in internal tanks. There also are fire monitors. Public and industry concern about blowouts, fire, collisions and other accidents at sea has also created the need for improved rescue and pollution control equipment. This new equipment is rapidly becoming standard in the industry.

Tidewater has responded in yet another direction with respect to its expansion program by "packaging" a broad range of specialized equipment built to the customer's specifications.

A recent example of such specialization is a 170-foot, 3,000-bhp support vessel for the rug-

(continued on page 17)

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- More controlled and predictable elongation

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Offshore Support Fleet

(continued from page 15)

ged Bass Strait offshore Australia. This vessel is designed to provide support for a remote-controlled undersea submersible used to survey and monitor pipelines and underwater construction, and to aid seabed survey work. Important secondary functions of the vessel include diving and firefighting roles. It is among the most advanced vessels currently engaged in the offshore oil and gas industry, and ranks high among the world's most specialized offshore support equipment.

The remote-controlled vehicle is attached to the vessel by cable, propels itself along the seabed or pipeline, and relays pictures by television camera to the mother vessel. The mother vessel keeps station on the remote-controlled vehicle by operating in the dynamic positioning mode.

Another specialized vessel with extreme shallow draft capability (six feet) is now under construction for geophysical applications in the Gulf of Mexico. This vessel will represent another "first" for the industry.

Tidewater is beefing up its fleet of inshore towing/supply vessels in the 72-foot class. These new vessels have an open foredeck area that provides carrying capacity for 25 long tons of cargo. They are also equipped to deliver diesel fuel and fresh water to inland drilling rigs and platforms. The most innovative feature of the new tugs is that they permit the delivery of limited amounts of deck and liquid cargoes to the drilling rig that heretofore required the use of a barge working in combination with the vessel. These vessels are certified by the U.S. Coast Guard to serve the oil and gas industry.

Tidewater continues to acquire offshore tugs in the 4,200 horsepower and larger classes to meet the requirements for towing new jack-up drilling rigs due to come into Gulf of Mexico service within the next few years.

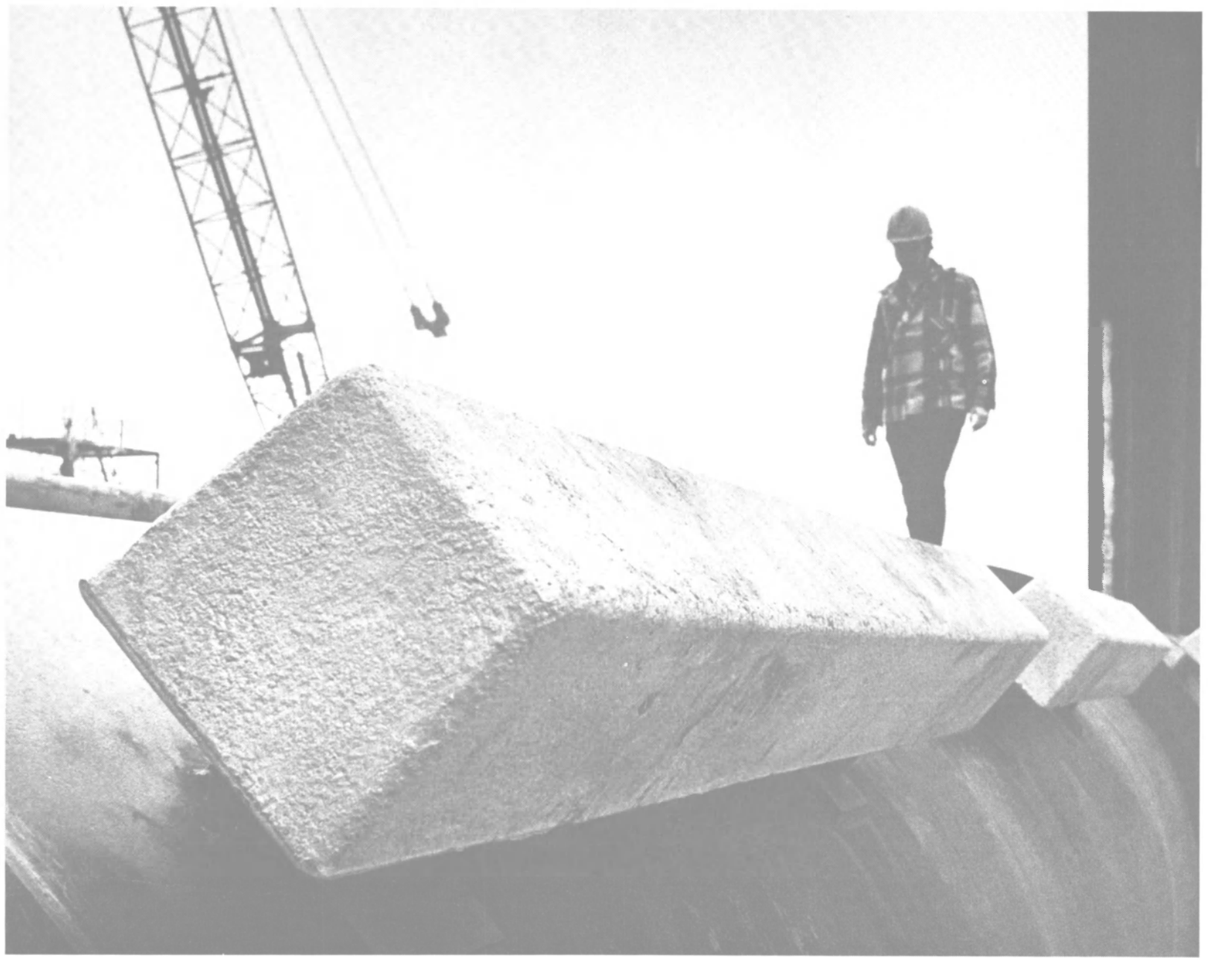
Although there are no current plans to add to the 218-foot, 10,000-horsepower towing-supply vessels in our fleet, we continue to remain alert to the opportunity. These vessels were in demand in the North Sea in the decade of the 70s, and their resurgence awaits the step-up in construction of semisubmersible drilling rigs and consequent exploration and development of areas far offshore, in deep water or in harsh operating environments.

The future also appears geared for work in frontier areas in addition to established oil-producing areas around the globe. The West Coast of Alaska, the Beaufort Sea, the East Coast of Canada, Argentina, China, and other areas yet to be opened to exploration, suggest continued strong utilization for higher-horsepower vessels in the Tidewater fleet.

The increase in opportunity also poses some problems. Our domestic industry continues to be beset by an increase in the number of passive investors who have risen to the bait of the investment tax credit and accelerated depreciation for the immediate benefit of the investor's personal tax situation. This has resulted in lower levels of profitability in the U.S. Gulf for publicly held vessel operators such as Tidewater.

However, recent changes have been proposed both in the qualification standards for Maritime Administration Title XI financing, and in the level of investment tax credit availability as part of President **Reagan's** "Economic Recovery Tax Act of 1981." If consummated, these changes will substantially erode the benefits that these limited partnerships now enjoy and should result in their decline.

Future opportunities for the Tidewater fleet are impressive on a broad scale. We close in on this new decade in industry progress confident of demonstrating good operating results, and also with high expectations, enthusiasm and excitement, not only for our marine business segment but for our other lines of business, too.



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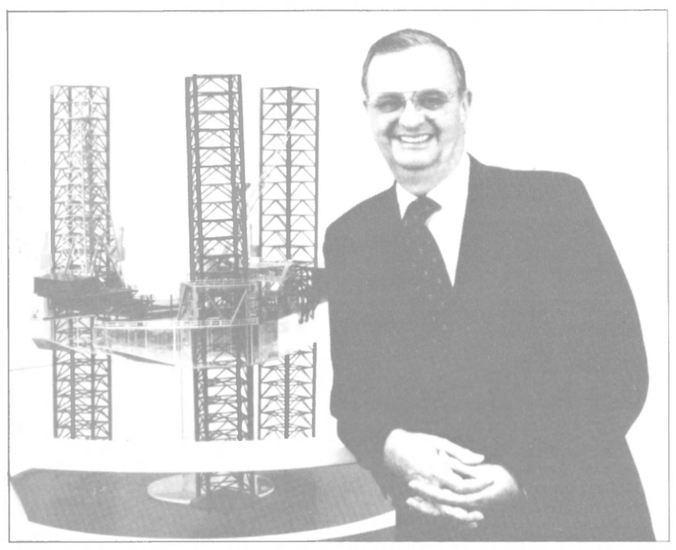
OFFSHORE DRILLING RIGS

MOBILE JACKUP PLATFORMS– PAST, PRESENT AND FUTURE

By Ken Farmer



Ken Farmer, president of Marathon LeTourneau Offshore Company and vice president of Marathon Manufacturing Company, has more than 25 years of experience in the offshore drilling platform construction industry. He has served on the American Bureau of Shipping's Special Committee on Offshore Mobile Drilling Units, and is a member of the American Management Association. Marathon Manufacturing is a wholly owned subsidiary of The Penn Central Corporation.

In November 1955, the first electromechanical, three-legged offshore self-elevating drilling platform was launched from what was then R.G. LeTourneau's manufacturing facility on the Mississippi River south of Vicksburg. Christened Scorpion by its owner, Zapata Offshore Company, this self-elevating offshore drilling platform was designed to operate in 80 feet of water.

That first-generation mobile offshore jackup rig was a giant step in the evolution of the offshore oil and gas industry. Earlier "mobile" offshore drilling platforms were often inland barges and drilling tenders, limited to the marshes and relatively safe shallow coastal waters of the Gulf of Mexico and Lake Maracaibo. Although the triangular-leg Scorpion's 80-foot operating depth is far less than the 300- to 350-foot capabilities of today's jackups, from another perspective it was a remarkable technological breakthrough. Scorpion's operating depth was twice that of its predecessors.

The decade from the mid-fifties to mid-sixties saw a remarkable spurt of inventiveness in design and manufacturing technology for jackup rigs. Like most technological revolutions, the rapid and successful development of the jackup was tied directly to economic conditions. Vast amounts of offshore oil and gas were known to exist. These energy reserves were in demand and return on investment in offshore exploration and production was attractive.

What had been missing was an economical, mobile, sturdy offshore drilling platform from which experienced drilling contractors could exploit known offshore reserves. That piece of equipment had to be a true open-water vessel that could be safely towed to a drilling site, position itself securely, get the job done, then move on to the next location.

Once those initial engineering and fabrication challenges were overcome, the trend in jackup design took the direction of expanding water depth, drilling depth and operating environment capabilities. This trend continues to dominate jackup technology today.

The improvements that have taken place in jackup capability have historically been stimulated by the need to find and produce additional offshore energy reserves. Important design changes that increased operating water depths came during the mid-sixties.

A unit was developed that could operate in 250 feet of water. This jackup had slanted legs. This change was based on two factors: first, the types of steel then readily available could not withstand the calculated combined loads when the spud legs were in a vertical configuration; second, the slanted legs increased the rig's overturning moment without requiring a larger and heavier hull. These first slant leg jackups extended operating water depths by 100 feet. Later models of the slant leg self-elevating drilling platform could operate in over 300 feet of water.

By the early seventies, the use of higher strength steels made it possible to build jackups with vertical legs that could operate in water depths up to 350 feet.

Looking at the history of the offshore energy industry from our present perspective, it is accurate to say that the jackup is the success story of that industry. It provides the offshore drilling contractor with the essential advantage of a stable, fixed area from which to work. Once a jackup is on location, it also provides important time and cost advantages over floating drilling equipment. Of the several types of deepwater mobile offshore drilling units in use, jackups have proven they can drill more foot of hole per dollar spent.

Statistics bear out the jackup's dominant role in offshore operations. At the start of 1981, there were 549 mobile offshore drilling rigs of all types. Of that total, 270 were jackups. Of the 204 mobile rigs on order or under construction at the start of the year, 152 were jackups. Jackups make up more than half of the total mobile offshore rig fleet. By the end of the eighties, the total number of jackups may well be 600.

The current state-of-the-art in jackup design and manufacture consists of building versatile units that meet the wide variety of drilling contractor requirements while at the same time satisfying the guidelines of regulatory agencies. Offshore exploration and development drilling now takes place in a number of areas that have a variety of meteorological and other environmental characteristics. There are jackups specifically designed for remote, deeper water areas where weather conditions such as frequency of storms, excessive wind and wave heights must be taken into account. A totally different class of self-elevating platform is specifically designed for accessible areas where weather, water depth or remoteness from supply sources are not major obstacles. Between these two extremes of offshore operating environments are a number of other situations that call for jackups with different operating capabilities.

In addition to providing units tailored for specific environments, the rig construction industry took a major step toward meeting operator requirements with the introduction of the cantilever drilling jackup. This feature is now found on shallow water, moderate environment units as well as on large, deepwater units that can withstand wave heights up to 88 feet.

The incorporation of cantilever drilling into the jackup design concept added a remarkable degree of versatility. In rough waters, jackups provide a stable base so that the cantilevered drilling package can remain extended and drilling operations continued. In addition, the cantilever lets the self-elevating offshore drilling platform perform production

drilling and well servicing functions in addition to exploratory drilling. In those areas where there are a number of bottom-supported production platforms, a cantilever jackup can take up position next to such a permanent structure, cantilever its drilling package over the structure without placing any weight on the platform, and carry out whatever drilling and well servicing activities are called for. When working on very large production platforms, it is feasible to move the drilling structure onto the permanent platform and use the mobile platform as a tender. The cantilever jackup has thus become a valuable and economic tool for extending the productive lives of older offshore wells.

In deeper waters, where there are fixed platforms that provide for multiple wells, cantilever jackups can drill exploratory or development wells in rough weather conditions that previously would have shut down drilling operations. They can do this without exerting dead or static loads normally brought to bear on sea floor units by package drilling units resting entirely on the fixed platform. This capability is extremely important in exploiting offshore oil and gas fields that previously had been judged as economically marginal. In such fields, the estimated recoverable reserves were not great enough to justify large permanent, and costly, bottom-supported platforms from which to drill, complete and service multiple wells.

Such a situation offers a glimpse of what the future may hold for jackup rig application. For example, a North Sea operator plans to cut development costs of the Morecambe Bay offshore gas field by approximately $240 million. Key elements in this plan are the use of jackup drilling platforms, a derrick package designed for slant drilling and a number of minimal fixed platforms.

These bottom-supported, fixed platforms will be strategically placed so as to permit depletion of as much of the field's reserves as possible. These platforms will be smaller, less expensive and quicker to construct than if conventional drilling techniques were used from large fixed drilling platforms.

The Morecambe Bay development plan calls for the self-elevating drilling platforms to be positioned alongside each of the minimal platforms. The drilling

OFFSHORE DRILLING RIGS UNDER CONSTRUCTION OR ON ORDER AT U.S. YARDS — MAY 1, 1981

Builder	Owner	Name	Type	Delivery
Alabama Maritime Mobile, Ala.	Diamond M	Diamond M. Hunter	Semisub.	11/81
	"	Diamond M. Eagle	"	4/82
Baker Marine Ingleside, Texas	Huthnance Dlg	Charger I	Jackup	6/81
	Huthnance Dlg	Charger II	"	9/81
	Magnum Marine	Mr. Demp	"	11/81
	Magnum Marine	Robert N. Haskin	"	5/82
	Magnum Marine	Robert W. Womack	"	6/82
	Marine Drilling	J. Storm XV	"	4/81
Bethlehem Steel Beaumont, Texas	Griffin-Alexander	Griffin-Alexander II	Jackup	6/81
	"	Griffin-Alexander V	"	5/82
	"	Griffin-Alexander VII	"	9/82
	"	Griffin-Alexander VIII	"	3/82
	Houtech Energy	Houtech I	"	8/81
	" "	Houtech II	"	10/81
	" "	Houtech III	"	3/82
	" "	Houtech IV	"	9/82
	Marine Drilling	J. Storm XVI	"	7/81
	"	J. Storm XVII	"	9/81
	O & U Drilling	(unnamed)	"	1/82
	Teledyne	Movible 20	"	11/82
	Alfa Drilling	(unnamed)	"	1983
Bethlehem Steel Sparrows Point, Md.	Houston Offshore	Sabine III	Jackup	6/81
	Griffin-Alexander	Griffin-Alexander III	"	10/81
	"	Griffin-Alexander IV	"	3/82
	"	Griffin-Alexander VI	"	6/82
	Temple Drilling	Cheyenne	"	4/82
General Dynamics Charleston, S.C.	Bailey & Shannon Inc.	Bill Bailey	Jackup	10/81
	" "	Bob Warner	"	12/81
	" "	Mr. Shannon	"	4/82
	" "	Mr. Williamson	"	6/82
	" "	Mark Jones	"	1982
	" "	Mr. Webster	"	1982
Gulfport Shipbuilding Port Arthur, Texas	Compania	Perforadora	Jackup	1982
Ingalls Shipbuilding Pascagoula, Miss.	Transworld Drilling	Transworld 69	Submersible	6/81
	" "	Transworld 70	"	8/81
	" "	Transworld 72	"	11/81
	" "	Transworld 73	"	2/82
	Bonito Offshore	Bonito I	Jackup	3/82
	" "	Bonito II	"	12/82
	Chiles Drilling	Yucatan	"	9/81
	Global Marine	Glomar Main Pass I	"	11/81
	"	Glomar Main Pass II	"	1/82
	"	Glomar Main Pass III	"	5/82
	"	Glomar Main Pass IV	"	9/82
	Huthnance Drilling	Vanguard I	"	7/81
	"	Vanguard II	"	10/82
	Keyes Offshore	Keyes 301	"	5/81
	" "	Keyes 302	"	6/81
	" "	Keyes 303	"	7/82
Levingston Shipbuilding Orange, Texas	Dixilyn-Field	DF-87	Jackup	6/81
	Noble Drilling	Ed Holt	"	10/81
	" "	(unnamed)	"	12/82
	Compania Perforadora	(unnamed)	"	5/82
Marathon LeTourneau Brownsville, Texas	Chiles Drilling	Seabee	Jackup	3/83
	Global Marine	Glomar Adriatic I	"	7/81
	" "	Glomar Adriatic II	"	10/81
	" "	Glomar Adriatic V	"	8/83
	" "	Glomar Adriatic VI	"	10/83
	" "	Glomar Adriatic VII	"	1/84
	Penrod Drilling	Penrod 86	"	2/82
	" "	Penrod 88	"	5/82
	" "	Penrod 90	"	8/82
	" "	Penrod 98	"	4/84
	Rowan Drilling	(unnamed)	"	12/82
Marathon LeTourneau Vicksburg, Miss.	Penrod Drilling	Penrod 87	Jackup	5/82
	" "	Penrod 89	"	9/82
	" "	Penrod 91	"	1/83
	" "	Penrod 99	"	4/84
	Rowan Drilling	Arch Rowan	"	6/81
	" "	Gilbert Rowe	"	10/81
	" "	Cecil Provine	"	3/82
	Rowan Drilling	(unnamed)	Jackup	9/83
	" "	(unnamed)	"	1983
	" "	(unnamed)	"	1984
Vemar Shipyard Channelview, Texas	Atwood Oceanics	Richmond	Submersible	9/81
	Cliffs Drilling	(unnamed)	Jackup	7/81
	"	(unnamed)	"	11/81
	Penrod Drilling	Penrod 170	Submersible	1/82
	" "	Penrod 171	Submersible	5/82
	" "	Penrod 172	Submersible	9/82

packages with slant drilling capabilities will then be skidded onto or cantilevered over the fixed platforms. Flexible control and drilling fluids lines will extend from the mobile platform to the drilling floor. With the mobile platform serving as tender, the jackup can move from fixed platform to fixed platform drilling and completing development wells to bring the field on stream and generate early cash flow.

Another innovative use of jackup drilling rigs presently under consideration is a mobile, retrievable early production system. Such a system would be made up of a sea-floor concrete and steel storage unit, the jackup with a portable drilling template, and sea-floor as well as surface controls. The mobile platform would carry the drilling and production hardware.

Again, worldwide energy supply and demand factors will play a key role in the acceptance of such a system. This kind of retrievable, "reusable" system may well meet offshore requirements for lower total investment in early development of marginal fields. The system could be used to develop fields estimated at less than 500,000 barrels per day of crude production over a productive life of less than 10 years.

More immediately, a definite trend in jackup design is toward increasing not only the operating water depth but also the jackup's capacity to store consumable items such as fuel, cement, pipe, drilling mud, potable and nonpotable water, etc. Three criteria, namely operating water depth, drilling depth, and variable load capacity are directly related to environments in which the new "super" jackups will be operating.

This new generation of super jackups includes a massive unit that can operate under those extremely hostile conditions of weather, water depth and remoteness which presently constitute the major frontiers of offshore operations. This "hostile environment" jackup can not only operate in these regions but can be safely towed from location to location under sea conditions that previously would have prohibited relocation. Such conditions exist in the North Sea, off the coasts of southern Africa and eastern Asia, both coasts of North and South America, and the Bering Sea. On location wave heights up to 88 feet combined with wind speeds of 100 knots were some of the factors that had to be accounted for in designing such a rig.

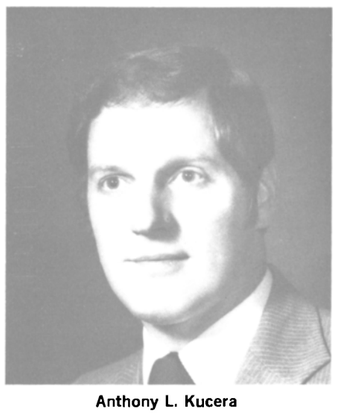
An important factor in the development of a jackup with these capabilities has been the effective use of higher strength steels to keep hull weight to a minimum and at the same time provide maximum strength.

The newest member of the jackup family is a unit specifically designed for those offshore areas where conditions are labeled "harsh" rather than "hostile." This unit's strong suit is its greater capacity to store more consumable items necessary for offshore drilling at greater distances from supply bases. This capability is a necessity because in most harsh offshore areas, frequent scheduled re-supply of consumables is impractical and unpredictable.

Speculation about the future of any facet of offshore operations is risky. As for further development of the self-elevating offshore drilling platform, there will probably not be any radical changes in the basic jackup design in the near future. However, the proven and tested elements of this design will probably be further refined under the stimulus of worldwide demand for oil and gas. As a result, we may see operating water depths reach beyond the 300-400 foot maximums of the present. Storm ratings may increase and new techniques may permit the jackup to go on and off location in greater wave heights than permissible today.

Any of these developments are contingent on a number of economic and geopolitical factors. One certainty is that the established jackup rig builders have demonstrated the expertise and capacity to build units that will go anywhere drilling contractors search for offshore oil and gas.

U.S. BARGE AND TOWING OPERATIONS



Anthony L. Kucera

ALL INDICATORS POINT TO DRAMATIC INCREASE IN DEMAND FOR BARGE CAPACITY

By Anthony L. Kucera, President
The American Waterways Operators, Inc.

The U.S. barge and towing industry has established an excellent reputation for being responsive to the needs of America's shippers and consumers. It is fuel-efficient, cost-effective and highly productive.

With these qualities, it is no wonder that this industry has assumed a major role in moving the nation's freight. The bulk commodities carried by barge represent the lifeblood of America's economy . . . the fibre of its industrial and agricultural strength. In short, they are the goods that keep our society on the move.

Barge transportation consists largely of energy commodities and other bulk raw materials basic to our economy (Table 1).

The barge and towing industry has played an important role in meeting emerging transportation needs. And it is flexible enough to respond quickly to new transportation demands. For example, this industry has played an ever-increasing role in the movement of U.S. grain to export points along the Gulf of Mexico and Pacific Northwest. In 1973, the barge and towing industry moved 20 percent of all grain exports to oceangoing ports. By 1980, this share had increased to more than 40 percent.

Not only did the barge industry double its market share, but it did so during a period when the market was expanding very rapidly. The industry was able to build and put into service the required fleet capacity and horsepower necessary to move this grain. In 1980, for example, 1,581 new dry-cargo barges were added to the fleet. Approximately 1,000 of these additions were grain-carrying barges, built in quick response to the growing grain export trade (Table 2).

Given this flexibility, together with the industry's inherent advantages, one would expect the nation's barge operators to have unlimited optimism for the years ahead. After all, numerous recent studies have projected substantial increases in the movement of commodities suitable for barge transport. Domestic needs and international trade developments seem to hold great promise for the industry.

Tables 3 and 4 show the recent growth in inland waterway traffic, as well as traffic by major rivers for 1978. However, this bright picture is shadowed by a growing number of constraints placed on the viability of the inland waterways transportation industry. These constraints, if unresolved, could clearly limit the ability of the barge industry to meet future needs. They demand the attention of our nation's policymakers.

They should know that barge transportation has some key advantages that make it a most attractive mode for moving bulk cargo. From a shipper's standpoint, the most important consideration is usually cost. It costs only about seven-tenths of a cent to move a ton of cargo one mile by barge, compared with 2.6 cents by rail and over 10 cents by truck.

While the inland waterways industry moves about 12 percent of the nation's total freight, it does so at only 2 percent of the total cost. For those shippers with access to barge transportation — and 87 percent of our nation's major cities are located on navigable waterways—it is the obvious choice for economical movement of bulk goods.

The cost advantage of barge transportation is due in large degree to its excellent fuel efficiency. Study after authoritative study has shown that this transportation mode moves bulk freight more cheaply than anything on wheels.

A wealth of previous data on modal fuel efficiency was brought together neatly last year in a special study performed by **Samuel E. Eastman**, a lawyer, economist, and former director of the Department of Transportation's Office of Policy Review. The

(continued on page 24)

Table 1 — Barge Traffic By Commodity — 1978

Commodity	Tons (millions)	Percent
Petroleum & petroleum products	280.03	42.3
Coal and lignite	120.48	18.2
Building materials	87.38	13.2
Grain & grain products	59.58	9.0
Chemicals	39.72	6.0
Iron and steel	20.52	3.1
Other	54.28	8.2
Total	**662.00**	**100%**

Table 2 — Dry-Cargo Barge Fleet Additions — 1976-1981

Date	Number in Fleet	Number Added	Total Fleet
January 1976	8,763	378	9,114
January 1977	9,330	525	9,855
October 1978	11,414	546	11,960
October 1979	12,737	1,045	13,782
March 1981	15,021	1,581	16,602

Barge & Towing Operations

(continued from page 22)

study, "Fuel Efficiency in Freight Transportation," combined new survey information with conclusions of more than 30 studies of transportation efficiency, performed mainly for the Departments of Transportation and Energy over the past 10 years. Its major findings are summarized below:

Table 3 — U.S. Inland Waterway Traffic — 1970-1978

Year	Tons (Millions)	Ton-Miles (Billions)
1970	553.6	204.1
1971	560.5	210.0
1972	597.3	229.8
1973	596.5	232.3
1974	599.2	247.4
1975	582.2	243.0
1976	607.7	267.2
1977	612.1	277.6
1978	624.0	290.4

Comparative Fuel Efficiency by Mode

Mode	BTUs per Ton-Mile	Ton-Miles Per Gallon
Barge	270	514
Rail	687	202
Truck	2,343	59

While these figures again confirm the superior fuel efficiency of barging, it emphasized that all bulk transport modes make a significant contribution to the nation's transportation system, and all are deserving of full recognition as energy savers. The different modes must work cooperatively to move the products that fuel America's industries and utilities, and carry the fruits of this country's labors to domestic and foreign markets.

These twin advantages of barge transportation—cost effectiveness and fuel efficiency—are magnified by the awesome capacity of these vessels. A single barge load of soybeans, for example, carries the harvest of more than 1,100 acres. One hopper barge has the capacity of 15 railcars or 57 trucks.

An added advantage of barge transportation is its excellent safety record. An Arthur D. Little, Inc., study of hazardous substance transportation revealed that barge spills occur less frequently than rail or truck spills by a significant margin. In addition, barge transportation results in less exposure of hazardous substances to urban areas, thus offering the least threat of property damage in the event of a spill.

All indicators point to a dramatic increase in demand for barge capacity in the next several years. The latest traffic projections, contained in the preliminary findings of the National Waterways Study, are a case in point. (The study is a three-year effort by the Corps of Engineers to assess the capability of the existing waterways system to meet the projected needs, and to formulate alternative plans for improvements to the system.)

The study notes that petroleum price and supply considerations will prompt a substantial switch from oil and gas to coal. It projects a tripling of waterborne coal traffic between 1977 and the year 2003.

In the agricultural sector, productivity and exports are expected to continue expanding rapidly, according to the National Waterways Study. This burgeoning harvest must be moved from America's farms to our coastal export centers. Table 5 depicts the trends in barge movements of export grain.

The study also predicts growth in industrial chemical traffic, particularly along the waterways of the Gulf Coast. In addition, the trend toward greater use of imported steel and coke will mean

(continued on page 27)

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HALTER MARINE INC.

The Total Shipbuilding Group

Barge & Towing Operations

(continued from page 24)

greater waterways movements of these commodities.

The Maritime Administration's Mid-America Ports Study came up with similar conclusions, and projected a doubling of inland waterborne commerce by the year 2000. Under the methodology used in this study, the following barge-carried commodities were expected to experience high growth by the turn of the century: grain (up 80 percent); coal (127 percent); petroleum products (75 percent); fertilizers (446 percent); and chemicals (108 percent).

Since the release of the Mid-America Ports Study in May 1979, there has been an unprecedented increase in interest in U.S. coal among foreign buyers. Spurred by skyrocketing oil prices, other countries have started turning to this alternative source of energy. U.S. exports of steam coal during the first half of 1980 increased nearly eightfold compared to the first half of 1979. A report issued last year by the World Coal Study forecast U.S. coal exports of between 150 million and 240 million tons by the year 2000, compared with the record 65 million tons expected this year.

Another recent development expected to impact on the barge industry was the signing on October 22, 1980 of a grain agreement between the United States and the People's Republic of China. It calls for the PRC to purchase at least six million metric tons of U.S. grain annually from 1981 to 1984.

It is obvious that the inland waterways industry will be called upon as never before in the next two decades to haul commodities essential to this nation's economy and strategic position in the world. The central question is whether the industry will be allowed to do the job—or be stifled by various constraints.

Some of the major constraints facing the industry concern the physical capacity of the waterways system to handle increased traffic. This problem does not refer to the actual size of the waterways; given adequate maintenance dredging, they are wide enough and deep enough to accommodate substantial growth for years ahead. The real threat is that the Corps of Engineers will be prevented—through a host of legislative and regulatory obstacles — from maintaining adequate channel depths and modernizing inadequate man-made facilities on the rivers.

The gravity of the dredging situation was exemplified last July by a massive traffic backup

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Table 4 — U.S. Barge Traffic By Major Rivers — 1978

River System	Tons (Millions)	Ton-Miles (Billions)
Mississippi River (consolidated)	413.1	150.5
Ohio River	152.6	38.8
Gulf Intracoastal Waterway	120.4	18.6
Columbia-Snake River	43.7	4.3
Illinois Waterway	41.6	7.7
Monongahela River	31.7	1.2
Tennessee River	31.6	4.4
Houston Ship Channel	25.0	n/a
Black Warrior System	14.6	4.0
Arkansas River	9.9	1.7
Missouri River	7.9	1.5
Atlantic Intracoastal Waterway	4.9	.6

Barge & Towing Operations

(continued from page 27)

on the Upper Mississippi River near Bellevue, Iowa. At one point, 26 line-haul towboats, pushing approximately 330 barges, were immobilized until the channel could be reopened. Their cargo—including some 462,000 tons of grain, coal, crude oil and other commodities—was valued at more than $50 million.

Table 5 — Grain Movements By Barge On U.S. Inland Waterways (Million Bushels)

Year	Total Grain Exports	Barge Grain Shipment	Barge Percent of Total
1973	3,511	0.716	20.4
1974	2,880	0.777	27.0
1975	3,159	0.987	31.3
1976	3,560	1.264	35.5
1977	3,367	1.274	37.8
1978	4,197	1.636	39.0
1979	4,565	1.622	35.5
1980	4,833	1.945	40.3

Similar incidents occurred last year on other reaches of the Mississippi, and on the Arkansas and Missouri Rivers. The "blame" for this situation cannot be placed solely on the Corps of Engineers (which can take pride in its long and distinguished record of maintaining the nation's waterway system) or any of the other many agencies now involved in the dredging process. The problem is precisely that there *are* so many agencies involved.

Today, the Corps must consult with regional offices of such Federal units as the Environmental Protection Agency, the Fish and Wildlife Service, and the Soil Conservation Service, not to mention a myriad of agencies from individual states. Taken together, these requirements serve to make the Corps' task a nearly impossible one.

The General Accounting Office (GAO) addressed this problem in a report issued in June 1980 on "Managerial Changes Needed to Speed up Processing Permits for Dredging Projects," a study requested by the Chairman of the House Merchant Marine and Fisheries Committee. Citing the spread of Federal regulation in this area during the past decade, the report said: "Striking a balance among these competing objectives has complicated the process for issuing dredging permits, involving several Federal agencies and increasing the time required to process applications.

"Lengthy processing is costly to applicants, makes planning difficult, and can hinder construction and water transportation," the GAO report continued. "During fiscal year 1979, the average times to process dredging permits at Baltimore, New Orleans, and Philadelphia districts of the Corps of Engineers ranged from 4 to 10 months. Some were in the process more than 2 years. Corps regulations indicate that total processing time generally should not exceed 3½ months."

Fortunately, the Corps was successful in signing memoranda of understanding in 1980 with the other Federal agencies involved in the permit process, a step that should help shorten the process. The new plan calls for three classes of permits, and only those having a major environmental or policy impact can be "forced up" to Washington for a decision. All others should be decided at division level, after consultation between Corps officials and their regional counterparts from other agencies.

The barge and towing industry believes that another necessary step is to change to Section 404(T) of the Federal Water Pollution Control Act Amendments of 1972. This section provides for

state involvement in controlling discharge of dredged material within the navigable waters of each state. It should be amended to clearly define the authority of the Corps of Engineers to maintain commercial interstate water transportation.

Another constraint to barge industry growth is created by the condition of many of the navigation locks on the inland waterways. Many of these facilities were built in another era of transportation requirements. The Corps does a commendable job keeping them in working condition, but the age and inadequate size of these structures demand that more decisive steps be taken.

When the Ohio River project was completed in the late 1920s, the Corps of Engineers was projecting 13 million tons of traffic annually on that river. The Ohio handled 23 million tons its first year of operation, 152 million tons in 1978, and the 1980 tonnage is expected to be calculated at 200 million tons. Many of the locks and dams on the Ohio River were last modernized more than 40 years ago.

The Gulf Intracoastal Waterway, which celebrated its 75th anniversary in 1980, originally was expected to handle about 5 million tons annually. In 1978, it carried 120 million tons.

On some occasions, backups of up to 60 barge tows are experienced at Locks and Dam 26 on the Mississippi River, just below its confluence with the Illinois. It sometimes takes 2½ to 3 days for a tow to clear this most infamous of barge bottlenecks. The Corps has finally received approval to go ahead with a replacement lock there—following funding delays and court battles with the railroads and environmental groups—but it is expected to be another 8 or 10 years before the new, larger facility is completed. By that time, demand will already meet the enlarged capacity.

Numerous other facilities have the potential for becoming just as troublesome as Locks and Dam 26. The National Waterways Study has identified several of these facilities, including the Vermilion Lock on the Gulf Intracoastal Waterway; Gallipolis and Emsworth Locks on the Ohio; Winfield Lock on the Kanawha; Marseilles Lock on the Illinois; Bonneville Lock on the Columbia; and many others.

Any discussion of needed capital improvements to the inland waterways system inevitably turns to the question of who will pay for them. It was not always so. The freedom of the inland waterways from user charges extends back at least to the Northwest Ordinance, which stated that the system "shall be common highways and forever free . . ."

That policy, which recognized the navigable rivers as a national asset benefiting numerous interests, was restated numerous times during the country's first 200 years. But it was changed in 1978, when Congress passed Public Law 95-502, which provided not only for the construction of a new facility at Locks and Dam 26, but also for a Federal tax on fuel used in commercial transportation on inland waterways.

The fuel tax, which became effective October 1, 1980, started at four cents per gallon and will increase in steps to 10 cents per gallon by 1985. The tax receipts will be placed in a trust fund for construction and rehabilitation projects on the waterways. Another provision of Public Law 95-502, Section 205, calls for a study of the impact of waterway user taxes and charges. That study is being undertaken by the Departments of Commerce and Transportation, and is scheduled to be submitted to Congress by September 30, 1981.

However, well before the results of that study are even released, the Administration has proposed and Congress is now

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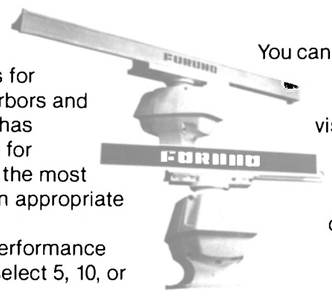

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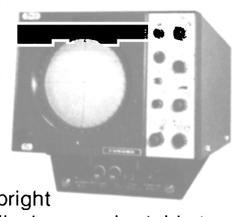

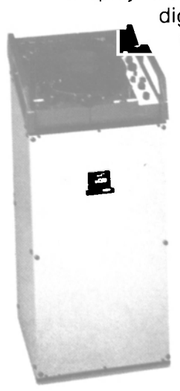

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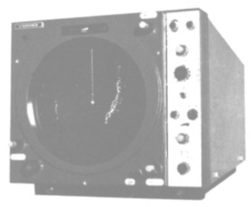

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Barge & Towing Operations

(continued from page 28)

considering legislation that would dramatically increase the user charges paid by our industry, effective this October 1. The Corps of Engineers, according to legislation introduced in the House and the Senate, is to devise a system of user fees to recover 100 percent of operations, maintenance, and construction expenditures on the waterway system.

We do not quarrel with the Administration's objectives of reducing inflation and cutting Federal expenditures. But we do take issue with the inequity of placing the burden of user charges on only one mode of bulk transportation, while at the same time Federal expenditures that benefit other transportation modes go unreimbursed.

We also object to the policy of recovering Corps of Engineers expenditures on the waterway system from only one beneficiary of that system—commercial navigation. A Corps of Engineers preliminary cost allocation study revealed that approximately 25 to 30 percent of navigation account funds do not benefit navigation, but other users of the waterway system. To recover those expenditures from only one of the many waterway beneficiaries is inequitable.

The policy of recovering Coast Guard expenditures, as proposed by the Administration, is also inequitable. The Federal Railroad Administration (FRA), for example, expends funds for the inspection of rail track, similar to the Coast Guard's function of inspecting vessels for safety. However, we see no attempt made to recover FRA funds from the railroad industry. But we do see a proposal to recover Coast Guard expenditures from the barge and towing industry. Again, we believe this discriminatory policy to be patently unfair.

These types of inequities can only result in major shifts of cargo from one mode of transportation to another. Traffic could in many instances be forced *from* energy-efficient and safety barge transportation *to* less efficient modes. The probability exists for serious disruptions in the flow of commerce and less transportation efficiency and higher costs for both shippers and consumers. This in turn could fuel inflation.

It should be evident that the barge industry faces more than enough challenges to its viability through the current level of fuel taxes and the other constraints already discussed. For example, the Maritime Administration's Mid-America Ports Study concluded that "The waterway user charge and the constraints imposed by the . . . locks and dams which reach capacity over the forecast period will reduce waterborne traffic by as much as 16 percent by the year 2000."

With the stresses that undoubtedly will be placed on our transportation system in the next several years, it should be obvious that additional, unnecessary burdens are counter to the nation's best interests. While numerous factors—such as environmental, safety and economic concerns—must be considered in the Federal decision-making process, we believe that the pendulum has swung too far to the side of regulation.

A more realistic approach to these important decisions is required, one that balances social concerns with economic realty. Such an approach requires recognition by the nation's policymakers that the barge industry plays a vital role in the total U.S. transportation system.

The country's 25,000 miles of navigable waterways are truly a national asset, beneficial to a wide array of interests. We can either use them to their fullest potential, or neglect their maintenance and stifle their use. The choice should not be a difficult one.

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Herman J. Molzahn

AWO'S AMERICAN WATERWAYS SHIPYARD CONFERENCE IS SHAPING POLICY FOR LONG-TERM GROWTH

By Herman J. Molzahn
Vice President, Shipyard Operations
The American Waterways Operators, Inc.

Apart from the 24 major deep-sea shipyards, there exists a segment of the U.S. maritime industry composed of more than 300 small- and medium-sized commercial shipyards located throughout the nation on the East, West, and Gulf Coasts, the Great Lakes and the Western rivers. Although these shipyards employ only between 40,000 and 50,000 workers, their economic contribution to the nation is far greater than their size would indicate. These shipyards are responsible for building and repairing the tugboats, towboats, and barges for the fuel-efficient domestic water transportation industry, the supply boats, crewboats, and other specialized vessels for the offshore service industry, and the vessels for the fishing industry.

The American Waterways Shipyard Conference was organized as part of the American Waterways Operators, Inc. in 1976 to address the many problems faced by this segment of the industry. Some of the major problems that sent shock waves throughout the industry were: the 1972 Amendments to the Longshoremen's Act; the shortages of material created by the Arab oil embargo in 1973-74; and establishment of the Occupational Safety and Health Administration (OSHA).

In the early 1970s, several attempts were made to bring the industry together such as the formation of an Ad Hoc Committee to fight the Longshoremen's Act. However, these efforts did not achieve the desired results.

In 1975, a group of nine shipyard executives formed the "Shipyard Steering Committee," and elected **Edward Renshaw,** president of St. Louis Ship, as their first chairman. They approached the board of directors of The American Waterways Operators, Inc. and asked them to expand the scope of AWO's trade association activities to include shipyards. The two groups reached an agreement to employ a professional staff person to administer the new shipyard activities, and in 1978 the shipyards were granted Conference status in AWO, which gave them maximum flexibility and autonomy in the conduct of their affairs.

Thus, in five short years, the common problems faced by this segment of the industry have bonded more than 70 of these small- and medium-sized shipyards into the American Waterways Shipyard Conference. In addition, several major shipyards are also members of the AWSC because they are partly engaged in this segment of the industry.

The Longshoremen's and Harbor Workers' Compensation Act is still the most critical issue facing the AWSC. The liberalization of benefits engendered by the 1972 Amendments to the Act—coupled with indexed benefits and a bloated life insurance and retirement program—have created a situation where payments for *not working* often exceed salary. The industry has exhausted its administrative remedies to this problem with the Department of Labor, and it has brought actions in the Federal courts, many of which have gone all the way to the United States Supreme Court. Chief Justice **Burger** has described the Act "as about as unclear as any statute could conceivably be . . .", and Justice **William Brennan** called the Act a "...jurisdictional monstrosity...".

The only permanent solution to the problems in the Longshoremen's Act rests with Congress to undo what is wrong with the Act. The House has held more than 20 days and the Senate has held one day of oversight hearings on the Act, and numerous amendments have been introduced, only to die in committee.

Meanwhile, the Longshoremen's Act continues to sap the financial and economic viability of the industries covered by it. Before 1972, only about 10 percent of the work force in small- and medium-sized shipyards fell under the jurisdiction of the Act. After the 1972 amendments, with its shoreward extension of cov-

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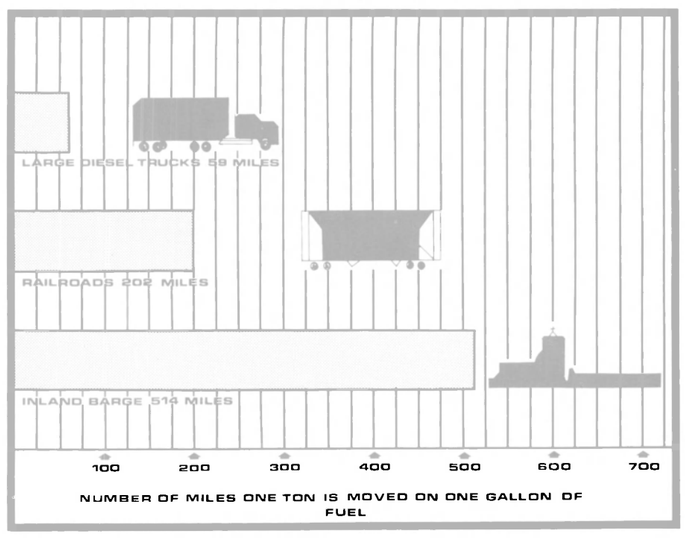
RELATIVE ENERGY EFFICIENCIES



Inland/Coastal— Small/Medium Yards

(continued from page 33)

erage, 90 percent of a shipyard's work force has come under the coverage of the Act.

While attention to the Act waned in the latter days of the last Congress, the AWSC backed a narrow jurisdictional amendment that would return the Act's coverage to the water's edge for small- and medium-sized shipyards as it existed prior to 1972. The Senate attached it as a nongermane amendment to a House-passed bill, and it was passed by the entire Senate. The AWSC made a valiant effort to get this amendment to a conference committee; however, the effort had to be abandoned in the fleeting moments of the 96th Congress to avoid killing the underlying bill. The AWSC, however, emerged as a political force, having brought an amendment to the labor-coveted Longshoremen's Act closer to passage than any previous effort by other groups.

The AWSC is also a member of the Longshore Action Committee, a group of more than 60 organizations seeking broad reform of the Longshoremen's Act. This committee supports H.R. 25, a bill to amend the Act that was introduced early in the 97th Congress by Representative **John H. Erlenborn** (R-Ill.).

Despite the serious problems facing this segment of the industry, the vitality of the shipyards represented by the AWSC has been the envy of many foreign shipyards. Several attempts to enter the U.S. markets were uncovered by the AWSC and blocked. One method tried by several foreign companies was to obtain United States Federal Government assistance through the Farmers Home Administration (Department of Agriculture) and the Economic Development Administration (Department of Commerce) to finance the construction of foreign-owned shipyards in the United States. These shipyards would be fully qualified to produce U.S.-flag vessels that could enter the domestic trade under the Jones Act.

Another attempt to enter the U.S. market involved the construction of vessel sections in Korea. These sections would be shipped to the United States on the return trip of bulk coal carriers, and the sections would be assembled and passed off as Jones Act vessels. This attempt was also blocked by the AWSC.

Although the foregoing attempts were uncovered and blocked by the AWSC, it illustrates the need for industry vigilance, intelligence, and action that can only be provided by an alert and aggressive trade association. Without such an organization, individual companies would not even be aware of the danger until it was too late.

The AWSC has also been active in urging the Occupational Safety and Health Administration to reduce the regulatory burden on the industry. Several programs have been inaugurated by the AWSC that could set the stage for industry self-regulation in the area of occupational safety and health. First, a comprehensive set of training programs are under development, starting with the new employee and going to the supervisory and professional levels. These programs are being developed under an OSHA "New Directions" grant that the AWSC received in 1980.

Second, the AWSC has urged OSHA to consolidate the three shipyard standards — shipbuilding, ship repairing, and shipbreaking — so that a vertical standard, expressed in performance rather than specification terms, can be developed. A vertical standard for shipyards would contain only those standards that are appropriate for shipyards, and all others would be eliminated. An initial step in

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Inland/Coastal—Small/Medium Yards

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this program was taken recently by OSHA when it published a proposed rule-making for a vertical standard for the marine terminal industry. And third, the AWSC has started a quarterly Occupational Injury and Illness Survey that will provide a baseline and statistical proof that our industry's safety and health programs are working.

When the foregoing items are completed, the AWSC will approach OSHA with a program for industry self-regulation. The **Reagan** Administration has said that it intends to lift the regulatory burden from the back of industry. The AWSC is eager to participate in this effort. Under the proposed plan, qualified shipyards can periodically certify to OSHA that they are in compliance with the standards and thereby preclude unannounced OSHA inspections. This would restore the management prerogative of deciding how to attain safety and health objectives, rather than allocating time and resources to meeting questionable regulations that may not provide a safer workplace.

The shipyard industry has operations that are under industry self-regulation. One notable example is the marine chemists program, which is highly regarded by both industry and government. It should also be noted that this is one of the most hazardous areas of shipyard work, and it is accomplished with a near perfect safety record.

The AWSC is active in many other areas which are important to the industry. A review of the committee structure and the scope of their activities will present a more comprehensive picture of the AWSC.

The activities of the AWSC are guided by the nine-member Shipyard Steering Committee whose members serve for three-year terms. Each year the AWSC elects a Steering Committee member as chairman. The chairman automatically becomes a director in The American Waterways Operators, Inc., and a member of the board of directors' Executive Committee. In this way, shipyard activities are coordinated at the highest levels of the association. The recently elected chairman of the AWSC is **John Buursema**, president of Twin City Shipyard, Inc.

So far, six committees have been established to take action against nationwide problems affecting the industry and to monitor programs for the benefit of the industry. The Industrial Relations Committee, chaired by **John Chantrey**, vice president, Avondale Shipyards, Inc., monitored and participated in drafting the reform legislation to the Longshoremen's Act. In addition, they have commented on regulations and testified at hearings conducted by the Occupational Safety and Health Administration and the Equal Employment Opportunity Commission.

As Avondale Shipyards is also an active member of the Shipbuilders Council of America, Mr. **Chantrey** also acts as liaison for the activities of these two associations. The AWSC is an association member of the Shipbuilders Council, which also facilitates coordination at the staff level. This committee also conducts the annual Wage and Benefit Survey of shipyard production employees that has proven to be a valuable tool in labor relations.

The Economic and Commercial Committee, under the chairmanship of **Robert W. Greene III**, president, Jeffboat, Inc., is responsible for gathering industry data through the annual Shipyard Survey. This information is tabulated for the last 10 years. The annual Shipyard Survey contains such information as the number of vessels built and repaired, employment statistics, availability of materials, and revenues. The profile of the industry developed by this survey serves

as the foundation for conference testimony before the various Congressional committees and administrative agencies and provides the industry with an important marketing tool.

The Vessel Repair Committee, chaired by **John W. Sansing,** president, Newpark Shipbuilding and Repair, Inc., concentrates on matters affecting the repair of vessels. Examples include the Coast Guard's proposed rule-making concerning waterfront facilities and the application of proposed tankerman regulations to gas-freeing facilities. Other areas include the Environmental Protection Agency's proposed regulations on hazardous waste, and other regulations that would affect gas-freeing plants and drydocks.

Committee members represent the industry on several technical committees of the National Fire Protection Association, which promulgates shipyard and tank vessel fire protection standards. They are also working closely with the NFPA and the Marine Chemists Association to develop the marine chemists training curriculum. This committee also takes the lead in supporting the marine chemists function as an area of industry self-regulation.

The Committee of Counsel, chaired by **Dwight Miller,** St. Louis Ship, keeps the membership abreast of cases relating to the Longshoremen's Act, OSHA, manufacturers' liability and other matters. The Committee provides a clearing house for legal information pertaining to shipyards, and it advises the AWSC as to whether it should enter certain judicial matters either as a plaintiff or as an amicus curiae.

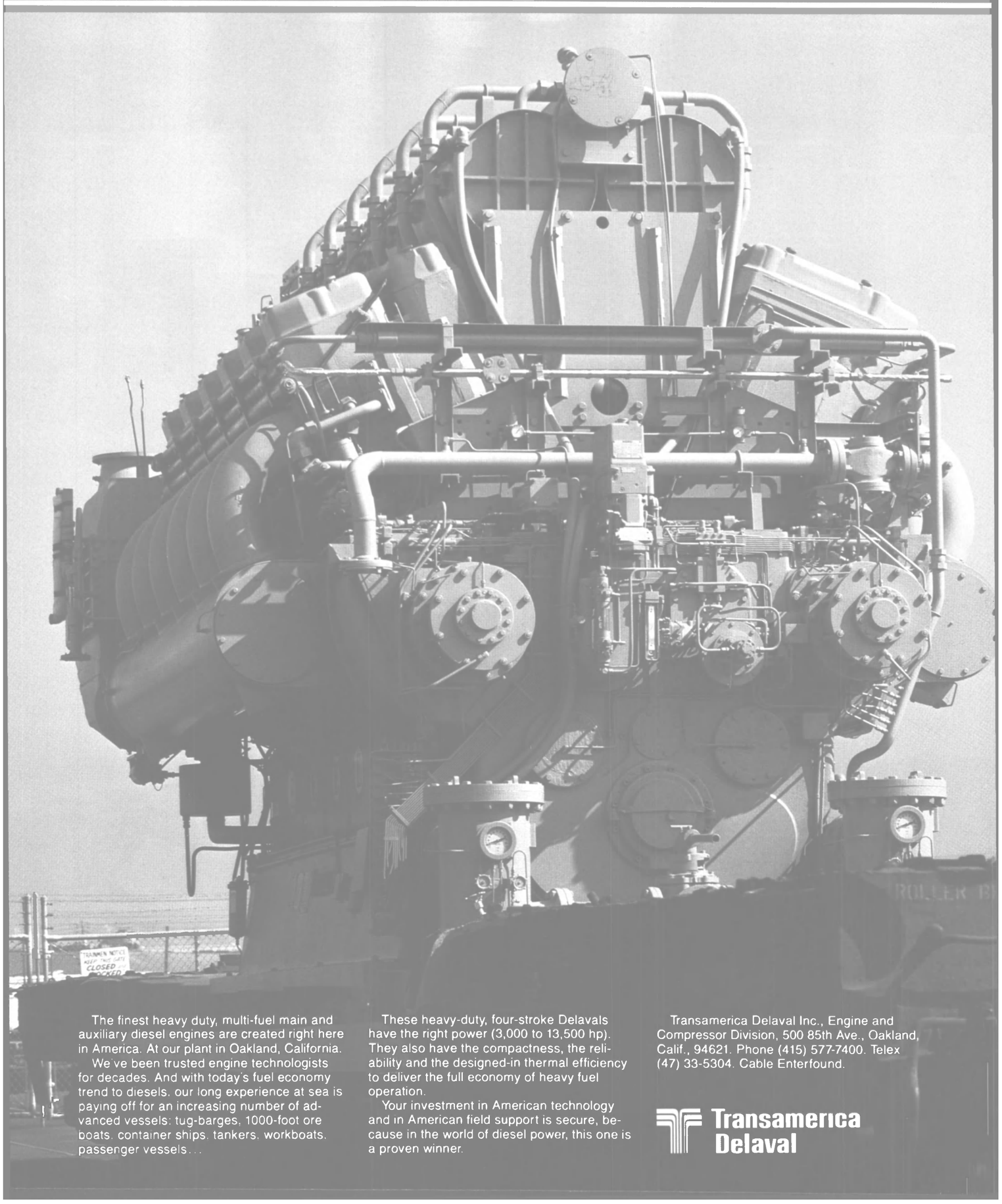
The Shipyard Safety Committee, chaired by **Vincent Laverghetta** of St. Louis Ship, was awarded a $50,000 planning grant under the OSHA "New Directions" program. The purpose of the grant is to assess the safety and health needs of the industry and to establish a safety training program for the new employee before he encounters safety and health hazards on the job. Also included is a guide for shipyard management explaining how to use the program effectively, how to adapt the training material to individual shipyards, and how to evaluate the impact of the training on new employees.

The Shipyard Safety Committee plans to apply for a developmental grant to produce additional shipyard safety training programs for supervisory and professional personnel. The developmental grant will also establish the AWSC as a center of competency for shipyard safety within a three- to five-year period, after which the activity will be financially self-sustaining. The committee has also published and distributed a "Catalogue of Safety Training Aids" to the AWSC membership. A quarterly injury and illness survey has also been started to pinpoint hazards so that the committee can develop corrective actions in a timely fashion.

The Membership and Public Relations Committee, now chaired by **Neal S. Platzer,** president of Platzer Shipyard, Inc., has conducted several membership campaigns over the past several years, and as a result of their efforts, the AWSC has more than 70 members.

In conclusion, the AWSC members invest part of their earnings and their time to keep up with the tide. AWSC members are constantly aware of developments in the industry, and the AWSC provides them with the tools they need for a more efficient operation. Through the AWSC, the members' horizons are extended beyond their offices and shipyards. By belonging to and supporting the AWSC, shipyards can serve the industry better. In turn, the AWSC, through its members, is shaping an environment that will assure the long-term growth and prosperity of this segment of the shipyard industry for the benefit of the nation.

One Proud American



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By Edwin M. Hood, President
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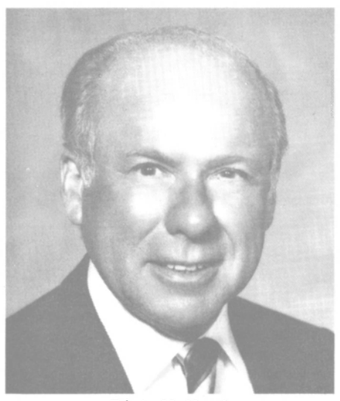

Edwin M. Hood

"Let our position be absolutely clear: an attempt by any outside force to gain control of the Persian Gulf region will be regarded as an assault on the vital interests of the United States of America and such an assault will be repelled by any means necessary, including military force."

This statement by President **Carter** in 1980 drew sharp attention to the questionable adequacy of U.S. naval and sealift resources and to the spreading competition of the U.S.S.R. for sea control. While the Secretary of Defense vowed that "only the United States can offset direct military power" in the Middle East, the thin margin of safety—the margin of strategic superiority—is fast slipping to the Soviet Union by default.

The assorted naval shipbuilding programs of recent years have not produced the requisite number of ships necessary to maintain U.S. naval superiority in the present decade. The Joint Chiefs of Staff see a national security requirement for a Navy of 770 active ships exclusive of naval reserve vessels. In comparison, the Carter Administration predicated its shipbuilding planning on a fleet of 550 ships, both active and reserve, by the early 1980's. This legerdemain with numbers can be perplexing. President **Reagan,** in his 1980 campaign, called for development of "a 600-ship Navy composed of U.S.-built ships as quickly as the budget would permit," but he made no distinction between active and reserve vessels. From FY '70 through FY '77, the Congress cut 43 naval ships from budgets submitted by Presidents **Nixon** and **Ford**. In the FY '77 FY '80 span, President **Carter** requested funds for only 15 ships per year, enough to sustain only a 400-ship fleet.

The current five-year naval shipbuilding program of 97 ships plus the current backlog of 91 vessels will enable the fleet to increase from the present total of 456 ships to 492 by FY '84. Thereafter, according to defense analysts, unless changes are made the same fleet will drop to about 400 active ships.

For the United States is to possess the naval capacity to neutralize any "assault" on the nation's vital interests as President **Carter** put it—or, for the United States to demonstrate "America's control of the seas in the face of any challenge," as President **Reagan** has put it, a larger Navy and an expanded naval ship construction effort will obviously be required.

Knowledgeable groups have endeavored to estimate the dimension of a five-year naval shipbuilding plan that will provide reasonable surety for the country. All are greater in numbers than that put forward by the Carter Administration.

A former Secretary of the Navy and the president of The Navy League of the United States joined in urging for a five-year program of 155 newbuildings and five conversions to achieve a 550-ship naval fleet by 1985. The Committee on the Present Danger, composed of former national security officials, proposed a six-year shipbuilding program of 224 vessels to enable a 650-ship three-ocean Navy fleet plus a permanent presence in the Caribbean Sea.

A bi-partisan group of 30 Capitol Hill staff members who work

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Naval Vessels Under Construction Or On Order In Private Shipyards As Of January 1, 1981

TYPE	NO. OF VESSELS	TOTAL LIGHT DISP. TONS
Destroyer Tender (AD)	3	40,200
Fleet Oiler (AO)	4	38,000
Submarine Tender (AS)	1	13,400
Guided Missile Cruiser (CG)	2	17,820
Aircraft Carrier (Nuclear) (CVN)	2	142,000
Destroyer (DD)	1	5,000
Guided Missile Destroyer (DDG)	4	32,800
Guided Missile Frigate (FFG)	34	92,718
Ballistic Missile Submarine (Nuclear) (SSBN)	7	87,500
Attack Submarine (Nuclear) (SSN)	23	138,000
Ocean Surveillance Ship (T-AGOS)	3	4,800
Cable Repair Ship (T-ARC)	1	8,430
Fleet Ocean Tug (T-ATF)	2	2,950
USCG Medium Endurance Cutter (WMEC)	4	4,800
TOTAL	**91**	**628,418**

Source: Shipbuilders Council of America

MAJOR U.S. NAVAL VESSELS UNDER CONSTRUCTION OR ON ORDER AT U.S. YARDS — MAY 1, 1981

Builder	Type	Navy Nos.	No.	Est. Contract Value, $Mil.
Avondale Shipyards	Fleet Oiler	AO-178-9	2	$144.0
	"	AO-180, 186	2	146.2
Bath Iron Works	Guided-Missile Frigate	FFG-21, 24, 26	3	178.2
	"	FFG-29, 32, 34	3	147.0
	"	FFG-36, 39, 42	3	209.9
	"	FFG-45, 47, 49	3	195.4
Boeing Marine Systems	Missile Patrol Hydrofoil	PHM-2	1	21.3
	"	PHM-3-6	4	178.0
GD-Electric Boat	Attack Submarine	SSN-699	1	428.0
	"	SSN-700-4	5	2,171.4
	"	SSN-705-10	6	2,605.6
	"	SSN-719-20	2	
	Trident Submarine	SSBN-726	1	285.4
	"	SSBN-727-9	3	699.4
	"	SSBN-730	1	354.5
	"	SSBN-731-2	2	699.0
	"	SSBN-733	1	401.0
Ingalls Shipbuilding	Missile Destroyer	DDG-993-6	4	1,400.0
	Destroyer	DD-997	1	231.0
	Aegis Missile Cruiser	CG-47	1	287.8
Lockheed Shipbuilding	Sub. Tender	AS-41	1	209.5
	Dock Landing Ship	LSD-41	1	338.6
Marinette Marine	Fleet Ocean Tug	T-ATF-172	1	8.4
National Steel & SB	Destroyer Tender	AD-42-4	3	520.0
	Cable Repair Ship	T-ARC-7	1	107.0
Newport News SB	Attack Carrier	CVN-70-71	2	1,718.6
	Attack Submarine	SSN-712-15	4	388.0
	"	SSN-716-18	3	380.8
Peterson Builders	Patrol Gunboats **	F-PGG-2-9	8	70.1
Tacoma Boatbuilding	Missile Patrol Chaser **	F-PCG-1-4	4	52.5
	Med. End. Cutter*	WMEC-901-4	4	130.0
Todd-San Pedro	Guided Missile Frigate	FFG-19, 23, 25	3	151.0
	"	FFG-27, 30, 33	3	147.0
	"	FFG-38, 41, 43	3	214.8
	"	FFG-46	1	67.7
Todd-Seattle	Guided-Missile Frigate	FFG-18	1	49.6
	"	FFG-20, 22	2	100.7
	"	FFG-28, 31, 35	3	147.0
	"	FFG-37, 40	2	143.2
	"	FFG-44, 48	2	135.3

*For U.S. Coast Guard. **For Saudi Arabia.

U.S. Navy

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primarily in areas involving national security and foreign policy warned: "Ten years of Congressional lethargy and three years of open anti-military hostility in the Carter Administration are going to prove costly to Americans for many years to come and regardless of specific corrective actions." It recommended a five-year, 158 Navy ship construction program (plus seven conversions) "to return America to a position of military strength capable of sustaining independent diplomatic or military action and unviolated national sovereignty."

With indications late in the year that the final Carter Administration FY '82 Budget would reduce the latest official five-year naval shipbuilding plan below the 97 ship level associated with the FY '81 Budget, the American Enterprise Institute for Public Policy, based in the nation's capital, proposed a 1982-1986 ship construction program of 135 ships to remedy current problems of "maintain(ing) a three ocean commitment with a one ocean Navy." Almost simultaneously, the Heritage Foundation, another public policy research institute, also headquartered in Washington, called for a naval building program of 30 ships per year at a cost of $11 billion annually (in FY '81 dollars).

These proposals would involve construction ranging between 27 and 37 Navy ships per year, compared with an average of 15 ships ordered in the 1970 decade. To reach an active fleet of 600 ships by the mid-1990s, as President **Reagan** stipulated during the 1980 campaign, would require new contracts at the rate of 25 to 30 vessels per year and would engage the services of some 16 shipyards as opposed to just 11 yards currently involved. With a lead time of three to seven years to deliver sophisticated warships, further vacillation can only be at national peril.

In 1980, there were also varied views with respect to the nation's sealift readiness. The Iranian crisis and the subsequent increased tempo of Indian Ocean operations gave rise to the opportunistic acquisition of ships for the Military Sealift Command to compensate for past shipbuilding neglect. Regrettably, the present U.S.-built inventory is limited and negotiations proceed for the purchase of a British combat stores ship and eight foreign-built containerships for ultimate conversion to Fast Logistics Ships. In addition, long-term charters are being offered for foreign-built roll-on / roll-off (RO/RO) ships.

In the longer view, the newly created Rapid Deployment Force, composed of existing Army, Navy, Air Force, and Marine units to rush to distant trouble spots in the Arabian Gulf or elsewhere to defend U.S. vital interests, envisions conversion of four existing U.S.-built vessels with roll-on/roll-off (RO/RO) capabilities plus construction of eight Maritime Pre-positioning Ships (T-AKX). However, in passing FY '81 appropriations, the Congress deleted $207 million for the T-AKX program, and only approved $33 million in advance procurement funding.

Of gravest concern, in these regards, is the preservation of an available shipbuilding capacity to achieve a hoped-for increase in naval ship requirements. At the start of the 1970 decade, less than 40,000 workers in private shipyards were engaged in naval construction. Naval ships then on order caused the workforce, skilled in the ways of Navy shipbuilding, to grow to 83,000 by mid-1979.

At year end, naval construction commanded the labors of some 60,000 skilled shipyard workers. Due to the absence of contract opportunities in the recent past, that employment level may fall.

Given the task to build the larger U.S. Navy of the future, the shipbuilding industry must maintain its skills and experienced work force equal to the task.

U.S. MERCHANT SHIPBUILDING

OFFSHORE DRILLING RIGS, SUPPORT VESSELS, NAVY SHIPS, INLAND BARGES, AND REPAIR WORK BRIGHTEN THE U.S. PICTURE

By Edwin M. Hood, President
Shipbuilders Council Of America

For the U.S. shipbuilding industry, the psychology of hope went full circle in 1980. Starting with the optimism of Congressional enactment of comprehensive "omnibus" maritime legislation in conjunction with an accelerated naval shipbuilding program and ending with the optimism of a more assertive leadership on the part of a newly elected President, the period in between was marked by a mixture of intense activity, confusing commotion, and much talk but little positive effect.

This convolution must be viewed against the background of recent events. The U.S. commercial and Naval fleets have decreased. The U.S. Navy is stretched paper-thin and is now at its lowest level since before World War II. The volume of cargoes carried by U.S.-flag ships has declined. The number of merchant shipbuilding contracts has dropped. The Naval shipbuilding program has been generally down. The industrial support base for ship construction has diminished. There has been no coherent policy to assure the uninterrupted movement of critical imports without which the U.S. military and industrial structure could not endure.

Alarms have been sounded repeatedly. The statistics have been recited endlessly. As in other recent years, there was no visible high-level recognition of the nation's endangered national security. Assurance of an adequacy of ships, shipping, and shipyard resources under U.S. sovereignty to serve essential national interests suffered from unresponsive leadership and adverse economic conditions.

As of December 31, 1980, the order book for merchant shipbuilding totaled 49 ships, with an approximate value of $2.3 billion, being constructed by 13 U.S. shipbuilders (compared to 15 at the end of 1979). Only 17 of these vessels will remain to be delivered after the end of 1981.

With regard to Naval shipbuilding, commitments were made in 1980 for the construction of six guided-missile frigates (FFGs), one guided-missile cruiser (CG), one nuclear-powered aircraft carrier (CVN), and three ocean surveillance ships (T-AGOS) in 1980. Contracts for several submarines were still under negotiation at year-end.

The value of the backlog of 91 Navy vessels on order at the close of 1980 is estimated at $9.0 billion, and deliveries will extend through 1987. Eleven shipyards (compared to 10 at the end of 1979) hold these contracts, one of which is also building four U.S. Coast Guard cutters (WMEC).

New orders at an annual rate of seven merchant ships and 11 Naval vessels will obviously not utilize the full capabilities of the shipbuilding industry of the United States. As a consequence, some 30,000 skilled shipyard workers in those yards which compose the so-called shipbuilding mobilization base face the uneasy prospect of unemployment over the next several years, with another 90,000 in supplier activities similarly affected. Conversion of existing vessels and construction of non-self-propelled barges for coastwise service in addition to non-ship work could moderate this forecast, but not substantially.

This downward trend has been compounded by expedient actions of the Department of Defense in planning to acquire 11 commercial-type, foreign-built vessels to fill ship voids in the nation's sealift forces, which should have been ordered from domestic shipbuilders three or more years ago. It should be noted that these 11 vessels are greater than the total number of definite contracts (seven ships) signed by U.S. builders in 1980: an incredible situation, more so because of the role of government.

A loss of 80 million man-hours of employment for the U.S. shipyard labor force takes place while the public treasury is paying millions of dollars in adjustment assistance to U.S. workers displaced by reason of low-cost foreign imports. With one hand, the government purchases foreign-built ships, while with the other hand, it bestows generous unemployment benefits to U.S. shipyard workers who should have built the ships in the first place.

The order book for offshore drilling rigs presents a much brighter picture. With 72 rigs on order at year-end with 11 U.S. builders (compared to six at the end of 1979), contracts for 53 were placed in 1980. Valued at about $2.4 billion, deliveries extend into 1984. Worldwide, competition for jackup and semisubmersible rigs intensified during the year as offshore oil and gas fields expanded. In like manner, the demand for new offshore petroleum service vessels has expanded; more than 200 of these

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Proposed FY '82 Federal Budget For Shipbuilding And Repair With Prior Years Appropriations

	FY '80 Actual	FY '81 Appropriate	FY '82 Request
Navy Shipbuilding & Conversion	$ 6,621.0	$ 7,483.6	$ 6,639.6
Navy Ship Repair/Alteration (Est.)	3,098.8	3,745.7	3,894.0
Merchant Ship Const.	101.0	135.0	107.0
U.S. Coast Guard (Est.)	112.5	125.0	177.0
Corps of Engineers	69.2	89.4	49.5
TOTAL	**$10,002.5**	**$11,578.7**	**$10,867.1**

Source: Shipbuilders Council of America

U.S. Merchant Shipbuilding

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supply boats were reportedly delivered in 1980.

Also on the plus side of the shipyard ledger, the demand for inland waterway barges as well as for commercial ship-repairing services has been strong throughout the year. The dollar value of ship repair work for 1980, both Naval and commercial is estimated at nearly $2.5 billion.

MERCHANT SHIPBUILDING

From the record of the past two decades, one is struck by the repeated evidences of a fruitless search for a fully effective and enduring policy to govern U.S. maritime affairs. 1980 was equally sterile.

At midyear, it became increasingly apparent that proposed legislation to counteract persistent deficiencies as affecting U.S. shipping and shipbuilding capabilities would not be enacted. In point of fact, the much-publicized "omnibus maritime bill" was never brought to a vote in the Congress because of its controversial scope, Carter Administration indifference, jurisdictional squabbles, and political events.

There was general agreement on the need for change and improvement, but, on details, industry and labor didn't agree, the Administration and the Congress did not agree, separate executive agencies within the government did not agree, shipowners and shipbuilders didn't agree, and, on some provisions, shipowners did not agree among themselves. For their part, shipbuilders made a number of concessions and compromises on basic principles in the hope of unity, but in vain.

This was not an exercise in total futility, however. The extensive Congressional hearings and accompanying public debate underscored these important points: (1) the devastating disarray with respect to U.S. maritime policy and implementation; (2) the nation's critical dependence on imported strategic materials of which 95 percent or more is brought to U.S. ports by ships flying the flags of other countries; and (3) the costly impact on U.S. shipbuilding prices resulting from regulatory requirements and standards more severe than those abroad. The resulting dialogue also provided a timely focus on the positive relationship of adequate and productive domestic shipbuilding and U.S.-flag shipping capabilities to the nation's security and economic structure.

Seen from today's perspective, these points need to be considered in the context of world shipping and shipbuilding conditions as they exist, not in the context of 18th century textbook theories as some classical economists even now hypothesize. With a depressed market worldwide that is not predicted to return to normalcy before 1984 or 1985, shipbuilders in other countries are reportedly quoting prices as much as 40 percent below actual costs, with the encouragement and blessing of their governments. This is possible through unique patterns of extraordinary subsidies, tax inducements, financing devices, and accelerated capital depreciation.

But as prices are lowered abroad, by whatever means, construction subsidy levels in this country rise, but they cannot exceed 50 percent by statute. The real differential with U.S. shipbuilding prices at this moment is probably closer to 60 or 65 percent. Obviously, newbuilding opportunities in this country are affected by that which takes place abroad and, at the same time, they are inhibited by the myopia of U.S. policies.

Practices of false pricing in other countries cannot continue indefinitely; the elastic limit of artificial government supports to indemnify shipbuilders against losses is not infinite. The elastic limit of government support for maritime affairs in the United States has traditionally been dictated by the availability and amount of Federal funds for ship construction and operations. Over time, Federal payments for operating subsidies, in total, have exceeded those for construction subsidies. Yet U.S. shipyards and supporting activities, over time, have provided far more jobs for American workers than seagoing operations.

It is nonetheless a fact of life that U.S. shipbuilders will prosper only to the extent that U.S. owners are able to order ships from them. To do so, the financing package must assure parity with foreign competition, and that assurance must be predicated on efficient utilization through good management and

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Dollar Volume Of Repair And Conversion Work Performed By Private Yards
(millions of dollars)

YEAR	COMMERCIAL SHIPS*** $ AMOUNT	%	NAVAL SHIPS $ AMOUNT	%	TOTAL
1968	458	55.8	363	44.2	821
1969	532	58.1	384	41.9	916
1970	431	54.6	359	45.4	790
1971	450	58.1	325	41.9	775
1972	484	55.6	387	44.4	871
1973	523	57.0	393	43.0	916
1974	713	57.0	533	43.0	1246
1975	688	55.4	554	44.6	1242
1976	715	52.6	644	47.4	1359
1977	789*	52.0	718*	48.0	1507*
1978	829**	48.0	915**	52.0	1744**
1979	870**	48.0	944**	52.0	1814**
1980	914**	49.0	962**	51.0	1876**

*Revised **Estimated ***Includes Military Sealift Command (MSC)
Source — Bureau of Census and Shipbuilders Council of America

MERCHANT VESSELS UNDER CONSTRUCTION OR ON ORDER AT U.S. YARDS — MAY 1, 1981

Builder	Owner	Total No.	Type	Hull Nos.	Est. GT (Each)	Est. DWT (Each)	Est. HP (Each)	Est. Total Cost ($Mil.)
American Ship Building	Interlake Steamship	1	Bulk	909	32,000	59,000	D-16,000	50.0
Avondale Shipyards	American President Lines	3	Container	2329-31	40,500	30,300	D-43,200	330.0
	Suwanee River	2	Tug/Barge	2325-8	16,000	41,300	D-18,200	75.4
	Ogden Marine	2	Products	2318-19	25,000	42,000	D-15,000	100.0
	Corps of Engineers	1	Dredge	2322	9,900	8,000	D-10,400	67.5
	United States Trust	1	Dredge	2332	—	9,980	D-13,800	40.0
	Exxon Company U.S.A.	3	Products	—	26,000	43,000	D-17,000	300.0
Bath Iron Works	Corps of Engineers	1	Dredge*	402	6,000	—	D-7,000	65.0
	Falcon I Sea Transport	2	Tanker	404-5	24,000	33,900	D-14,720	142.0
	Calif. & Hawaii Sugar	1	Barge*	406	21,000	37,000	—	25.0
Bay Shipbuilding	Goodyear Steamship	1	Bulk	724	12,000	23,500	D-7,500	25.0
	Ogelbay Norton	1	Bulk	726	33,000	50,000	D-14,000	52.4
	Beker Shipping	1	Bulk Barge	728	20,000	41,000	—	NA
	Universal American Barge	1	Bulk Barge	729	17,500	33,000	—	NA
	Ocean Barge	1	Bulk Barge	730	17,500	33,000	—	NA
Bethlehem-Sparrows Point	Artemis Marine	1	Tug/Barge	4652	32,000	47,000	D-18,200	52.6
	First-Fifth Tug/Barge	5	Tug/Barge	4653-7	32,000	47,000	D-18,200	266.0
Equitable Shipyards	City of New York	2	Ferry	1713-14	3,000	4,200	D-7,800	30.0
General Dynamics-Quincy	Coastwise Shipping	4	Tank Barge	73-75, 82	—	27,000	—	57.0
	New England Electric	1	Collier	—	23,500	36,000	T-12,000	60.0
	Watermanship Steamship	1	RO/RO-Cont.*	—	18,500	23,500	T-32,000	61.0
Levingston Shipbuilding	Asco Falcon I	3	Bulk	751-3	23,500	36,000	D-14,800	120.0
National Steel & SB	Union Oil	3	Products	415-17	24,500	37,500	T-13,000	150.0
	American Tankships	2**	Products	419-20	24,500	37,500	D-11,400	102.0
	American Trading Trans.	3	Products	424-6	27,000	44,000	D-11,400	153.0
Norfolk Shipbuilding	Coordinated Caribbean	1	Barge	34	4,000	6,680	—	21.2
Southern Shipbuilding	Great Lakes Dredge	1	Dredge	120	3,300	4,400	D-3,000	NA
Sun Ship, Inc.	Sun Transport	1	Products	677	17,000	31,000	D-14,200	36.0
	Waterman Steamship	2	RO/RO-Cont.	679-80	18,500	23,500	T-32,000	137.5
Upper Peninsula SB	State of Michigan	1/4	Tug(1)/ Barge(4)	001-5	5,400	10,000	D-8,000	35.5

* Subcontracted from Sun Ship. ** Option for three additional sister ships.

U.S. Merchant Shipbuilding

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profitable operations deriving from the transport of an increasing volume of cargoes. As President **Reagan** has put it: "a greater market share of U.S. trade for U.S.-flag, U.S.-built ships."

The development of a fully effective and enduring national maritime policy will require enlightened recognition of the realities of world shipping and the realities of world shipbuilding as presently existing and not as they should conform with someone's vacuity about economic theories of yesteryears. Any endeavors to increase the market share of the U.S. merchant marine must begin with recognition of this pervasive fact: whatever free trade that now exists in shipping services is rapidly disappearing and will, in all probability, be virtually non-existent by the end of the 1980 decade.

As to liner trades, the Code of Conduct for Liner Conferences, dictating a 40-40-20 percent division of cargoes between the shipping fleets of trading partners and third-flag carriers, will enter into force in 1981, notwithstanding the abstention of the United States and the reservations of the European Economic Community and Japan with respect to their trade with the United States. Implementation of the Code, commonly known as UNCTAD, will severely increase pressures on U.S.-flag carriers operating in U.S. liner trades as displaced tonnages flock to the only major trades remaining open.

While the Code has many well-documented flaws, it is a reality with which the United States must contend, and to which the United States must assent, if the U.S.-flag liner fleet is to prosper.

As to the bulk trades, the Third World effort to achieve similar cargo sharing arrangements is just beginning, and, as with the Liner Code 10 years ago, it is not taken seriously. The Department of State has evidently learned nothing from that experience, and again steadfastly opposes any momentum toward development of a rational and effective policy.

As suggested earlier, the shipbuilding industry of the United States acknowledges that its prosperity and that of U.S.-flag ship operators depends upon a national maritime policy in tune with the world of the 1980's, not the 1780's or the 1880's. That policy, however, must recognize and deal with the worldwide movement toward bilateralism and promotion of national flag shipping fleets. A realistic maritime policy for the 1980's must also take into account the economic and tax stimuli that underpin the shipping and shipbuilding endeavors of other countries.

For the short term, market opportunities for U.S. shipbuilders not principally involved in naval programs would seem to consist mainly of construction of specialized ships and vessels for domestic and Great Lakes trades; construction of barges and shallow draft vessels for the inland waterways and coastal trades; conversion of existing vessels; repowering of existing vessels with more fuel- and cost-efficient propulsion systems; retrofitting of existing tankers to comply with environmental requirements; and certain types of non-ship work.

For the long term, a gradual increase in merchant ship construction to accommodate incremental increases in world trade and a rise in the volume of cargoes carried by U.S.-flag shipping seems likely. Overage or uneconomic vessels will need to be replaced. Opportunities to build dry bulk carriers, ocean mining ships, ocean thermal energy conversion plantships, and other specialized vessels should also develop.

WORLD SHIPBUILDING

A VIEW OF WORLDWIDE SHIPBUILDING REVEALS SIGNS OF REVIVAL IN SOME SECTORS

No matter which set of shipbuilding tables or statistics one studies, there is no escaping the fact that Japan continues to be the world's leading shipbuilding nation, supplying over 50 percent of the world's tonnage. This has been achieved, moreover, in spite of an average cutback in capacity of about 35 percent, and in labor by 50 percent, compared with its peak-time figure.

In looking at Japan, one cannot help but notice her near neighbor, South Korea, which, in direct contrast with other shipbuilding nations, is actually increasing her shipbuilding capacity with the opening of the Daewoo shipyard. Both countries will be discussed in more detail later.

Elsewhere in the world there has been a general cutting back of shipbuilding capacity, the pruning in some countries being quite severe, particularly in Europe, with Sweden — only a few years ago the world's No. 2—being hit particularly hard. However, offshore work, which doesn't usually appear in shipbuilding returns, has helped to soften the blow for some yards, and naval orders have helped others. Even though there is much talk, and some evidence, that the recession is nearing its close, it has not halted the shipyard cutbacks.

It is understood that in Spain which, according to Lloyd's Register Shipbuilding Returns for the quarter ended December 31, 1980, is in third place in terms of total order book, talks are being held with a view to reducing facilities by 35 percent and manpower by 20 percent. It seems more likely, however, that the reductions will be 20 percent and 10 percent, respectively, because of the hardship such drastic cutbacks would mean to areas — Cadiz, for example—where there is so little other industry. Although that country's total order book has increased of late, more than 50 percent of this is now under construction. France, Germany, Italy, Norway, and the United Kingdom are all in similar situations though, in effect, the latter two countries have suffered a reduction in their total order books.

The country that has incurred the biggest fall in total order book is Brazil which, nevertheless, remains in fourth position closely followed by the United States. Like the U.S., the Brazilian order book is based on home orders, but Brazil does have a Shipbuilding Plan.

JAPAN

As stated earlier, Japan in spite of severe cutbacks both in terms of facilities and labor force, including the closure of 10 yards, is still supplying half the world's tonnage. The cutbacks average about 35 percent because the seven majors cut back by 40 percent, while yards not capable of building ships over 10,000 grt cut back by 15 percent. Yards between these two criteria cut back by an average of about 28 percent.

Another interesting point is that the average production of Japanese shipbuilders was limited by an industrial cartel, formed on August 1, 1979, to 39 percent of each yard's peak production figure, in terms of compensated gross registered tonnage. The idea behind this cartel was to help overcome the serious slump affecting Japanese yards, and it was to be effective until the end of March this year. However, as far back as April 1980 this cartel was extended by a year, and the production ceiling for fiscal 1981 increased by 30 percent over the previous year, i.e., 51 percent of the peak production.

In addition to the cartel which, by reducing available capacity, proved to be the most effective in cutting down the suicidal competition between yards that resulted in below-cost ships' prices. Japanese shipbuilders were also cushioned against the real effect of the depression by a relatively large number of domestic contracts in 1979. The 35th government-sponsored shipbuilding program for fiscal 1979 comprised 32 ships totaling over 1.6 million grt, and was about the same as the aggregate of the previous four programs. About 100 other vessels amounting to 1.2 million grt were ordered by Japanese owners.

Japan has, in recent months, come under scathing attack from European shipbuilding nations — she did in the mid-1970s — who are alarmed at her success rate. But Japan has truthfully replied that it has taken major steps to reduce its capacity . . . unlike a number of other nations. The reason behind the European complaints is obviously the number of orders that have been going to Japan from that part of the world. Japan has also been successful in obtaining orders from U.S.-based owners. This was illustrated recently by Hitachi Zosen who received contracts for two Panamax bulk carriers from subsidiaries of the Xylas Group, also two further Panamax bulk carriers and one 132,000-dwt bulk carrier from subsidiaries of the National Shipping and Trading Corporation Group. While Panamax bulkers appear to be a good buy for foreign owners, this does not seem to be the case for domestic operators who, allegedly, are re-assessing their plans for these vessels because of rising prices. Could it be that for them the cartel has been too effective?

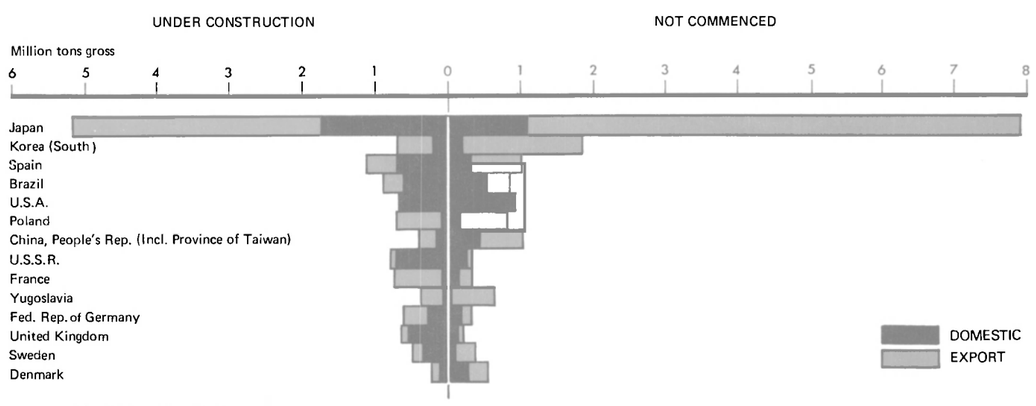
SOUTH KOREA

Some six years or so ago, the president of the Japan Ship Export Association said that because of the low wage rates in Korea, Japan could not compete with that country's prices when it came to "no-frills" ships. He felt that Japan's strength and future lay in building high-technology, sophisticated vessels leaving the ordinary type of ships for the Koreans to build. The expected rapid expansion of the Korean shipbuilding industry did not occur for various reasons, although its yards were successful in obtaining some very good orders, notably Hyundai's 28 ships built for Kuwait.

However, it now appears that Korea is once more causing a

(continued on page 46)

Total World Order Book By Country Of Build At December 31, 1980



Source: Lloyd's Register of Shipping

World Shipbuilding

(continued from page 45)

headache to the rest of the shipbuilding nations. Although its tonnage on order is a great deal less than that of Japan's it is, after all, in second place in the order book league — a position it has held for the third consecutive year. Furthermore, in the first three months of this year it has been very successful in obtaining new orders, the value of which is reported to be a staggering 35 times more than those received during the corresponding period last year. But even more worrying for its near neighbors is that a large number of these orders are for sophisticated tonnage. An example of this is the contract for four chemical tankers (with an option on two more) won by the new Daewoo shipyard. This yard's order book also includes five semisubmersible platforms — three for U.S. flag and two for U.K. — as well as a 140,000-dwt bulk coal carrier, two 150,000-dwt OBO carriers, and a 125,000-dwt tanker.

It is interesting to note that British consultants A & P Appledore and Det norske Veritas will jointly provide operational and completion assistance to the Daewoo yard, which was built to a design developed by A & P Appledore. It may be recalled that these consultants were responsible for Korea's leading shipyard, Hyundai Heavy Industries, which commenced operations in 1974. Hyundai has already delivered some 120 ships and its current order book, stretching through to 1983, must be the envy of many other yards throughout the world. Bulk carriers predominate with many of them for service under the British flag and others for Norway, although, as might be expected, the Liberian flag has the leading share.

Korea's third largest yard is Korea Shipbuilding and Engineering Company, whose order book is composed mostly of tankers in the 20,000-60,000-dwt range, including a number of chemical and product tankers. Next in size is Samsung Shipbuilding. In addition there are a number of smaller yards. Korea has been singularly successful in obtaining a high percentage of export orders, but the Government is also keen to see its own national flag fleet expanded in order to secure a greater share of its trade. As a consequence, most of the yards' order books are punctuated with domestic orders. Expectations are that Korea's national shipbuilding capacity will, by 1986, have grown to reach 6.5 million grt, which is nearly 50 times that existing in 1971.

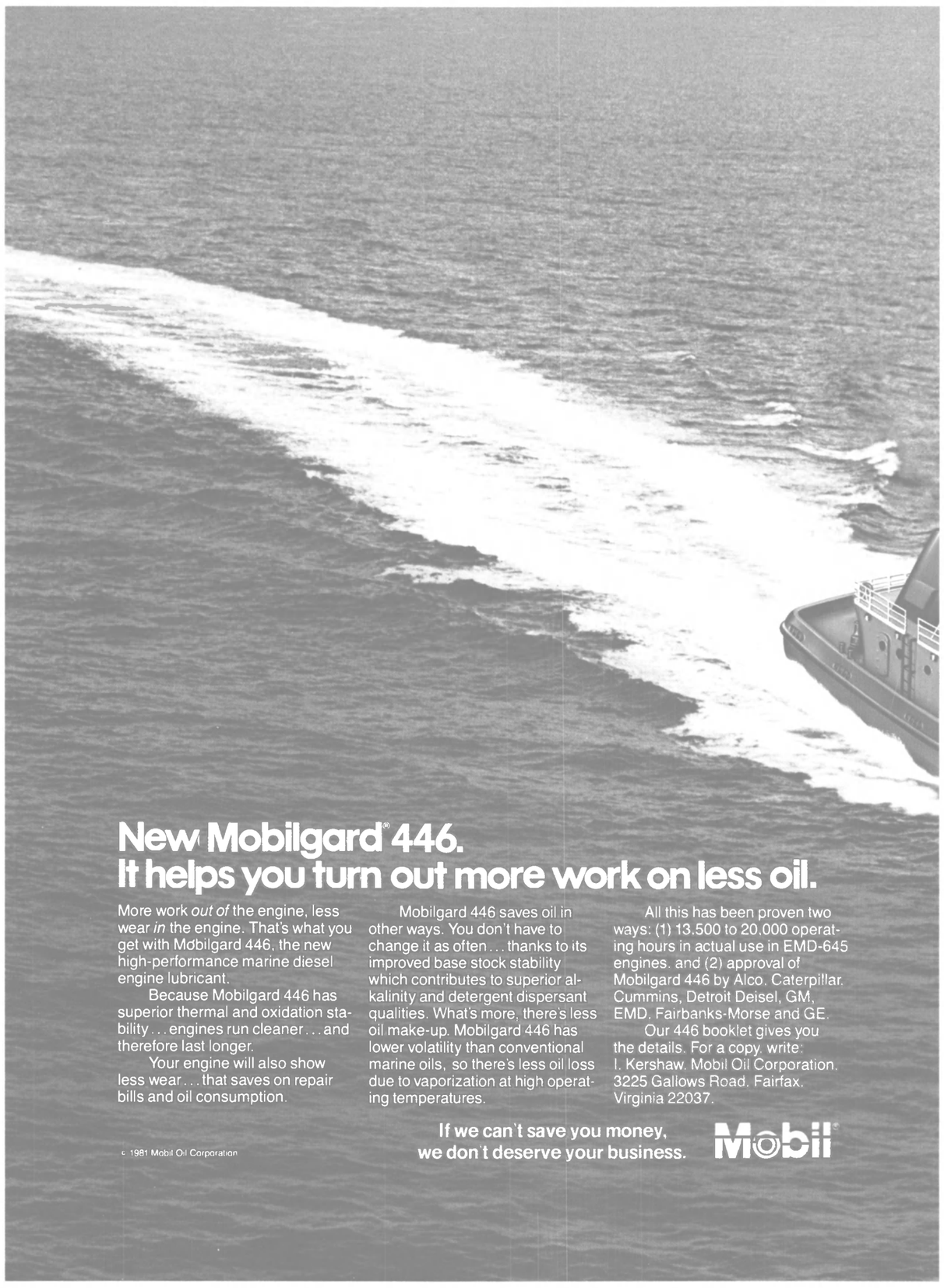
CHINA

A look at the order books of the Chinese yards reveal that this country, too, is achieving some measure of success in Europe with contracts from owners in Germany and Norway. Other export ships will fly the flags of Liberia and Panama. As for its domestic fleet, a number of vessels are on order but it should be recalled that in the past three years or so China has built up her merchant fleet by the acquisition of good quality secondhand tonnage.

China is now seeking to import shipbuilding technology and is currently upgrading the building facilities at a number of yards. At the Jiangnan Shipyard, Shanghai, for example, two 7,000-ton-capacity slips are being rebuilt to form one of 60,000 tons capacity. In addition, the yard has five other building slipways, one for ships of up to 27,000 dwt, three for vessels of up to 7,000 dwt, and the sixth for those of the 1,000-dwt category.

Also in Shanghai is the floating shipyard for which future development expansion is being considered. This story can be repeated for many other yards throughout the country, and it is certain that in the future many of these will be seeking export orders. When one takes the vast potential of this nation into account, clearly the prospects of

(continued on page 48)



Write **270** on Reader Service Card

World Shipbuilding

(continued from page 46)

China becoming a net exporter of ships cannot be ignored.

TAIWAN

Another country to increase its order book in recent months is Taiwan, whose China Shipbuilding Corporation (CSBC) has yards at Keelung and Kaohsiung. Again, domestic owners account for a fair proportion of the work in hand. There is also a national shipbuilding program accounting for 28 full containerships, 10 Panamax-type bulk carriers, and two tankers, all of which are to be built in three years from July 1980 to June 1983.

Built in 1975, the Kaohsiung yard has a building dock capable of constructing ships of up to 1,000,000 dwt. The Keelung yard's facilities include a 100,000-dwt capacity building dock and a 30,000-ton building berth, as well as repair docks. It is understood that CSBC is looking to the construction of highly specialized and sophisticated ships, such as LNGs, LPGs, etc., in the future.

So far as the rest of Southeast Asian shipbuilding countries are concerned, Singapore is perhaps best known for its highly successful ship repairing activities. However, there are a number of yards such as Promet and Far East-Levingston that have good order books for small, specialized craft in the form of supply ships, tugs, etc., as well as offshore rigs.

Across the causeway, efforts are being made to increase Malaysia's shipbuilding capability, though it looks as if this country will remain an importer of tonnage for some time to come as newbuildings are likely to be restricted to coastal vessels. On the other hand, the Labuan yard of Sabah Shipbuilding and Repairing is currently expanding its facilities.

In the jump from Southeast Asia to Europe, we pass over countries such as India whose yards are building for domestic owners.

SPAIN

Although Spain clearly leads Europe with the amount of tonnage on order, a very high proportion of this is for account of domestic owners. Spanish shipowners are not encouraged to build abroad and the selected subsidy program, together with a home credit scheme, are an added incentive. The country has recently attracted an increased number of export orders, but as stated earlier in this article a reduction in capacity is currently under review. According to Lloyd's Register, tonnage completed in Spanish yards last year was only a quarter of the figure returned in 1975. It could be that this decline in productivity explains why Spanish yards have so far been able to avoid the severe cutbacks experienced by other countries.

FRANCE

One of the leading European nations with regard to investment in shipbuilding facilities — the yards at Saint Nazaire and La Ciotat are outstanding examples —France has had to cut back its activities to more than half its peak level. But in this case these figures can be misleading because French yards have for some time been building highly specialized ships, particularly gas carriers, in which there is a high work content; much of the current order book is made up of such sophisticated tonnage. A considerable increase in newbuildings ordered by French owners last year helped French yards inasmuch as they received the bulk of the ships — four containerships, four RO/ROs, two LPG carriers, and a passenger ship — and the bulk of the value, but four ships, totaling over 440,000 dwt, went elsewhere.

WEST GERMANY

Most of the major German yards are having a lean time, although some have received naval contracts and others are engaged in offshore activities. An indication of the overall situation can be judged from Howaldtswerke Deutsche Werft whose recently released annual report cited the newbuilding sector as the primary cause of undisclosed losses. However, its chairman, Dr. **Norbert Henke,** said that it is possible to look ahead with cautious optimism as long as the gradual improvement in the shipbuilding industry continues without any major setbacks. He strongly urged that the West German Government continues its aid to the industry and added "it would be a gross mistake to stop this aid." Despite HDW's diversification into other non-marine fields, it has reduced its number of employees by 3,400 since 1975 and further reductions are planned. Dr. **Henke** contends that the future of West Germany's shipbuilding industry lies primarily in the construction of specialized vessels and progressive exploitation of advanced technology.

UNITED KINGDOM

The United Kingdom's shipbuilding industry is still being cut back, and in recent weeks there has been a considerable difference of opinion between the unions and the nationalized corporation, British Shipbuilders. The problem is that a further 2,600 redundancies were required and while 2,000 workers volunteered for this, lay-off notices were served on the remainder. The corporation has to date enjoyed much support and cooperation from the unions, but both sides appear to have a tough line over this latest move.

Last year, the corporation introduced a family of designs and more recently has decided to develop and market a range of liquefied gas carrier designs. In the meantime, its warship builders are doing well, and there has been much speculation about some of them being sold back to private enterprise. This seems unlikely — BS has itself denied such a move — as the corporation would lose money at an even higher rate than currently. Also looking on the bright side, Austin & Pickersgill, one of the few yards doing well prior to nationalization, is still maintaining a good order book for its SD 15 cargo ships and bulk carriers.

Clearly though, the Thatcher government will have to find some way of further supporting the industry — after taking office it gave BS support for two years while restructuring took place and its capacity was reduced by

one-third — otherwise there will be more unemployment in areas that already have been hard hit.

SCANDINAVIA

In Norway, as in the United Kingdom, a shipyard employment has been drastically reduced and for many shipbuilders it has been a question of survival. Many have no doubt been saved by offshore-related work. Norway's problem stems from the high cost of production compared with some other countries, and thus under normal circumstances the yards are unable to compete. However, there are several aid schemes that allow shipbuilders to compete more effectively for orders with subsidized yards in other countries.

Sweden's shipbuilders, which come under Swedyards, the state-owned industrial and marine group, have suffered considerably as a result of the recession, particularly with regard to large tanker construction that accounted for much of the tonnage built during the early to mid-1970s. Nevertheless, yards have diversified both with regard to the types of ships built and also into other areas.

Denmark, similarly, has had to make cutbacks in its labor force. The current order book shows a large proportion of ships under construction for domestic owners.

Most fortunate of the North European countries is Finland. The various yard order books reveal a very high percentage of ships to be building for the Soviet Union, a result of bilateral agreements between these two countries.

Before leaving Europe, mention must be made of the Polish industry, which is currently attracting considerable attention though not on account of its order books. What effect the political situation will have on its shipyards remains to be seen. Other European countries—Italy, Belgium, the Netherlands—have all been adversely affected by the recession in varying degrees, and it seems as if the contraction of European shipbuilding is not finished yet.

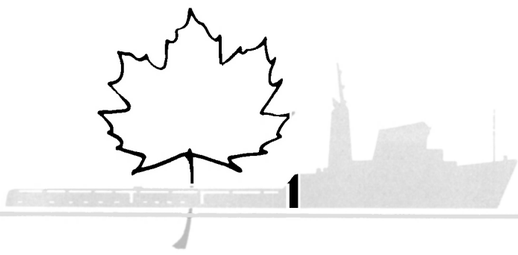
Despite the foregoing, however, London shipbrokers Eggar Forrester report that orders for new tonnage continue at a pace which may eventually lead the industry into one of its regular cycles of over-supply. That the majority of bulk tonnage orders has been going to the East was a subject of some recrimination at a recent OECD meeting. But European yards hold larger orders for the more sophisticated types of ships, and Spain has recently won a number of contracts especially for bulk carriers in the region of 30,000 dwt. With many yards holding full order books for 1983, few early berths are available: the U.K. is one exception here, and a weaker pound and good credit arrangements may also be attractive.

In summing up the world shipbuilding situation, the concentration of yards in Southeast Asia is unmistakable. Despite modern technology, shipbuilding is, always has been, and always will be, a labor-intensive industry and, logically, if labor costs are cheap then ships will be inexpensive. Advances in the industry apply to all countries, with low-labor-cost areas able to take the same advantages as their longer-established counterparts elsewhere; the Southeast Asia yards are among the most modern in the world.

It should also be realized that shipping is a competitive business and shipowners do not owe shipbuilders a living. Free of restrictions as to where he should build, the shipowner would naturally opt for the yard, in whatever country, that could offer him the lowest price coupled, of course, with the quality and delivery dates he requires. It follows, therefore, that to maintain a strategic level of indigenous shipbuilding capacity, many governments will have to provide more incentives to their native shipowners to build in their native yards.

Perhaps the other alternative, discussed in London at the International Marine Industries Forum in March, is to undertake a policy of "scrap and build" and, in so doing, remove less efficient ships while giving a steady base load to shipyards.

CANADIAN OFFSHORE SERVICE VESSELS



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CANADIAN EAST COAST OFFSHORE SERVICE VESSELS–EXPERIENCES AND PROBABLE FUTURE REQUIREMENTS

By Stuart S. Peters and Richard A. Spellacy*

The supply and anchor-handling vessels that are deployed on the east coast of Canada are basically a transfer of equipment, technology and experience that evolved in the northern parts of the North Sea in the middle to later 1970s. The North Sea as a whole tends to compare environmentally with the east coast of Canada as far as supply boat operators are concerned. The northern parts of the North Sea are similar to those off Newfoundland and the southern part of the North Sea.

Anchor-handling/supply vessels were becoming to be recognized as an integral part of the North Sea exploration activity by the late 1960s. Their appearance was coincidental with the use of the semisubmersible drilling rigs. These rigs required to be towed from one drilling site to another, and each site had its particular anchor pattern. The support vessels were used for transporting supplies, towing and anchor handling.

The early vessels engaged for these tasks were of modest horsepower (2,000-3,000) and encountered difficulty in anchor handling because of the low horsepower. It often required two vessels working together to drag out the anchor chains and place anchors. As drilling programs moved to deeper waters by the early 1970s, vessels of 4,000 to 6,000 horsepower were appearing in order to provide the required support services and handle greater lengths of chain and cable.

The North Sea area soon became dominated by Norwegian-built vessels that demonstrated that the northern areas of the North Sea required vessels of 7,000 to 8,000 bhp and with greater freeboard. By 1978 a few vessels with over 9,000 horsepower were appearing, and shipyards responded to the required new capacity and capability of anchor-handling/supply vessels. By now the low-horsepower vessels were obsolete except for the purpose of supply only.

By the mid 1970s the charter rates reflected the change in vessel technology and demand, and many shipyards were capitalizing on the situation. There has been a steady climb in charter rates that reflect a reasonable spread between horsepower categories.

Unfortunately, this reasonably encouraging situation did not last. By 1975, the oil and exploration activities on a worldwide basis entered a downturn. This was caused by various factors, most of which were related to international politics. By 1978, however, a full-scale recovery was being experienced, which for Canada's east coast was extremely exciting. Now, again through political disputes between levels of government and an apparent unacceptable national energy policy by some oil companies, we are in a reduced stage of exploration. The effect that politically motivated alterations of policy with respect to energy is serious and plays havoc with industrial growth and to the attainable objective of this nation's energy self-sufficient position.

In view of the uncertainty facing oil companies in the exploration activities, it is not surprising that over the past few years very few vessels of any particular horsepower class have been built, and there are now no vessels at all available.

Based on our operations, commencing in 1979 with 14 OSA vessels, we are satisfied that these vessels have performed reasonably well in our waters. These vessels range from 146 to 258 feet long with horsepowers ranging from 4,000 to 13,000, and deadweight tonnages from 936 to 2,480.

The horsepower for east coast support vessel operations appears to be in the 8,000 range with additional specifications and reserve capabilities requiring up to 13,000 horsepower. Along with this horsepower range, ice-strengthened hulls are required for ice and the heavy seas frequently encountered. Fuel consumption for vessels in this range could amount to as much as 20 tons per day, and with the present and expected cost of fuel, consideration must be given in designing vessels for the utmost economy.

For ease of maneuvering and especially in the "hover" situation, which occurs frequently under quite extreme weather conditions, joystick control is considered a standard. This single control, through an analog control system, transmits the required signal and thrust strength to the main propellers, bow thrusters and rudders. The next control development will be a requirement for automatic digital computer control using radar reference to maintain the distance from the rigs when loading or discharging personnel or goods. There is, however, some general opposition to this system because of the danger of the captain becoming less alert in his monitoring role rather than being physically responsible for the position of the vessel.

Weather-protected triple-drum and closed winches are now being favored over double-drum systems. This is to facilitate the additional pendant wire for deep waters, and thus, increases the speed of the anchor-handling activity.

There is also a trend toward deeper vessels that would permit 5 to 6 feet of freeboard and the capability of carrying 1,200 to 15,000 tons of cargo.

It does not appear conceptually possible to have one vessel designated that will meet all requirements. However, the paper does give an outline specification for a vessel that the authors feel would come as close as possible to the ideal vessel to operate off Canada's east coast.

This vessel has a length of 64 meters overall, a breadth of 14 meters, a depth of 7 meters, and a loaded draft of 6 meters with a deadweight of 1,400 metric tons. The bollard pull would be 120 metric tons. Propulsion would be provided by two diesel engines having a continuous rating of 8,000 bhp total and a total maximum rating of 8,800 bhp.

In addition to the features listed in these specifications, the following recommendations are suggested, based on the authors' experience, using the basic vessel as the 8000 type OSA:

1. Increase the brake horsepower to 8,000 bhp/120 tons bollard pull (preferably four 2,000 bhp engines with two engines on one gear box).

2. Increase the draft and water/fuel capacity (interchangeable tanks) (100-150 cubic meters of more water would be sufficient).

3. Increase freeboard by 0.30 to 0.50 meters.

4. With increased draft, a stronger bow thrust unit will be necessary.

5. Cooling water outlet to return outboard and to the seachest (to keep clear from ice) with two-way valve.

6. Thermal oil boiler for heating device (preferably steam) to be big enough to heat water tanks, void spaces, seachests, vent pipes and bilges. If steam, connections to be fitted on deck for deicing with flexible steam hose.

7. Vessel to be ice strengthened with icebreaking capability.

8. Bridge windows to have defrosting capability and the bridge to have two separate heating systems, i.e., steam and electric, with each system with the capacity to provide sufficient heat.

9. If avoidable, vessel should not have lifeboats but instead liferafts, to be installed in a place protected from freezing spray (behind the funnels) or releasing device to be heated. If lifeboats are necessary, the boats and davits should both be heated.

10. One storage winch to be capable of accommodating 1,200 meters of polypropylene rope for iceberg towing.

11. Avoid all unnecessary rails, wire stays, mast and aerials, sounding pipes, vent pipes, etc., on the forecastle and forward structure.

12. Winch room to be heated.

13. Besides air-conditioning, each cabin/messroom should have separate heating systems (steam/electric).

14. Deep-sea mooring to be limited to one winch.

*Mr. **Peters**, vice president corporate planning, and Mr. **Spellacy**, president, Crosbie Offshore Services Limited, presented the paper abstracted here before the recent technical session of the Annual Meeting of the Canadian Shipbuilding and Ship Repairing Association.

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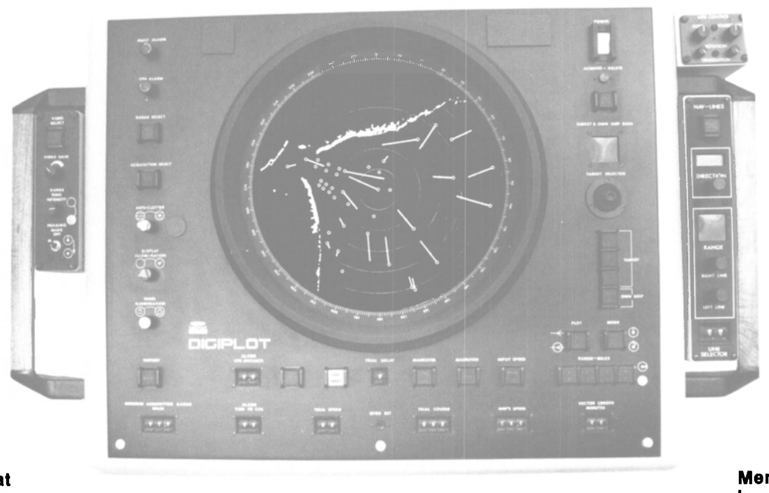

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OFFSHORE CANADA

CANADA'S EAST COAST OFFSHORE OIL POTENTIAL– OPPORTUNITIES FOR SHIPBUILDING

By A.E. Barroll*

Mobil Oil Canada, Ltd., has been active in the eastern Canadian offshore exploration drilling since 1967, principally in the vicinity of Sable Island and on the Eastern Grand Banks.

In the early 1970s, these exploration drilling activities led to involvement with the Canadian shipbuilding industry. We participated in the contractural arrangements for construction of the Sedco J semisubmersible in the Halifax Shipyards and for construction of three workboats in Vancouver. This equipment, and other rigs, were used in a jointly funded exploration program operated by Mobil over a span of 12 years. Now, this long program of exploratory and appraisal effort has come to fruition in both areas. We are currently operating three semisubmersible rigs, one jackup rig, and a fleet of nine workboats on the East Coast.

The objective of this paper is to tell you something of the operating problems caused by the physical environment in each area and to tell you how you may become involved in the solution of these problems.

Our gas discoveries have taken place in relatively shallow water in the vicinity of Sable Island. If this production remains commercial under the onerous vicissitudes imposed by the National Energy Policy, preliminary studies indicate that it can be developed in a conventional manner: by that is meant that conventional steel platforms can be used as a base for drilling development wells, and in the conventional manner, the drilling equipment can be replaced by gas separation and dehydration facilities on completion of the drilling. The gas can be dehydrated on the platforms and the recombined gas and liquids pipelined to a processing plant on the mainland.

The shipbuilding industry will, in all probability, be interested in the construction of the templates, piling and deck sections that would go into the construction of a conventional steel offshore platform. However, this is a very specialized and competitive industry not normally undertaken in conventional shipyards.

The specialized McDermott yard on Bayou Boeuf at Morgan City, La., is a good example of the shipyard required. The templates require the extensive use of large cranes and specialized steel-forming facilities to fabricate tubular members from very heavy plate. The deck sections are built under cover in a very large building. For a platform designed for about 200 feet of water, the piling and templates comprise some 3,000 tons of tubular members and the deck section would comprise approximately 1,000 tons of tubular and structural steel.

Drilling is continuing on the Scotian Shelf, and it is possible that industry might ultimately find reserves of such a configuration and magnitude as to justify the capital investment necessary to produce this specialized equipment in Canada.

Current evaluation of the potential demand for this type of platform does not suggest that a viable long-term industry specifically adapted to build this type of structure in Canada is indicated. Perhaps it would make more sense for Canadian yards to consider construction of the deck section and assemblage of the processing facilities as a more economically rewarding and adaptable endeavor.

The Grand Banks oil field has major significant differences in physical environment from the Sable Island area. There are no bergs or floe ice in the vicinity of Sable Island.

Recently, the iceberg Frances, which floated by the Nain Bank of Labrador, was somewhat over 1,000 feet long, about 200 feet above water, and about 350 feet in draft. This berg had a mass of about five million tons when it passed over the Grand Banks. The periodic occurrence of such bergs on the Grand Banks makes consideration of conventional bottom-supported platforms such as are used in the North Sea dubious, at best. Obviously, a berg of this size has great kinetic energy. We have been studying bottom-supported structures having the design potential of absorbing impact energy of this magnitude and we have not, as yet, been able to find a satisfactory engineering solution within anything approaching economic viability.

We are continuing to study the potential for bottom-supported gravity platforms but as it currently stands, we anticipate difficulty in arriving at a design that is satisfactory in either an engineering or an economic sense.

We have been carrying on simultaneous studies investigating the use of floating production facilities. Our reasoning is that, if we cannot design a structure which can withstand the tremendous destructive forces imposed by a large iceberg, we have no alternative except to consider using facilities which can be removed from the area when threatened by bergs or massive floe ice. We have considered two basic types of floating facilities — shipshape and semisubmersible. We have largely abandoned the shipshape concept because of problems relating to excessive motion in a seaway, high mooring loads, and the internal stresses imposed on a very large moored vessel in the sea-state conditions which can obtain on the Grand Banks. We have, therefore, focused on the semisubmersible system as being the most practical.

We have not as yet selected a hull design. However, we do know that the vessels we will require will be over 400 feet in length and 270 feet in the beam, that they will have a draft of at least 80 feet and an air gap in excess of 50 feet. They will have an estimated weight of structural steel of about 18,000 tons and will have a displacement of about 53,000 tons with a deckload capacity of about 15,000 tons. They will have accommodations for over 100 people. They will be self-propelled and be capable of surviving 115-foot waves and 100-knot winds.

The storage vessel, which has been considered, will be capable of staying on station and functioning in sea-states approaching those for which the semisubmersible production facilities are designed. It also is designed in the semisubmersible mode. It is some 774 feet by 217 feet and has a designed load draft of 164 feet. It has a displacement of about 400,000 tons. The vessel will be capable of disconnect and move out under its own propulsion if threatened by bergs. It will be equipped with thrusters and equipment to moor and load shuttle tankers over the stern.

To meet the transportation requirements, dedicated tankers shuttling between the Grand Banks and East Coast ports would be approximately 80-feet long by 120 feet in the beam and draw about 40 feet loaded. They would have about 18,000 horsepower, single-screw propulsion, with bow and stern thrusters, double-hull construction and segregated ballast and cargo.

The floating production system would require workboats which would be ice-strengthened North Sea type boats: about 240 feet in length, 55 feet in the beam and

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*Mr. Barroll, vice president of Mobil Oil Canada, Ltd., is Exploration and Producing Manager with overall responsibility for Canadian exploration, land, and producing operations. He presented the paper condensed here before the recent technical session of the Annual Meeting of the Canadian Shipbuilding and Ship Repairing Association.

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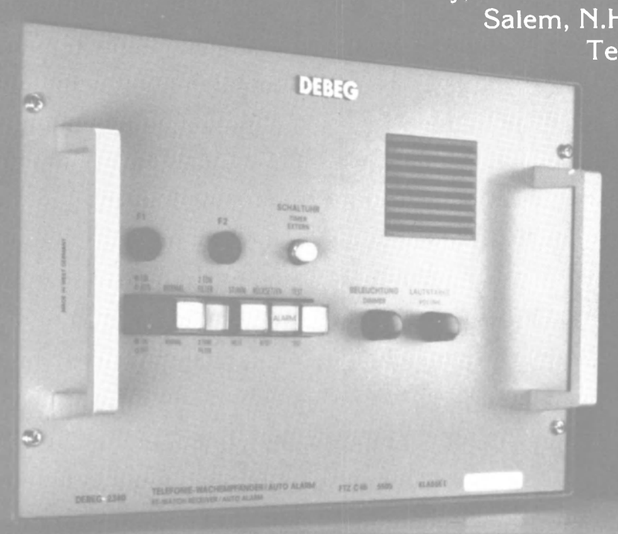

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(continued from page 52)

drawing about 17 feet — deadweight of 1,650 tons, about 11,000 horsepower, twin-screw propulsion with bow and stern thrusters and anchor-handling capacity.

The foregoing summarizes estimated requirements for facilities which you may be called upon to consider — semisubmersible producing vessels, a storage and loading vessel, shuttle tankers and workboats. In addition to this, there will be other related facilities, such as subsea templates, which could be fabricated in shipyards.

We have had preliminary enquiries from several shipyards and some newly formed companies who would like to get into the rig-building business. We have received direction from several provincial government agencies and the federal government concerning the use of goods and services from local sources. We are entirely sympathetic with these objectives—but we also are aware that Canadian shipyards are fairly busy now, and that there are drilling contractors looking for additional yard space to build ships and semisubmersibles. We think that potential requirements may overburden existing capacity. We would anticipate that some measure of cooperation within the industry is indicated, and that some of the new shipyards and smaller shipyards would be able to participate through subcontracting components.

The foregoing, in very broad terms, describes the directly related type of shipyard workload required to develop a Grand Banks oilfield and a Scotian Shelf gas field. There are many related types of fabrication activities in which shipyards can become involved.

The next question is when will the work be available. That is a good question. First of all, we have a jurisdictional problem that we are attempting to have settled — we want to know which government controls the offshore oil industry—to whom are we responsible for all aspects of our operations? Once this jurisdictional problem has been resolved, we can proceed with the appropriate approval process. Regardless of which government is confirmed in authority, the public hearings and extremely detailed analyses and reports to various government departments and commissions are time consuming. Particularly on the Grand Banks, we are extending known technology to accommodate the extremely difficult operating conditions, and this requires much careful and detailed engineering.

In common with the Canadian oil industry at large, we have other problems of a financial nature which also bear consideration and inevitably are part of the timing formula. The eight-billion-dollar Alsands project at Athabasca and the Esso Cold Lake project involving about the same capital investment have been deferred due to the inability to finance projects because of product pricing and fiscal uncertainties; these uncertainties caused in turn by disagreements between federal and provincial governments.

This demand for billions of dollars of investment capital occurs at a time when governments are adopting policies which seriously limit the ability of the industry to generate capital. The federal government continues to price crude oil at less than 50 percent of world price. Under the cloak of the National Energy Policy, the federal government also has imposed the 8 percent Petroleum and Gas Revenue Tax. The tax calculation includes production royalties paid to provincial governments.

Let us hope that we will soon see the development of realistic fiscal and pricing policies which will enable us to proceed expeditiously with our task of developing Canada's offshore resources of oil and gas. Then, we will see an expanding strong Canadian shipbuilding industry.

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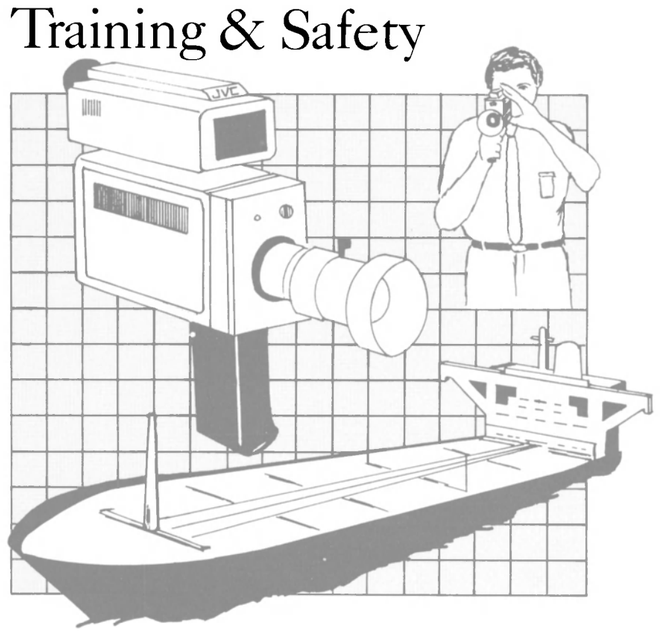
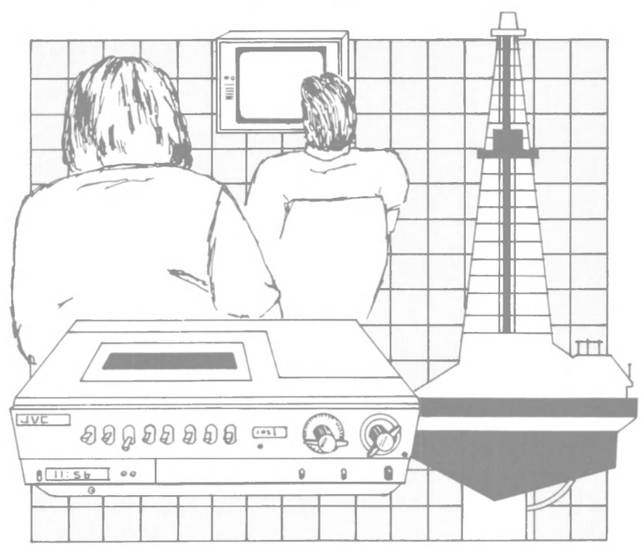


Inherent in the VLS scope of operation is the production of video tapes for safety and training material for industry use, most of which is "shot" on site and edited in the studio laboratory. In addition, VLS provides a Video Production package for industry which permits a company to prepare their own quality, professional tapes internally. VLS provides in this package, total workshop training and consultative services for the company as well as ongoing monitoring of its productions. **IGS** and **COW** training programs will soon be available.

Newsletters/Posters

VLS has developed a customized program of safety newsletters and posters. The package, company individualized, is geared primarily toward safety and health education and, at the same time, functions as a company newsletter. Recent issues have included such topics as CPR, Fire Fighting Systems, Pollution Prevention, and Care of Burns.

Entertainment



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U.S.-FLAG OCEANGOING FLEET

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
AMERICAN ATLANTIC SHIPPING					
One World Trade Center, Suite 1067, New York, N.Y. 10048					
Amazonia	Cargo	990	2,000	D-2,910	80
America	Cargo	990	2,000	D-2,910	79
Antillia	Cargo	990	2,000	D-2,910	80
AMERICAN FOREIGN STEAMSHIP CORPORATION					
80 Broad Street, New York, N.Y. 10004					
American Eagle	Tanker	20,520	34,939	T-15,000	59
American Hawk	Tanker	15,710	26,876	T- 7,240	44/62
AMERICAN PRESIDENT LINES, INC.					
1950 Franklin Street, Oakland, Ca. 94612					
President Adams	Cargo	16,000	22,200	T-24,000	68
President Cleveland	Cargo	16,000	22,200	T-24,000	69
President Wilson	Cargo	16,000	22,200	T-24,000	69
President Jackson	Cargo	16,000	22,200	T-24,000	68
President Truman	Container	16,500	19,000	T-22,000	62/71
President Taylor	Cargo	16,000	22,200	T-24,000	69
President Kennedy	Container	16,500	19,300	T-22,000	64/72
President Eisenhower	Container	16,500	19,600	T-22,000	62/72
President Fillmore	Container	17,800	17,500	T-24,000	68/72
President Harrison	Container	16,800	17,500	T-22,000	66/73
President Jefferson	Container	21,500	18,500	T-28,500	73
President Johnson	Container	21,500	18,500	T-28,500	74
President Madison	Container	21,500	18,500	T-28,500	73
President McKinley	Container	17,800	17,500	T-24,000	68/72
President Pierce	Container	21,500	18,500	T-28,500	73
President Polk	Container	16,800	17,500	T-22,000	65/72
President Taft	Container	17,800	17,500	T-24,000	67/72
President Van Buren	Container	17,800	17,500	T-24,000	67/72
President Roosevelt	Container	16,500	19,600	T-22,000	62/71
President Grant	Container	27,000	39,600	T-32,000	71/78
President Tyler	Container	27,000	39,600	T-32,000	72/78
President Hoover	Container	27,000	39,600	T-32,000	71/78
AMERICAN TRADING TRANSPORTATION COMPANY, INC.					
555 Fifth Avenue, New York, N.Y. 10017					
American Trader	Tanker	15,100	27,600	T- 9,350	43/67
Baltimore Trader	Tanker	31,100	57,900	T-15,000	55/70
Texas Trader	Tanker	15,100	27,500	T- 7,240	44/69
Washington Trader	Tanker	23,612	43,493	T-22,000	59
AMOCO SHIPPING COMPANY, INC.					
P.O. Box 8368, Chicago, Ill. 60680					
Amoco Connecticut	Tanker	12,500	20,900	TE-7,240	43/57
Amoco Delaware	Tanker	15,000	27,800	TE-7,240	44/71
APEX MARINE CORPORATION					
2001 Marais Avenue, Lake Success, N.Y. 11042					
Golden Dolphin	Tanker	44,900	91,849	T-24,500	74
Golden Endeavor	Tanker	44,900	91,849	T-24,500	74
Golden Monarch	Tanker	44,900	91,388	T-24,500	75
Worth	Tanker	44,900	91,849	T-24,500	76
Beaver State	Tanker	44,900	91,849	T-24,500	76
Rose City	Tanker	44,875	91,849	T-24,500	76
American Heritage	Tanker	44,000	91,849	T-24,500	76
Ultramar	OBO	39,800	82,199	T-24,000	73
Ultrasea	OBO	39,800	82,120	T-24,000	74
Pisces	Tanker	14,212	24,438	T- 7,000	45
Virgo	Tanker	13,908	24,483	T- 7,000	43
Scorpio	Tanker	14,156	24,513	T- 7,000	44
Capricorn	Tanker	14,126	24,040	T- 7,000	43
Brooklyn	Tanker	103,907	225,000	T-50,000	73
Charleston	Tanker	21,649	39,366	T-12,000	56
Williamsburgh	Tanker	103,812	225,000	T-50,000	74
ATLANTIC RICHFIELD COMPANY					
515 S. Flower Street, Los Angeles, Ca. 90071					
Arco Prudhoe Bay	Tanker	35,646	69,797	T-20,000	71
Arco Sag River	Tanker	35,646	69,747	T-20,000	72
Arco Endeavor	Tanker	18,347	31,816	T-14,850	58
Arco Heritage	Tanker	28,381	53,288	T-20,680	63
Arco Prestige	Tanker	20,046	34,124	T-13,750	62
Arco Anchorage	Tanker	57,691	120,319	T-26,000	73
Arco Juneau	Tanker	57,691	120,585	T-26,000	74
Arco Fairbanks	Tanker	57,700	120,585	T-26,000	74
Arco Alaska	Tanker	83,675	188,436	T-28,000	79
Arco California	Tanker	83,675	188,436	T-28,000	80
CENTRAL GULF LINES, INC.					
International Trade Mart, 2 Canal Street, New Orleans, La. 70130					
Bay	Cargo/Container	10,659	12,556	T-13,750	61
Builder	Cargo/Container	10,659	12,629	T-13,750	62
Buyer	Cargo/Container	10,659	12,529	T-13,750	62
Dawn	Cargo	11,309	12,939	T-18,150	63
CHEVRON SHIPPING COMPANY					
555 Market Street, San Francisco, Ca. 94105					
Hillyer Brown	Tanker	10,600	17,700	T- 7,700	53
Chevron California	Tanker	35,588	70,213	T-20,000	72
Chevron Mississippi	Tanker	35,588	70,213	T-20,000	72
Chevron Colorado	Tanker	16,941	39,304	GT/E-12,500	76
Chevron Oregon	Tanker	17,091	39,274	GT/E-12,500	75
Chevron Washington	Tanker	16,941	39,304	GT/E-12,500	76
Chevron Arizona	Tanker	16,941	39,298	GT/E-12,500	77
Chevron Louisiana	Tanker	17,076	39,258	GT/E-12,500	77
DELTA STEAMSHIP LINES, INC.					
Trade Mart Building, New Orleans, La. 70130					
Del Oro	Cargo	9,827	13,106	T-11,660	61
Del Rio	Cargo	9,827	13,065	T-11,660	61
Del Sol	Cargo	9,287	13,106	T-11,660	61
Del Mundo	Cargo	10,396	13,039	T-11,660	68
Del Monte	Cargo	10,396	13,039	T-11,660	68
Del Viento	Cargo	10,396	13,039	T-11,660	68
Del Campo	Cargo	10,396	13,039	T-11,660	68
Del Valley	Cargo	10,396	13,039	T-11,660	68
Delta Mar	LASH	32,306	40,400	T-32,000	73
Delta Norte	LASH	32,306	40,572	T-32,000	73
Delta Sud	LASH	32,306	40,400	T-32,000	73
Delta Caribe	LASH	26,406	39,918	T-32,000	71
Santa Barbara	Cargo	9,323	12,699	T-15,500	67
Santa Clara	Cargo	9,323	12,699	T-15,500	66
Santa Cruz	Cargo	9,323	12,699	T-15,500	66
Santa Elena	Cargo	9,323	12,699	T-15,500	67
Santa Isabel	Cargo	9,323	12,699	T-15,500	67
Santa Lucia	Cargo	9,323	12,699	T-15,500	66
Santa Adela	Cargo	11,040	13,695	T-18,750	66
Santa Juana	Cargo	11,040	13,695	T-18,750	66
Santa Magdalena	Cargo/Passenger	11,219	9,376	T-19,800	63
Santa Maria	Cargo/Passenger	11,188	9,376	T-19,800	63
Santa Marianna	Cargo/Passenger	11,188	9,376	T-19,800	63
Santa Mercedes	Cargo/Passenger	11,188	9,376	T-19,800	63

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
ENERGY TRANSPORTATION CORPORATION					
540 Madison Avenue, New York, N.Y. 10022					
LNG Aires	LNG Carrier	83,102	71,475	T-43,000	77
LNG Aquarius	LNG Carrier	83,102	71,475	T-43,000	77
LNG Capricorn	LNG Carrier	83,102	71,475	T-43,000	78
LNG Gemini	LNG Carrier	83,102	71,475	T-43,000	78
LNG Leo	LNG Carrier	83,102	71,475	T-43,000	78
LNG Libra	LNG Carrier	83,729	71,503	T-43,000	79
LNG Taurus	LNG Carrier	83,729	71,495	T-43,000	79
LNG Virgo	LNG Carrier	83,729	71,482	T-43,000	79
EXXON COMPANY, U.S.A.					
P.O. Box 1512, Houston, Texas 77001					
Exxon Baltimore	Tanker	29,068	51,926	T-19,000	60
Exxon Bangor	Tanker	17,330	28,163	T-12,500	53
Exxon Baton Rouge	Tanker	34,266	75,600	T-19,000	70
Exxon Benicia	Tanker	75,272	172,775	T-26,700	79
Exxon Boston	Tanker	30,680	51,966	T-19,000	60
Exxon Chester	Tanker	17,327	28,583	T-13,750	52
Exxon Florence	Tanker	17,378	28,518	T-13,750	54
Exxon Galveston	Tanker	12,769	27,241	T-14,400	78
Exxon Gettysburg	Tanker	23,655	40,873	T-26,500	57
Exxon Houston	Tanker	32,039	71,540	T-19,000	64
Exxon Huntington	Tanker	17,548	28,112	T-13,750	53
Exxon Jamestown	Tanker	23,831	40,872	T-26,500	57
Exxon Lexington	Tanker	25,182	40,910	T-26,500	58
Exxon Newark	Tanker	17,378	28,553	T-13,750	52
Exxon New Orleans	Tanker	32,036	71,508	T-19,000	65
Exxon North Slope	Tanker	75,272	172,537	T-26,700	78
Exxon Philadelphia	Tanker	38,144	76,160	T-19,000	70
Exxon San Francisco	Tanker	34,266	75,649	T-19,000	69
Exxon Washington	Tanker	23,762	40,933	T-26,500	57
FALCON TANKERS, INC.					
277 Park Avenue, New York, N.Y. 10017					
Columbia	Tanker	20,751	37,276	D-15,000	71
Neches	Tanker	20,751	37,276	D-15,000	71
Susquehanna	Tanker	20,751	37,276	D-15,000	72
FARRELL LINES INCORPORATED					
One Whitehall Street, New York, N.Y. 10004					
Argonaut	Container	17,904	16,205	T-17,500	79
Austral Entente	Container	30,990	28,207	T-28,500	73/77
Austral Envoy	Container	30,990	28,207	T-28,500	72/78
Austral Lightning	LASH	26,406	29,820	T-32,000	71
Austral Moon	LASH	26,456	29,749	T-32,000	73
Austral Pioneer	Container	30,685	27,706	T-29,500	79
Austral Puritan	Container	30,685	27,706	T-29,500	80
Austral Rainbow	LASH	26,456	29,749	T-32,000	72
Defiance	Container	11,757	15,649	T-30,000	69
Export Banner	Cargo/Container	10,659	12,629	T-13,750	61
Export Challenger	Cargo/Container	11,000	10,985	T-13,750	63
Export Champion	Cargo/Container	11,000	10,990	T-13,750	63
Export Commerce	Cargo/Container	11,000	10,937	T-13,750	63
Export Freedom	Container	17,904	16,230	T-17,500	72
Export Patriot	Container	17,904	16,345	T-17,500	73
Great Republic	Container	11,757	15,687	T-30,000	69
Red Jacket	Container	11,757	15,697	T-30,000	69
Resolute	Container	17,902	16,205	T-17,500	80
Young America	Container	11,757	15,686	T-30,000	70
GETTY REFINING AND MARKETING COMPANY					
P. O. Box 1650, Tulsa, Okla. 74102					
Delaware Getty	Tanker	17,054	28,808	T-12,500	54
Louisiana Getty	Tanker	13,659	25,088	T- 6,000	44/68
New York Getty	Tanker	17,054	28,808	T-12,500	54
Wilmington Getty	Tanker	13,659	25,184	T- 6,000	44/68
GULF TRADING & TRANSPORTATION COMPANY, MARINE DEPARTMENT					
One Presidential Boulevard, Bala Cynwyd, Pa. 19004					
Gulfcrest	Tanker	18,000	30,800	T-13,600	59
Gulking	Tanker	20,100	34,700	T-13,600	57
Gulfknight	Tanker	20,000	34,700	T-13,600	58
Gulfoil	Tanker	19,000	30,800	T-13,600	60
Gulfpride	Tanker	17,500	30,800	T-13,600	59
Gulfprince	Tanker	20,100	34,700	T-13,600	58
Gulfqueen	Tanker	20,200	34,700	T-13,600	57
Gulfsolar	Tanker	18,100	30,800	T-13,600	59
Gulfspray	Tanker	18,200	30,800	T-13,600	60
Gulfsupreme	Tanker	19,000	30,800	T-13,600	61
American Spirit	Tanker	117,500	262,400	T-35,000	77
American Independence	Tanker	117,500	262,400	T-35,000	77
John Henry	Heavy Lift	3,500	2,950	D- 5,600	78
Paul Bunyan	Heavy Lift	3,500	2,950	D- 5,600	79
HESS SHIPPING CORPORATION					
1 Hess Plaza, Woodbridge, N.J. 07095					
Chesapeake	Tanker	27,000	50,000	T-15,000	64

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
HUDSON WATERWAYS CORPORATION					
1 Chase Manhattan Plaza, New York, N.Y. 10005					
Manhattan	Tanker	62,400	114,700	T-43,000	62
Transcolorado	Heavy Lift	10,000	11,500	T- 9,900	45
Transcolumbia	Heavy Lift	10,000	11,200	T- 9,900	45
Transindiana	Container	13,500	14,500	T- 9,900	44
INTEROCEAN MANAGEMENT CORPORATION					
Three Parkway, Philadelphia, Pa. 19102					
Great Land	RO/RO	17,527	18,115	T-30,000	75
Westward Venture	RO/RO	17,527	18,411	T-30,000	77
Brooks Range	Tanker	74,250	165,037	T-26,700	78
Thompson Pass	Tanker	74,250	165,037	T-26,700	78
U.S.T. Atlantic	Tanker	189,416	398,143	T-45,000	79
U.S.T. Pacific	Tanker	189,416	398,143	T-45,000	79
Solveig	Tanker	31,292	60,861	T-20,000	65
KEYSTONE SHIPPING COMPANY					
313 Chestnut Street, Philadelphia, Pa. 19106					
Baldbutte	Tanker	19,386	33,477	T-20,460	59
Chancellorsville	Tanker	14,445	25,194	TE-7,240	43
Chelsea	Tanker	22,357	39,340	T-15,000	75
Cherry Valley	Tanker	22,357	39,335	T-15,000	74
Cornucopia	Tanker	21,668	34,249	T-15,000	58
Coronado	Tanker	22,357	39,342	T-15,000	73
Edgar M. Queeny	Tanker	19,046	37,116	T-15,000	70
Golden Gate	Tanker	34,088	62,144	T-20,000	70
Keystoner	Tanker	11,368	18,424	T- 7,700	53
Meadowbrook	Tanker	15,671	27,186	TE-7,240	43
Monmouth	Tanker	16,376	29,780	TE-7,240	42
Perryville	Tanker	14,445	25,083	TE-7,240	43
Spirit of Liberty	Tanker	20,948	38,238	T-15,000	68
Valley Forge	Tanker	20,572	37,753	T-15,000	66
Meton	Tanker	18,272	33,881	T-20,460	59
Fredericksburg	Tanker	21,557	39,374	T-20,460	58
Atiqun Pass	Tanker	74,250	173,380	T-26,700	77
Keystone Canyon	Tanker	74,250	173,380	T-26,700	78
Chestnut Hill	Tanker	44,875	91,295	T-24,500	76
Kittanning	Tanker	44,875	91,344	T-24,500	77
Kenai	Tanker	60,384	122,805	T-30,000	78
Tonsina	Tanker	60,384	122,805	T-30,000	78
Sinclair Texas	Tanker	27,470	50,063	T-15,000	63
LYKES BROS. STEAMSHIP COMPANY					
300 Poydras Street, New Orleans, La. 70130					
Adabelle Lykes	Cargo	9,300	11,300	T-11,000	63
Aimee Lykes	Cargo	9,400	12,700	T-11,000	63
Allison Lykes	Cargo	9,400	12,700	T-11,000	64
Almeria Lykes	Seabee/Container	21,700	38,400	T-36,000	72
Ashley Lykes	Cargo/Container	11,900	14,300	T-11,000	63/73
Brinton Lykes	Cargo	11,900	14,300	T-11,000	62
Charlotte Lykes	Cargo	9,300	12,700	T-11,000	63
Christopher Lykes	Cargo	9,400	12,700	T-11,000	63
Doctor Lykes	Seabee/Container	21,700	38,400	T-36,000	72
Dolly Turman	Cargo	10,700	14,700	T-15,500	67
Elizabeth Lykes	Cargo	11,000	14,700	T-15,500	66
Genevive Lykes	Cargo	10,700	14,700	T-15,500	68
Howell Lykes	Cargo	10,700	14,700	T-15,500	67
James Lykes	Cargo/Container	11,900	14,300	T- 9,900	60/72
Jean Lykes	Cargo/Container	11,900	14,300	T- 9,900	61/72
John Lykes	Cargo/Container	11,900	14,300	T- 9,900	60/72
Joseph Lykes	Cargo/Container	11,900	14,300	T- 9,900	60/71
Leslie Lykes	Cargo/Container	11,900	14,300	T- 9,900	62
Letitia Lykes	Cargo	10,700	14,700	T-15,500	68
Louise Lykes	Cargo	11,000	14,700	T-15,500	65
Mallory Lykes	Cargo	10,700	14,700	T-15,500	66
Margaret Lykes	Cargo	9,400	12,700	T-11,000	63
Marjorie Lykes	Cargo/Container	11,900	14,300	T-11,000	62/72
Mason Lykes	Cargo	10,700	14,700	T-15,500	66
Mayo Lykes	Cargo	9,300	12,700	T-11,000	63
Nancy Lykes	Cargo/Container	11,900	14,300	T- 9,900	61/71
Ruth Lykes	Cargo	11,000	14,700	T-15,500	66
Sheldon Lykes	Cargo	9,300	12,700	T-11,000	63
Shirley Lykes	Cargo/Container	11,900	14,300	T-11,000	62/72
Stella Lykes	Cargo	11,900	14,300	T-15,500	66
Solon Turman	Cargo/Container	11,900	14,300	T- 9,900	61/71
Thompson Lykes	Cargo/Container	11,900	14,300	T- 9,900	61/71
Tillie Lykes	Seabee/Container	21,700	38,400	T-36,000	73
Velma Lykes	Cargo	10,700	14,700	T-15,500	67
Zoella Lykes	Cargo/Container	11,900	14,300	T- 9,900	60/71
Gulf Banker	Cargo	9,500	11,400	T-11,000	64
Gulf Farmer	Cargo	9,500	11,400	T-11,000	64
Gulf Merchant	Cargo	9,500	11,400	T-11,000	65
Gulf Shipper	Cargo	9,500	11,400	T-11,000	64
Gulf Trader	Cargo	9,500	11,400	T-11,000	64
Charles Lykes	RO/RO	13,155	19,543	T-37,000	76
Lipscomb Lykes	RO/RO	13,155	19,543	T-37,000	76
Tyson Lykes	RO/RO	13,155	19,543	T-37,000	76
Cygnus	RO/RO	13,098	15,195	D-18,990	77
Lyra	RO/RO	13,098	15,195	D-18,990	77

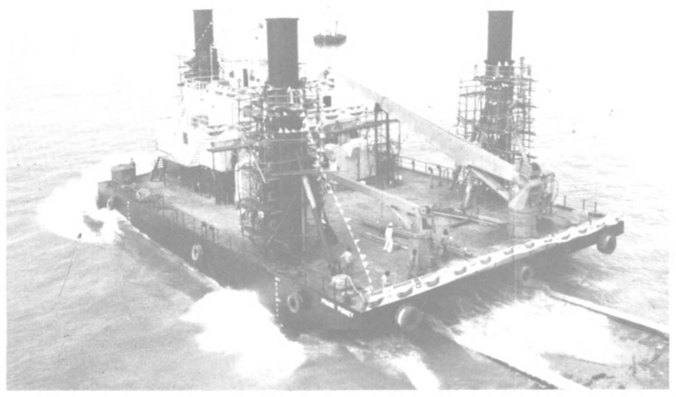
U.S.-FLAG OCEANGOING FLEET

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
MARINE TRANSPORT LINES, INC.					
5 Hanover Square, New York, N.Y. 10004					
Leland I. Doan	Chemical tanker	9,558	17,272	T- 7,700	61
Marine Chemist	Chemical tanker	20,237	35,949	T-15,000	70
Marine Duval	Sulfur tanker	11,080	24,693	TE-7,000	44/70
Marine Eagle	LPG tanker	15,883	26,021	TE-7,000	44/69
Marine Electric	Bulk carrier	13,758	25,575	TE-7,000	44/62
Marine Floridian	Sulfur tanker	11,150	24,838	TE-7,000	44/67
Marine Texan	Sulfur tanker	10,066	24,252	TE-7,000	45/64
Sealift Antarctic	Tanker	17,158	27,221	D-14,000	75
Sealift Arabian Sea	Tanker	17,134	27,202	D-14,000	75
Sealift Arctic	Tanker	17,158	27,222	D-14,000	75
Sealift Atlantic	Tanker	17,158	27,214	D-14,000	74
Sealift Caribbean	Tanker	17,158	27,223	D-14,000	75
Sealift China Sea	Tanker	17,134	25,200	D-14,000	75
Sealift Indian Ocean	Tanker	17,134	27,500	D-14,000	75
Sealift Mediterranean	Tanker	17,158	27,717	D-14,000	74
Sealift Pacific	Tanker	17,134	25,200	D-14,000	74
Marine Chemical Transporter	Chemical tanker	10,730	16,361	TE-7,000	43/55
Alaskan	Chemical tanker	15,288	24,437	T- 9,900	44/66
B.T. Alaska	Tanker	83,650	188,099	T-28,000	78
B.T. San Diego	Tanker	83,650	188,099	T-28,000	78
MATSON NAVIGATION COMPANY					
333 Market Street, San Francisco, Ca. 94105					
Hawaiian Citizen	Container	12,600	10,000	T- 9,350	44
Manukai	Container	23,800	27,100	T-32,000	70
Maunawili	Container	17,800	17,900	T- 9,900	45
Maunalei	Container	17,500	17,900	T- 9,900	44
Manulani	Container	23,800	27,100	T-32,000	70
Mauna Kea	Cargo	3,900	4,400	D- 1,530	67
Lurline	RO/RO	15,300	13,900	T-30,000	73
Matsonia	RO/RO	15,300	13,900	T-30,000	73
Maui	Container	23,800	27,100	T-32,000	78
Kauai	Container	23,800	22,539	T-32,000	80
MOBIL OIL CORPORATION					
150 East 42nd Street, New York, N.Y. 10017					
Mobil Aero	Tanker	18,600	31,900	T-17,600	59
Mobil Fuel	Tanker	18,700	31,100	T-15,000	57
Mobil Lube	Tanker	18,700	31,100	T-15,000	58
Mobil Meridan	Tanker	28,200	49,200	T-15,000	61
Mobil Power	Tanker	18,700	31,100	T-15,000	57
Mobilgas	Tanker	17,500	28,600	T-13,750	56
Socony Vacuum	Tanker	17,400	28,600	T-13,750	54
Mobiloil	Tanker	18,600	31,700	T-17,600	59
Mobil Arctic	Tanker	57,800	124,468	T-30,000	72
MOORE McCORMACK BULK TRANSPORT, INC.					
2 Broadway, New York, N.Y. 10004					
Mormacstar	Tanker	22,354	39,232	T-15,000	75
Mormacsun	Tanker	22,354	39,232	T-15,000	76
Mormacsky	Tanker	22,354	39,232	T-15,000	77
MOORE McCORMACK LINES, INC.					
2 Broadway, New York, N.Y. 10004					
Mormacaltair	Cargo	14,001	16,183	T-19,000	65/76
Mormacargo	Cargo	10,500	12,800	T-19,000	64
Mormacdraco	Cargo	14,001	16,183	T-19,000	65/76
Mormaclynx	Cargo	10,500	12,800	T-19,000	64
Mormacrigel	Cargo	10,500	12,800	T-19,000	65
Mormacvega	Cargo	10,500	12,800	T-19,000	64
Mormacglen	Cargo	9,300	12,400	T-12,100	61
Mormacsaga	Cargo	12,724	14,467	T-19,250	62
Mormacsea	Cargo	12,691	14,389	T-19,250	62
Mormactide	Cargo	12,691	14,389	T-19,250	62
Mormacwave	Cargo	12,691	14,361	T-19,250	62

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
OCEAN CARRIERS, INC.					
Zapata Tower Building, Houston, Texas 77001					
Courier	Tanker	21,572	35,100	D-14,000	77
Patriot	Tanker	21,572	35,100	D-14,000	76
Ranger	Tanker	21,572	35,100	D-14,000	76
Rover	Tanker	21,572	35,100	D-14,000	77
OGDEN MARINE, INC.					
280 Park Avenue, New York, N.Y. 10017					
Columbia	Bulk	14,462	24,319	T- 7,240	45/62
Potomac	Bulk	13,858	23,846	T- 7,240	45/62
Connecticut	Tanker	22,600	38,200	T-18,750	58
Merrimac	Bulk	15,995	26,216	T- 7,240	44/62
Traveler	Bulk	15,147	25,977	T- 7,240	45/62
Ogden Wabash	Tanker	20,884	37,853	T-15,000	69
Ogden Willamette	Tanker	20,884	37,853	T-15,000	69
Ogden Champion	Tanker	20,858	37,874	T-15,000	69
Ogden Challenger	Tanker	20,549	35,111	T-15,000	59
Ogden Charger	Tanker	20,877	37,807	T-15,000	69
Ogden Leader	Tanker	20,877	37,807	T-15,000	69
Ogden Yukon	Tanker	37,384	85,739	T-24,000	73
OSG BULK SHIPS					
511 Fifth Avenue, New York, N.Y. 10017					
Overseas Alaska	Tanker	34,400	62,000	T-20,000	70
Overseas Aleutian	Tanker	21,500	39,800	T-15,000	53/71
Overseas Alice	Tanker	20,900	37,800	T-15,000	68
Overseas Anchorage	Tanker	29,300	51,300	T-20,625	60
Overseas Valdez	Tanker	22,600	38,200	T-20,625	60
Overseas Vivian	Tanker	20,900	37,800	T-15,000	68
Overseas Arctic	Tanker	20,900	37,800	T-15,000	69
Overseas Joyce	Tanker	34,400	62,000	T-20,000	71
Overseas Juneau	Tanker	28,300	49,850	T-15,000	61
Overseas Natalie	Tanker	57,700	120,500	T-26,000	73
Overseas Chicago	Tanker	41,000	72,650	T-23,000	61
Overseas Ohio	Tanker	44,850	90,600	T-24,500	77
Overseas New York	Tanker	44,850	90,550	T-24,500	77
Overseas Washington	Tanker	44,850	90,400	T-24,500	77
Overseas Marilyn	Bulker	44,900	90,500	T-24,500	78
Overseas Harriette	Bulker	14,310	25,500	D-10,700	78
		14,310	25,500	D-10,700	78
PRUDENTIAL LINES, INC.					
One World Trade Center, New York, N.Y. 10048					
Lash Atlantico	LASH	26,406	29,820	T-32,000	74
Lash Pacifico	LASH	26,406	29,820	T-32,000	74
Lash Italia	LASH	26,406	29,820	T-32,000	70
Saroula	Tanker	19,291	33,521	T-18,600	58
PUERTO RICO MARINE MANAGEMENT, INC.					
P.O. Box 1910, Elizabeth, N.J. 07207					
Aquadilla	Container	13,487	15,231	T- 9,900	44/70
Arecibo	Container	17,977	18,172	T- 9,000	44/69
Borinquen	Container	17,189	17,032	T- 9,000	45/66
Carolina	Container	13,487	15,316	T- 9,900	44/70
Bayamon	RO/RO	15,131	14,180	T-32,000	70
Fortaleza	RO/RO	15,135	13,969	T-30,000	72
Mayaquez	Container	13,489	15,250	T- 9,900	45/69
Ponce	RO/RO	17,513	16,943	T-32,000	68/81
Puerto Rico	RO/RO	14,770	14,090	T-30,000	75
San Juan	Container	18,455	17,897	T- 9,000	45/69
Caguas	RO/RO	17,513	16,943	T-30,000	74
REYNOLDS METALS COMPANY, MARINE DIVISION					
P.O. Box 2311, Corpus Christi, Texas 78403					
Inger	Bulk	14,192	23,977	T- 7,240	45/62
Walter Rice	Bulk	14,192	23,996	T- 7,240	45/63

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
SABINE TOWING & TRANSPORTATION COMPANY					
P.O. Box 1528, Groves, Texas 77619					
Brazos	Tanker	13,900	25,000	T- 7,240	45/67
Colorado	Tanker	16,900	30,600	T- 7,240	44/72
Guadalupe	Tanker	16,900	30,600	T- 7,240	45/78
Llano	Tanker	13,800	25,200	T- 7,240	44/61
Neches	Tanker	10,600	17,000	T- 7,240	43
Pecos	Tanker	17,300	28,900	T-13,750	50
Sabine	Tanker	17,800	28,800	T-13,750	49
Trinity	Tanker	13,800	25,200	T- 9,350	44/67
Red River	Tanker	15,500	27,000	T- 7,240	45/61
San Jacinto	Tanker	15,500	27,000	T- 7,000	44
San Marcos	Tanker	17,300	27,400	T-13,750	49
Concho	Tanker	18,681	32,741	T- 7,000	45
Frio	Tanker	15,344	26,901	T- 7,500	45
SEA-LAND SERVICE, INC.					
P.O. Box 900, Edison, N.J. 08817					
Aleutian Developer	Container	4,631	4,200	D- 4,200	60/75
Baltimore	Container	10,948	9,016	T- 7,240	44/70
Boston	Container	11,522	9,317	T- 9,900	44/68
Charleston	Container	11,389	10,002	T- 9,900	45/68
Consumer	Container	23,764	26,600	T-32,000	73
Economy	Container	24,774	25,513	T-32,000	71
Galveston	Container	11,558	9,401	T- 9,900	45/68
Houston	Container	11,601	13,503	T-10,000	44/67
Jacksonville	Container	11,601	13,586	T-10,000	44/68
Long Beach	Container	17,184	16,977	T- 9,900	45/66
Mobile	Container	11,302	9,451	T- 9,900	45/68
Newark	Container	11,384	9,344	T- 9,900	45/68
Oakland	Container	17,184	17,091	T- 9,900	45/66
Panama	Container	17,184	17,014	T- 9,900	45/66
Philadelphia	Container	11,389	9,357	T- 9,900	45/69
Pittsburgh	Container	18,024	17,568	T- 9,900	45/69
Portland	Container	11,389	9,708	T- 9,900	45/68
Producer	Container	23,764	26,600	T-32,000	74
St. Louis	Container	18,362	17,566	T- 9,900	44/69
San Pedro	Container	18,420	17,033	T- 9,900	45/70
Sea-Land Adventurer	Container	17,376	15,270	D-17,400	78
Sea-Land Commerce	Container	41,127	27,141	T-120,000	73
Sea-Land Defender	Container	25,255	23,308	D-30,150	80
Sea-Land Developer	Container	25,255	23,308	D-30,150	80
Sea-Land Endurance	Container	25,255	23,308	D-30,150	80
Sea-Land Exchange	Container	41,127	27,141	T-120,000	73
Sea-Land Explorer	Container	25,255	23,308	D-30,150	80
Sea-Land Express	Container	25,255	23,308	D-30,150	80
Sea-Land Finance	Container	41,127	27,141	T-120,000	73
Sea-Land Galloway	Container	41,127	27,141	T-120,000	72
Sea-Land Independence	Container	25,255	23,308	D-30,150	80
Sea-Land Leader	Container	17,376	15,174	D-17,400	78
Sea-Land Liberator	Container	25,255	23,308	D-30,150	80
Sea-Land Mariner	Container	25,255	23,308	D-30,150	80
Sea-Land Market	Container	41,127	27,141	T-120,000	73
Sea-Land McLean	Container	41,127	27,141	T-120,000	72
Sea-Land Pacer	Container	17,376	15,212	D-17,400	78
Sea-Land Patriot	Container	25,255	23,308	D-30,150	80
Sea-Land Pioneer	Container	17,376	15,289	D-17,400	78
Sea-Land Resource	Container	41,127	27,141	T-120,000	73
Sea-Land Trade	Container	41,127	27,141	T-120,000	73
Sea-Land Voyager	Container	25,255	23,308	D-30,150	80
Seattle	Container	11,499	8,740	T- 7,200	44/70
Tampa	Container	11,601	13,371	T-10,000	44/69
Venture	Container	24,774	25,513	T-32,000	71
SUN TRANSPORT, INC.					
P.O. Box 2224, Aston, Pa. 19014					
America Sun	Tanker	37,300	80,700	T-24,000	69
Delaware Sun	Tanker	18,800	31,884	T-13,500	53
New Jersey Sun	Tanker	18,800	31,891	T-13,500	53
Pennsylvania Sun	Tanker	26,300	53,463	T-18,500	59
Texas Sun	Tanker	26,300	53,453	T-18,500	60
Western Sun	Tanker	18,800	31,828	T-13,500	54
Eastern Sun	Tanker	18,800	31,878	T-13,500	55
New York Sun	Products	19,500	34,400	D-14,200	80
TEXACO, INC.					
Port Arthur, Texas 77640					
Texaco California	Tanker	23,460	42,067	T-15,000	54/73
Texaco Connecticut	Tanker	23,459	41,949	T-15,000	53/71
Texaco Florida	Tanker	23,459	41,956	T-15,000	56/71
Texaco Georgia	Tanker	16,514	26,333	T-15,000	64
Texaco Kansas	Tanker	14,153	24,480	TE-7,000	43/60
Texaco Maryland	Tanker	16,514	26,550	T-15,000	63
Texaco Massachusetts	Tanker	16,515	26,547	T-15,000	63
Texaco Minnesota	Tanker	15,622	26,724	TE-7,000	43/64
Texaco Mississippi	Tanker	15,688	26,588	TE-7,000	43/64
Texaco Montana	Tanker	16,584	26,547	T-15,000	65
Texaco New Jersey	Tanker	12,621	20,806	TE-6,600	44/59
Texaco New York	Tanker	23,461	41,993	T-15,000	53/72
Texaco Rhode Island	Tanker	16,584	26,547	T-15,000	64
Texaco Wisconsin	Tanker	20,583	34,770	T-15,000	58
TRINIDAD CORPORATION					
Public Ledger Building, Philadelphia, Pa. 19106					
Austin	Tanker	15,400	26,900	T- 7,000	45
Fort Worth	Tanker	14,700	27,600	T- 7,000	45
Houston	Tanker	14,700	27,000	T- 7,000	42
Pasadena	Tanker	14,800	27,000	T- 7,000	45
San Antonio	Tanker	14,800	27,100	T- 7,000	45
Prince William Sound	Tanker	60,084	121,000	T-30,000	75
Glacier Bay	Tanker	38,400	81,000	T-24,000	70
Sohio Intrepid	Tanker	37,800	80,800	T-24,000	71
Sohio Resolute	Tanker	37,800	80,600	T-24,000	71
UNION OIL COMPANY OF CALIFORNIA					
1650 East Golf Road, Schaumburg, Ill. 60196					
Avila	Tanker	11,486	17,599	T- 7,700	54
David D. Irwin	Tanker	15,400	25,700	T-12,800	42
Lompoc	Tanker	10,488	16,690	TE-7,240	45
Pure Oil	Tanker	9,900	16,500	T- 7,700	45
UNITED STATES LINES, INC.					
27 Commerce Drive, Cranford, N.J. 07016					
American Accord	Container	15,827	15,200	T-19,250	54/71
American Ace	Container	15,827	15,200	T-19,250	53/70
American Alliance	Container	15,864	15,500	T-19,250	54/70
American Archer	Container	15,864	15,400	T-19,250	54/70
American Argosy	Container	15,827	14,800	T-19,250	53/70
American Apollo	Container	19,127	20,000	T-26,000	70
American Astronaut	Container	18,877	20,600	T-26,000	69
American Aquarius	Container	19,127	20,100	T-26,000	71
American Challenger	Cargo	11,105	13,600	T-21,600	62
American Champion	Cargo	11,105	13,600	T-21,600	63
American Charger	Cargo	11,105	13,600	T-21,600	62
American Chieftain	Cargo	11,105	13,600	T-21,600	63
American Corsair	Cargo	11,105	13,500	T-22,500	63
American Courier	Cargo	11,105	13,500	T-21,600	63
American Lancer	Container	18,765	22,200	T-26,000	68
American Lark	Container	18,887	20,600	T-26,000	69
American Leader	Container	15,864	15,500	T-19,250	53/71
American Legacy	Container	15,864	15,500	T-19,250	54/71
American Legend	Container	15,864	15,400	T-19,250	54/70
American Legion	Container	18,165	22,200	T-26,000	68
American Liberty	Container	18,877	21,700	T-26,000	68
American Lynx	Container	18,878	20,600	T-26,000	68
American Racer	Cargo	11,202	13,300	T-18,750	64
American Ranger	Cargo	11,202	13,300	T-18,750	64
American Reliance	Cargo	11,202	13,300	T-18,750	65
Pioneer Commander	Cargo	11,164	13,500	T-22,500	63
Pioneer Contender	Cargo	11,164	13,500	T-22,500	63
Pioneer Contractor	Cargo	11,164	13,500	T-22,500	63
Pioneer Crusader	Cargo	11,164	13,500	T-22,500	63
Pioneer Moon	Cargo	11,164	13,600	T-21,600	62
VICTORY CARRIERS					
645 Fifth Avenue, New York, N.Y. 10022					
Monticello Victory	Tanker	28,500	49,300	T-15,000	61
Montpelier Victory	Tanker	29,300	49,500	T-21,500	62
Mount Vernon Victory	Tanker	27,400	49,200	T-15,000	61
Mount Washington	Tanker	28,840	49,500	T-21,500	63
WATERMAN STEAMSHIP CORPORATION					
120 Wall Street, New York, N.Y. 10005					
Benjamin Harrison	LASH	32,269	40,921	T-32,000	80
Button Gwinnett	LASH	32,279	46,890	T-32,000	74
Edward Rutledge	LASH	32,269	40,921	T-32,000	81
George Wythe	LASH	32,278	46,890	T-32,000	74
Jeff Davis	Cargo	12,779	13,735	T-19,250	62
Robert E. Lee	LASH	32,269	40,921	T-32,000	74
Sam Houston	LASH	32,269	40,921	T-32,000	74
Stonewall Jackson	LASH	32,269	40,921	T-32,000	74
Thomas Nelson	Cargo	12,779	13,735	T-19,250	62
William Hooper	LASH	32,279	46,890	T-32,000	74

Promet Private Limited Completes Jackup Service Barge For Sun Contractors



Promet Private Limited, Singapore, recently launched its second self-propelled jackup well-service barge, named Frank Purkey (shown above).

Built for Sun Contractors, this barge was delivered at the end of May 1981.

The Frank Purkey measures 110 feet by 50 feet by 10 feet. It is equipped with a sophisticated floating elevating mechanism and other facilities needed to service oil wells. It has three tubular legs, each 205 feet, which support the barge while in a jacked-up position.

The well-service barge is designed to undertake a variety of work: testing and maintenance of wells; repairing and maintenance of offshore drilling platforms and pipelines; drilling-production testing; firefighting; and even cargo-handling. In addition, there are two cranes mounted on the barge that enable it to perform heavy lifts. This barge is classed under the American Bureau of Shipping as A-1.

Other orders from Sun Contractors include one more three-legged jackup barge and two four-legged jackup barges.

Cornelsen Named Manager-Technical Operations For Well Control Systems

David J. Cornelsen has been promoted to manager, technical operations, for the Well Control Systems organization of National Supply Company, announced **George E. Gray**, general manager. Mr. **Cornelsen** will be responsible for all quality assurance, produce design, and development of new products.

Mr. **Gray**, commenting on the creation of this new position, stated that "this move was necessary to maintain a strong emphasis on quality while the company continues to develop and expand its product line." He said that "current plans call for the company to continue increasing its manufacturing capacity as rapidly as possible in an effort to meet increasing demand."

Mr. **Cornelsen** was first employed by National Supply Company in 1955 as design engineer. He advanced through several supervisory engineering positions before becoming chief product engineer for Well Control Systems in 1973.

FORGED STEE

"HIGH LOAD" SHACKLES

SCREW PIN ANCHOR

Safe Working Load U.S tons	Body Dia d	Pin Dia D	Inside Length L (Min.)	Inside Width at Pin W	Inside Width at Bow B	Outside of eye Dia (Max.)	Approx Wt. per 100 in lbs	Ordering Code Galvanised
½	5/16	¼	⅜	⅝	19/32	9/16	5	UBG 1½
½	¼	5/16	1½	19/32	23/32	11/16	12	UBG 2
¾	5/16	⅜	1 7/32	17/32	27/32	13/16	18	UBG 2½
1	⅜	7/16	1 7/16	21/32	1 1/32	21/32	30	UBG 3
1½	7/16	½	1 11/16	21/32	1 5/32	1 1/16	49	UBG 3½
2	½	⅝	1⅞	13/16	1 5/16	1 3/16	76	UBG 4
3¼	⅝	¾	2 13/32	1 1/16	1 11/16	1 5/16	149	UBG 5
4¾	¾	⅞	2 27/32	1¼	2	1⅝	222	UBG 6
6½	⅞	1	3 5/16	1 7/16	2 5/32	2½	343	UBG 7
8½	1	1⅛	3⅝	1 11/16	2 11/16	2⅝	534	UBG 8
9½	1⅛	1¼	4¼	1 13/16	2 29/32	2⅝	746	UBG 9
12	1¼	1⅜	4 11/16	2 1/32	3¼	3	968	UBG10
13½	1⅜	1½	5¼	2¼	3⅝	3 7/16	1,287	UBG11
17	1½	1⅝	5¾	2⅝	3¾	3⅝	1,749	UBG12
25	1⅝	2	7	2⅝	5	4 7/16	2,802	UBG14
35	2	2¼	7¾	3¼	5¾	5	4,134	UBG16
45	2¼	2½	8¾	3⅝	5½	5⅝	5,940	UBG18
55	2½	2¾	10½	4⅜	7¼	6	8,412	UBG20
70	2¾	3	12	4½	7⅝	6 5/16	10,850	UBG22
85	3	3¼	13	5	7⅞	7	11,948	UBG24
120	3½	3⅝	15	5¾	9½	8	21,000	UBG28

DIMENSIONS SHOWN ARE NOMINAL

SCREW PIN CHAIN

Safe Working Load U.S tons	Body Dia d	Pin Dia D	Inside Length L (Min.)	Inside Width at Pin W	Outside of eye Dia (Max.)	Approx Wt. per 100 in lbs	Ordering Code Galvanised
½	¼	5/16	⅜	19/32	11/16	11	UDG 2
¾	5/16	⅜	1 7/32	17/32	13/16	17	UDG 2½
1	⅜	7/16	1¼	21/32	31/32	29	UDG 3
1½	7/16	½	1 7/16	5/8	1 1/16	42	UDG 3½
2	½	⅝	1⅝	15/16	1 5/16	71	UDG 4
3¼	⅝	¾	2	1 1/16	1 5/16	127	UDG 5
4¾	¾	⅞	2⅝	1¼	1⅞	221	UDG 6
6½	⅞	1	2 13/16	1 7/16	2⅛	315	UDG 7
8½	1	1⅛	3 1/16	1 11/16	2⅝	460	UDG 8
9½	1⅛	1¼	3 5/16	1 13/16	2⅝	668	UDG 9
12	1¼	1⅜	3 13/16	2 1/32	3	896	UDG10
13½	1⅜	1½	4 7/16	2¼	3 5/16	1,220	UDG11
17	1½	1⅝	4⅞	2⅝	3⅜	1,635	UDG12
25	1⅜	2	5⅝	2⅞	4 7/16	2,550	UDG14
35	2	2¼	6⅝	3¼	5	3,630	UDG16
45	2¼	2½	7⅛	3⅝	5⅝	5,500	UDG18
55	2½	2¾	8	4⅛	6	7,420	UDG20
70	2¾	3	8½	4½	6 5/16	9,650	UDG22
85	3	3¼	8½	5	7	10,840	UDG24
120	3½	3¾	10½	5¾	8	19,250	UDG28

DIMENSIONS SHOWN ARE NOMINAL

SAFETY ANCHOR

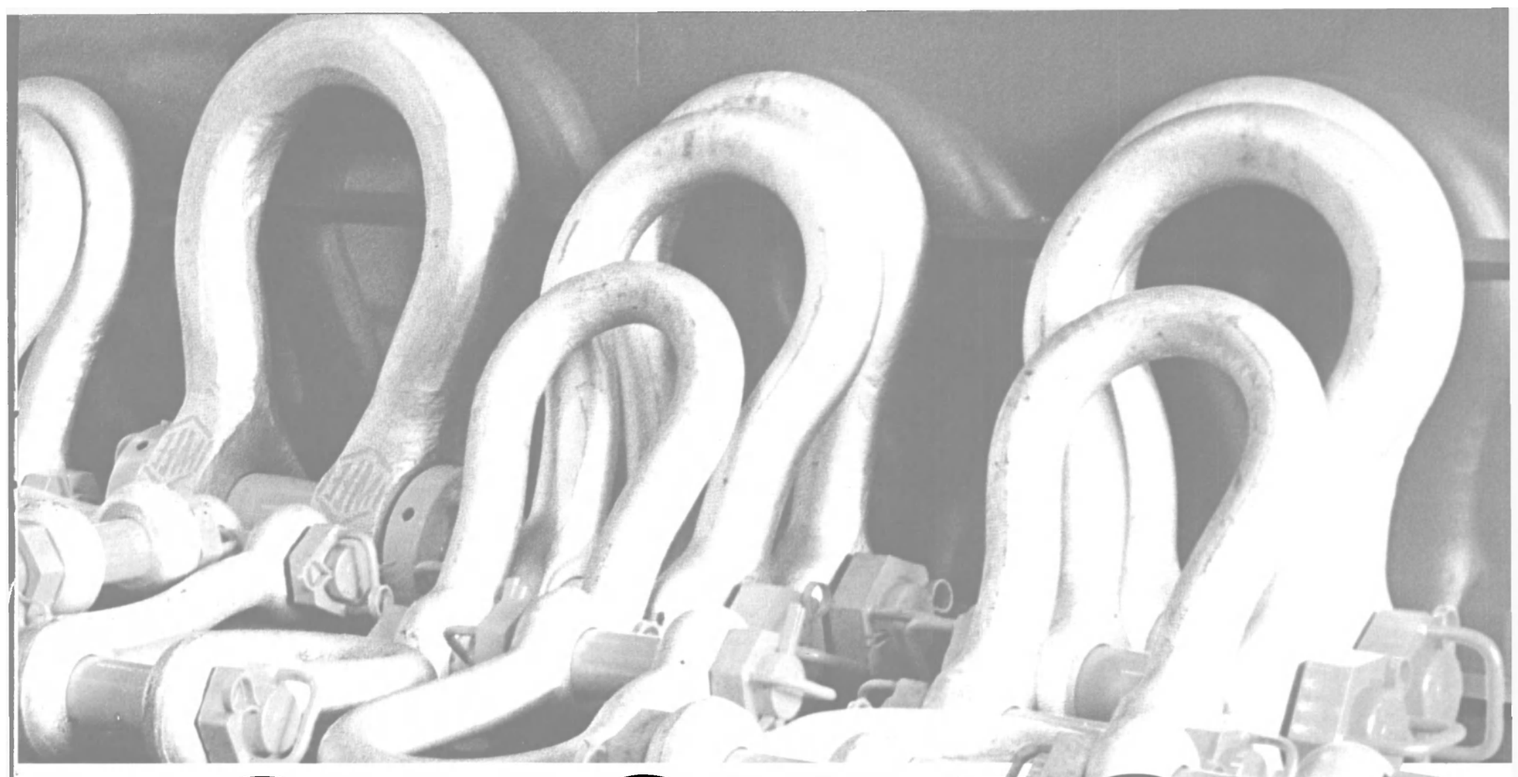
Safe Working Load U.S tons	Body Dia d	Pin Dia D	Inside Length L (Min.)	Inside Width at Pin W	Approx Wt. per 100 in lbs	Ordering Code Galvanised
2	½	⅝	1⅞	13/16	85	USBG 4
3¼	⅝	¾	2 13/32	1 1/16	162	USBG 5
4¾	¾	⅞	2 27/32	1¼	287	USBG 6
6½	⅞	1	3 5/16	1 7/16	402	USBG 7
8½	1	1⅛	3⅝	1 11/16	571	USBG 8
9½	1⅛	1¼	4¼	1 13/16	795	USBG 9
12	1¼	1⅜	4 11/16	2 1/32	1,129	USBG10
13½	1⅜	1½	5¼	2¼	1,536	USBG11
17	1½	1⅝	5¾	2⅝	1,968	USBG12
25	1⅜	2	7	2⅞	3,140	USBG14
35	2	2¼	7¾	3¼	4,645	USBG16
45	2¼	2½	8¾	3⅝	6,750	USBG18
55	2½	2¾	10½	4⅜	9,420	USBG20
70	2¾	3	12	4½	12,000	USBG22
85	3	3¼	13	5	14,530	USBG24
120	3½	3¾	15	5¾	25,080	USBG28
150	4	4¼	17	6½	35,900	USBG32

DIMENSIONS SHOWN ARE NOMINAL

SAFETY CHAIN

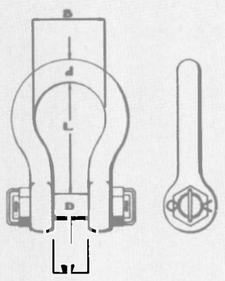
Safe Working Load U.S tons	Body Dia d	Pin Dia D	Inside Length L (Min.)	Inside Width at Pin W	Outside of eye Dia (Max.)	Approx. Wt. per 100 in lbs	Ordering Code Galvanised
2	½	⅝	1⅞	13/16	1 5/16	78	USDG 4
3¼	⅝	¾	2	1 1/16	1 5/16	160	USDG 5
4¾	¾	⅞	2⅝	1¼	1⅞	269	USDG 6
6½	⅞	1	2 13/16	1 7/16	2⅛	372	USDG 7
8½	1	1⅛	3 1/16	1 11/16	2⅝	544	USDG 8
9½	1⅛	1¼	3 5/16	1 13/16	2⅝	738	USDG 9
12	1¼	1⅜	3 13/16	2 1/32	3	1,038	USDG10
13½	1⅜	1½	4 7/16	2¼	3 5/16	1,349	USDG11
17	1½	1⅝	4⅞	2⅝	3⅜	1,855	USDG12
25	1⅜	2	5⅝	2⅞	4 7/16	2,665	USDG14
35	2	2¼	6⅝	3¼	5	4,128	USDG16
45	2¼	2½	7⅛	3⅝	5⅝	6,340	USDG18
55	2½	2¾	8	4⅛	6	8,465	USDG20
70	2¾	3	8½	4½	6 5/16	10,600	USDG22
85	3	3¼	9	5	7	12,360	USDG24
120	3½	3¾	10½	5¾	8	21,860	USDG28
150	4	4¼	12½	6½	9¼	31,100	USDG32

DIMENSIONS SHOWN ARE NOMINAL



L SHACKLES

"HIGH CAPACITY" SHACKLES

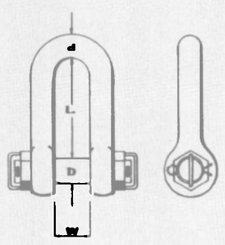


SAFETY ANCHOR

DIMENSIONS IN MM (AND INCHES)

Safe Working Load U.S tons	Body Dia d	Pin Dia D	Inside Length L (Min.)	Inside Width at Pin W	Bow Dia B (Min.)	Ordering Code	Approx Weight Each Kgs (lbs)
50	50 (2)	55 (2¼)	250 (9¾)	85 (3⅜)	180 (6¾)	HCA 50	22 (48)
80	65 (2½)	70 (2¾)	320 (12⅝)	110 (4⅜)	200 (7⅞)	HCA 85	43 (95)
120	80 (3)	82.5 (3¼)	390 (15⅜)	130 (5⅛)	250 (9¾)	HCA 80	73 (160)
150	90 (3½)	95 (3¾)	435 (17⅛)	150 (5⅞)	280 (11)	HCA 90	115 (280)
175	105 (4)	110 (4¼)	460 (18)	165 (6½)	300 (11⅞)	HCA105	175 (385)
200	110 (4¼)	120 (4¾)	520 (20½)	175 (6⅞)	330 (13)	HCA110	210 (460)
250	120 (4¾)	130 (5⅛)	575 (22⅝)	200 (7⅞)	380 (14⅞)	HCA120	290 (640)
300	130 (5⅛)	145 (5¾)	650 (25½)	210 (8¼)	400 (15¾)	HCA130	370 (810)
400	145 (5¾)	155 (6⅛)	710 (28)	225 (8⅞)	450 (17¾)	HCA145	520 (1140)
500	155 (6⅛)	170 (6¾)	775 (30½)	250 (9¾)	500 (19¾)	HCA155	630 (1380)
750	205 (8)	215 (8½)	830 (32½)	340 (13⅜)	585 (23)	HCA205	1400 (3070)
1000	245 (9½)	255 (10)	990 (39)	395 (15½)	740 (29⅛)	HCA245	2350 (5150)

DIMENSIONS SHOWN ARE NOMINAL



SAFETY CHAIN

DIMENSIONS IN MM (AND INCHES)

Safe Working Load U.S tons	Body Dia d	Pin Dia D	Inside Length L (Min.)	Inside Width at Pin W	Ordering Code	Approx Weight Each Kgs (lbs)
50	50 (2)	55 (2¼)	200 (6)	85 (3⅜)	HCC 50	20 (46)
80	65 (2½)	70 (2¾)	250 (10)	110 (4⅜)	HCC 65	40 (90)
120	80 (3)	82.5 (3¼)	300 (11⅞)	130 (5⅛)	HCC 80	70 (160)
150	90 (3½)	95 (3¾)	350 (13⅞)	150 (5⅞)	HCC 90	115 (250)
175	105 (4)	110 (4¼)	400 (15⅞)	165 (6½)	HCC105	170 (370)
200	110 (4¼)	120 (4¾)	450 (17½)	175 (6⅞)	HCC110	200 (445)
250	120 (4¾)	130 (5⅛)	500 (19½)	200 (7⅞)	HCC120	280 (620)
300	130 (5⅛)	145 (5¾)	550 (21½)	210 (8¼)	HCC130	350 (780)
400	145 (5¾)	155 (6⅛)	600 (23½)	225 (8⅞)	HCC145	500 (1100)
500	155 (6⅛)	170 (6¾)	640 (25½)	250 (9¾)	HCC155	600 (1330)
750	205 (8)	215 (8½)	700 (27½)	340 (13⅜)	HCC205	1350 (2970)
1000	245 (9½)	255 (10)	850 (33½)	395 (15½)	HCC245	2260 (4970)

DIMENSIONS SHOWN ARE NOMINAL

Apart from the shackles listed we are able to design and produce shackles to special dimensions up to 1000 tons S.W.L. capacity.

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Write 466 on Reader Service Card

Northern New England ASNE Holds Joint Meeting With NCAA & NANTS

Capt. **Phil O'Connell** (left), ASNE Northern New England Section chairman, congratulates guest speaker **Robert Obradovic,** project engineer for Morrison-Knudsen.

The Northern New England Section of the American Society of Naval Engineers (ASNE), the Naval Civilian Administrators Association (NCAA), and the National Association of Naval Technical Supervisors (NANTS) recently sponsored a combined dinner meeting in Portsmouth, N.H. Many old acquaintances were renewed during the social hour and at dinner prior to the technical session.

The guest speaker for the technical session was **Robert L. Obradovic,** project engineer for the Morrison-Knudsen Company. Mr. **Obradovic's** subject for the evening was entitled "Moles and Men — Seabrook Power Plant Tunnel Project." He presented a well-received talk supported by numerous slides detailing the construction of the cooling water tunnels at Seabrook Station.

The tunnels (the only tunnels in New Hampshire) will be 19 feet in diameter, 150 feet below sea level, and 3½ miles long when completed this year. Built to protect the salt-water marshes and to be trouble-free for 40 years, the tunnels are being cut using a 1,200 horsepower circular cutting machine 22 feet in diameter called a "mole," which cuts through the mostly granite rock at 39 feet per day. Pumps will circulate 850 gallons of cooling water per minute through the completed tunnels via the undersea intake, which is the largest prefab shaft ever constructed.

At the conclusion of the presentation, ASNE Section chairman Capt. **Phil O'Connell** presented Mr. **Obradovic** with a book as a token of appreciation for coming to address the group.

WARNING
CALL YOUR ELECTRICIAN

Your building may have one of these Federal Pacific Circuit Breakers which need to be replaced, or field modified:

NEJ/HEJ NFJ/HFJ NEG/HEG NEF NP

Under certain conditions these breakers could cause personal injury or property damage.

FPE circuit breakers are most likely to be found in enclosures marked FPE. However, they *may* also be found in *some* enclosures made by other manufacturers, such as: Zinsco, GTE Sylvania, Frank Adam Electric Co.

THEY WILL NOT BE FOUND IN ENCLOSURES MARKED GE, WESTINGHOUSE, ITE, SQUARE D, AND CUTLER-HAMMER.

Because of the difficulty in identifying these devices, have your on-site electrician or facility engineer review the following chart to determine if you have any of these FPE Breakers.

Identification chart of breakers involved in corrective actions

BREAKER TYPE	AMPERE RANGE	POLES	VOLTS A.C. RATING MAX.	TYPE OF FACILITY	CORRECTIVE ACTION REQUIRED
NEJ/HEJ	70-225	2 & 3	240	Light Industrial	REPLACE BREAKERS
NFJ/HFJ	70-225	2& 3	600	Industrial	REPLACE BREAKERS INSTALLED ON ELECTRICAL SYSTEMS ABOVE 550 VOLTS
NEG/HEG	30-100	2 & 3	600	Heavy Industrial	MODIFY BREAKERS INSTALLED ON 480 VOLTS OR ABOVE. MODIFY BREAKERS INSTALLED IN FPE ENCLOSURES 1100T.
NEF	40-100	2 & 3	480 600	Commercial and Industrial	REPLACE BREAKERS
NP	600-2500	2 & 3	600	Large Electrical Distribution Systems	REPLACE BREAKERS INSTALLED ON ELECTRICAL SYSTEMS WITH AVAILABLE FAULT CURRENTS ABOVE 85,000 AMPERES AT 240 VOLTS OR 50,000 AMPERES AT 480 AND 600 VOLTS OR WHERE ROUTINELY USED AS A SWITCH

This is part of a program voluntarily initiated by Federal Pacific. The Consumer Product Safety Commission has been notified. Lab tests have indicated that these Circuit Breakers could cause personal injury or property damage. Federal Pacific will respond as soon as possible by phone or mail. Allow 6 weeks for this preliminary contact.

If your electrician finds you have these FPE breakers in service, or if he is uncertain, please call, toll free: 800-526-3962 (In New Jersey: call collect: 201-526-1330). *YOUR SAFTEY IS OUR CONCERN*

Yes. We have _____ breakers in use. MR

Please have an FPE engineer contact us.

Name _____

Title _____

Company _____

Address _____

Phone _____

FEDERAL PACIFIC ELECTRIC COMPANY

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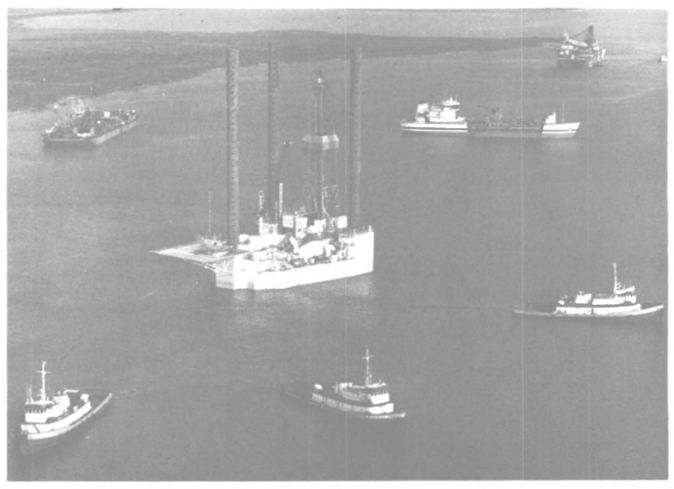

'Griffin-Alexander I' Now In Service– First Of Eight Costing $280 Million

Griffin-Alexander Drilling Company has announced that the first of its eight new jackup drilling rigs is now in service. The Griffin-Alexander I (shown above under tow), a Bethlehem cantilever design, mat-supported jackup built by Bethlehem Steel at its Beaumont, Texas, shipyard, is now on location and drilling in the Gulf of Mexico for Atlantic Richfield in Mustang Island, Block 762, approximately 50 miles offshore Corpus Christi, Texas. The second and third rigs, also jackups of Bethlehem design, are expected to be completed in June and September, respectively, and also will go into service in the Gulf of Mexico.

The Griffin-Alexander I and II were announced simultaneously in December 1979 by Griffin-Alexander Drilling, which subsequently placed orders for six additional jackups that are now under construction in Texas and Maryland shipyards. The rigs represent an aggregate cost of approximately $280 million. "We were the first start-up company to order two rigs for their entry into the offshore drilling business and look forward to providing the kind of service the industry wants and expects of a contract drilling company, now and in the future," **Loy D. Griffin**, chairman of Griffin-Alexander, said.

The G-A I has a rated water depth of 200 feet, drilling depth to 25,000 feet, and quarters for 50 personnel. Hull dimensions are 157 feet by 132 feet by 18 feet. Drilling equipment includes a MIDCO 1220 drawworks; Gardner-Denver PZ11 1,600-hp pumps; three 12-cylinder Electro-Motive Division 1,650-bhp engines; and a Gardner-Denver 37½-inch rotary table.

The firm of Griffin-Alexander was organized just over a year ago by the two veterans of the offshore drilling industry. **Loy D. (Butch) Griffin**, chairman of the board of G-A, served with Global Marine, Dresser Industries, and as a financial consultant specializing in mergers and acquisitions before being named chairman of Griffin-Alexander.

Bill Alexander, president of G-A, formerly was employed by Union Oil of California and another offshore drilling company.

SNAME Philadelphia Section Hears Report On Stack Performance

The Philadelphia Section of The Society of Naval Architects and Marine Engineers' last technical meeting of the 1980-81 program was held recently at the Engineers Club in Philadelphia. Following the cocktail and dinner hours, the meeting was formally opened by chairman **J.J. Hibbits**, who immediately presented the following nominations for the coming year, all of which were unanimously approved by the members present: chairman, **T.P. Campbell**, Sun Ship, Inc.; vice chairman, **D.S. Champlin**, Selby Battersby & Company; secretary-treasurer, **C.W. Lofft**, Sun Ship, Inc.; and Executive Committee, **J.J. Hibbits, R.V. Ciliberti**, and **K.W. Lawrence**.

The technical session featured a thesis titled, "The Effect of Superstructure Proportions on Smokestack Performance."

The thesis, submitted in partial fulfillment of the requirements for a bachelor's degree in naval architecture and marine engineering by **Robert Conachey** and **Michael Kidwell** while students at the Webb Institute of Naval Architecture, describes a system to test the effect of various sizes of superstructures on the occurrence of deck contamination from stack exhaust for a typical superstructure.

The system, previously researched by **Kevin Calhoun** and **Mark Herder**, in 1978 while students at Webb, involves a test performed by placing a freeboard model of a 270,000-dwt tanker upside down in the Webb free surface flow channel and using a dye ejected out of the stack to simulate the smoke exhaust. The thesis submitted by students **Conachey** and **Kidwell**, using the same system described above, tested various superstructure models, and analyzed the results, from which they determined what the necessary height of a smokestack above the superstructure boundary layer should be to insure satisfactory smokestack performance. An oral presentation, along with slides, was presented by Mr. **Kidwell**.

The meeting was coordinated by **R.C. Lockwood** from the Army Corps of Engineers. The authors were presented with a certificate of appreciation by chairman **Hibbits**.

Among participants at recent Philadelphia Section SNAME meeting were (standing, L to R): **T.P. Campbell**, vice chairman; **K.W. Lawrence**, Executive Committee; **R.C. Lockwood**, coordinator; and **C.W. Lofft**, Executive Committee. (Seated, L to R): **K. Gyswyt**, Executive Committee; **M.J. Kidwell**, author; and **J.J. Hibbits**, chairman, Philadelphia Section.

Captain Sandberg Honored At New York Section SNAME Meeting

Capt. **Clifford W. Sandberg**, USMS (Ret.), was the honored guest at the season's last meeting of the New York Metropolitan Section, The Society of Naval Architects and Marine Engineers. A member of SNAME since 1945, he was for many years chairman of the Section's Membership Committee, playing a strong role in developing student membership.

Professor **Sandberg**, assistant head of the Department of En-

Newly elected officers and guests at recent New York SNAME meeting (L to R): chairman-elect **Neil Reddy**, ABS Worldwide Technical Services; Capt. **Clifford Sandberg**, honored guest, Maritime Associates; **Moses W. Hirschkowitz**, author, U.S. Merchant Marine Academy; **Joseph D. Conners**, elected secretary-treasurer, consulting engineer; **John Higginbotham**, chairman of the Papers Committee, John J. McMullen Associates; and **John C. Daidola**, elected vice chairman, M. Rosenblatt & Son.

gineering at the U.S. Merchant Marine Academy for 30 years, has been a major influence in the training and licensing of seagoing engineers. He was a member of the Maritime Administration staff for the nuclear ship Savannah, and has been associated with preparation of license examinations for Liberian services since 1950.

The author of the evening was Prof. **Moses W. Hirschkowitz** of the U.S. Merchant Marine Academy, who presented a paper titled *A Steam Engineer's First Impressions of a Diesel Propulsion Plant.* The paper discussed a variety of problems concerning the at-sea operation and maintenance of the modern motor ship. It was directed in particular at those members of the marine industry who are responsible for planning, specifying, machinery procurement, design, and management of such engine plants.

Professor **Hirschkowitz** touched on such topics as the unattended engine room, local/bridge controls, work areas and tools, instrumentation, and maintenance. Drawing on his several tours of duty aboard diesel-powered ships, he illustrated his presentation with slides taken aboard those vessels.

At this meeting, Section officers for the 1981-82 season were elected. **Neil E. Reddy,** manager-technical operations for ABS Worldwide Technical Services, Inc. was elected chairman. **John C. Daidola** of M. Rosenblatt & Son was named vice chairman, and **Joseph D. Connors,** consulting engineer, will be secretary-treasurer.

The following companies have contributed to this season's Special Funding Program of the New York Metropolitan Section, which in part reduced attendance cost for both student and regular members: American Bureau of Shipping; Anshuetz of America; Colt Industries; Energy Transportation Corporation; L.F. Gaubert & Company, Inc.; George G. Sharp, Inc.; Gibbs Brothers Foundation; Hose McCann Telephone Company, Inc.; J.J Henry Co., Inc.; Marine Industrial Cable, Inc.; John J. McMullen Associates; Mitsubishi Heavy Industries America, Inc.; M. Rosenblatt & Son, Inc.; Transamerica Delaval, Inc.; and Worthington Pump Corporation.

Furuno Introduces ADF For Big Ship Market— Literature Available

For the big ship market, Furuno has come out with a new high-precision, automatic direction finder. The recently introduced FD-120 combines a digital frequency readout and a bright, high fidelity CRT display for superior accuracy in direction finding in general navigation and rescue operations. Five brands cover 200 kHz to 9 mHz with bearing accuracy to 1 degree. For continuous tuning, the FD-120 has 23 crystal-controlled spot channels plus one external crystal mount for the most used frequencies. Power requirements for the unit are 45VA. Error correction coils are available as an option.

For further information and free literature on the FD-120,

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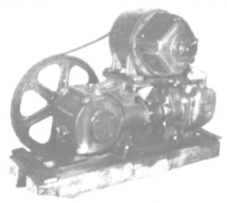
Title XI Approved By MarAd On G&A Jackups To Cost $85 Million Total

The Maritime Administration has approved in principle an application by G&A Limited I & II, Houston, for a Title XI guarantee to aid in financing construction of three jackup drilling rigs. Two vessels will be owned by G&A I and the other by G&A II.

The rigs are mat-supported and are capable of drilling in water up to 200 feet. They will be operated on the U.S. continental shelf. Bethlehem Steel Corporation, Baltimore, is the builder. The Title XI guarantee covers $64,070,000 or 75 percent of the estimated cost of $85,428,600.

PUMPS

WORTHINGTON 2½x2 SANITARY & FLUSHING PUMP — 20 GPM — 80 LBS



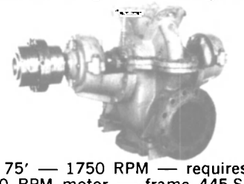
Motor driven type KAA — 1½" suction — 1" discharge. MOTOR: 2 HP — 230 VDC. Can also be furnished with A.C. motor if desired.

UNUSED 5"x4" — 500 GPM @ 20 PSI — 1800 RPM WEIL GENERAL CIRCULATOR SERVICE PUMP

With totally enclosed explosion-proof motor. Bronze pump — horizontally split case — flooded submergence test pressure 300 PSI. MOTOR: Continental 10 HP — 440/3/60 — 1800 RPM — fan cooled — totally enclosed — horizontal — self-ventilated — EXPLOSION-PROOF. Unit 60" long — 24" flange to flange.

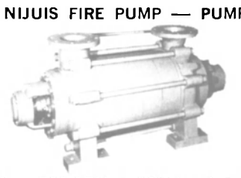
2000 GPM @ 75'

BRONZE PUMPS



8X8 — 2000 GPM @ 75' — 1750 RPM — requires 50 HP 440/3/60 1750 RPM motor — frame 445-S. Pumps are ball-bearing split case centrifugals with cast iron driplip base. Very good condition.

UNUSED NIJUIS FIRE PUMP — PUMP ONLY



HID-5125250 — 531 GPM @ 323' head @ 1800 RPM

6X5 BRONZE GARDNER-DENVER PUMP

Split case type D — 1000 GPM — 125 lbs — 281' @ 1800 RPM. Requires 100 HP diesel drive. Suction lift 15 to 25' — 10½" diameter flange. 6" Suction 5" Discharge.

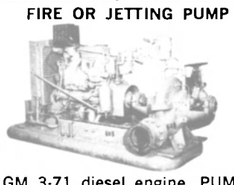
"EUREKA" DUPLEX DOUBLE-ACTING RECIPROCATING BILGE PUMP 500 GPM — 100' HEAD

Motor driven — pump operates at 320 RPM. MOTOR: 15 HP — 440/3/60 1750 RPM. DIMENSIONS: 5'9" high — 3' wide — 4' deep. Ex-M.V. Globtic Sun.

NIJUIS 3510 GPM DIESEL DRIVEN FIRE PUMP

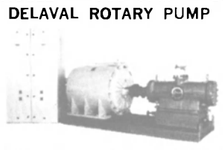
3510 GPM @ 350' head — 161.7 PSI. Pump is 10X8 — factory new — horizontally split case. ENGINE: GM 6V-71 or 8-V-71. Can furnish with heat exchanger & radiator.

GARDNER-DENVER 6"X5" BRONZE CENTRIFUGAL FIRE OR JETTING PUMP



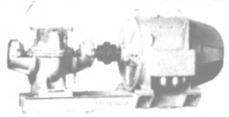
Driven by GM 3-71 diesel engine. PUMP: 1000 GPM @ 150 PSI/1500 GPM @ 100 PSI — 1750/2000 RPM. Maximum head 175 PSI. Self-contained fuel tank in base. Automatic self-priming optional.

NEW UNUSED — 700 GPM — 150 PSI DELAVAL ROTARY PUMP



6X8 — 700 GPM @ 150 PSI — 1150 RPM — with 4-speed motor & control 100/75/50/37.5 HP — 440/3/60 — 1200/900/600/450 RPM. With Cutler-Hammer controller.

UNUSED BRONZE 2000 GPM @ 337' HEAD FIRE OR HIGH PRESSURE SERVICE PUMP

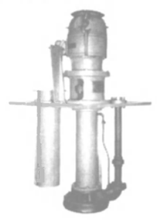


Mfg by Frederick Iron & Steel — 8" side discharge; — 8" bottom suction — model 8DSU-SPL. MOTOR: Crocker Wheeler — 250 HP — 240 volts DC — 1900 RPM — 102 7/8" O.A.L. — 34½" wide — 37" high.

NEW UNUSED KINNEY 20 GPM FUEL OIL SERVICE PUMP

Vertical — 50 PSI — with 2" inlet & outlet. MOTOR: 2 HP — 440/3/60 860 RPM — with starter. For fuel oil service, etc.

NEW UNUSED SUMP OR LOW PRESSURE DRAIN PUMPS



Bronze — 40 GPM @ 40 PSI. 2" Discharge — single impeller — CW rotation — 32" from deck plate to base. Complete with flotation equipment. Totally enclosed 5 HP 440/3/60 1725 RPM motor. Repair parts for motor & pump included.

CARVER CHILLED WATER SERVICE PUMP 160 GPM — 57 PSI

For air conditioning or water circulation. 160 GPM @ 57 PSI — 110 ft. head. Closed coupled — 10 HP 440/3/60/3500 RPM.

500 GPM FIRE SERVICE PUMP

Mfg. by Buffalo. Bronze — 500 GPM @ 100 Lbs. — 5X4 — 30 HP/240 DC — 105 amps — 1750 RPM.

PASSENGER/CRUISE SHIP SELF PRIMING NEW WORTHINGTON VERTICAL SUBMERSIBLE BILGE PUMP

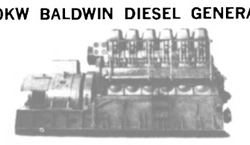
FOR EMERGENCY USE ON PASSENGER SHIPS, ETC. PUMP: JAS — 264 GPM — 171' head — two 6" inlets — one 5" outlet. MOTOR: 40 HP — 230 volts DC — 149 amps. COMPLETE WITH NASH — SELF PRIMING PUMP ATTACHED.

DIESEL GENERATOR SETS

290KW GM 8-268A DIESEL GENERATOR SET

120/240 VDC—1250 amps—shunt wound. ENGINE: GM 8-268A — 8 cyl — 6½X7 — 1200 RPM — good condition.

300KW BALDWIN DIESEL GENERATOR SET

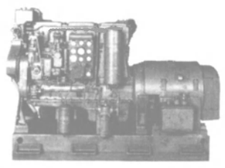


300KW — 120/240 VDC — 1250 amps — stab. shunt — 450 RPM. Baldwin diesel model VO. Ex C-1MAVO1.

100KW GBD8 DIESEL GENERATORS

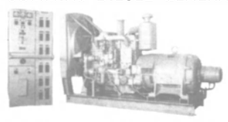
From LST vessels. 120/240 VDC — 417 amps — stab shunt — 1200 RPM — Delco generator — self-excited. ENGINE: Superior GBD-8 — 8 cyl — 5½X7 — 150 HP — 30 volt electric starting. Reconditioned to ABS. Dry weight 10,000 lbs. — OAL 124" — 65 11/16" high — 42" wide. Height necessary to pull piston 68". Fuel consumption 0.620 lbs/hr.

60 KW CUMMINS DIESEL GEN. SETS



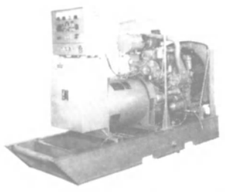
60KW — 120 volts — 500 amps DC generators. 6-Cyl. model H Cummins diesel engine.

75 KW CUMMINS DIESEL GENERATOR SET



75KW — 93.8 KVA — 440/3/60 — 1200 RPM — electric starting. Cummins 6-cyl engine with free-standing switchgear.

GM-4-71-T TURBO-CHARGED 100 KW DIESEL GENERATOR SET RADIATOR COOLED 1800 RPM

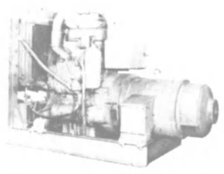


12 wire — all voltages possible — 100 KW 440/220/3/60. With switchgear. Has protective cabinet.

GM 8-268A 200 KW A.C. DIESEL GENERATOR SETS

ENGINE: 8-268A — 6½" bore — 7" stroke — 1200 RPM — driving Westinghouse generator — 200 KW — 440 volts — 3-phase — 60 cycle — 321 amps — 80% PF @ 1200 RPM. Switchgear available.

20KW 2-71 DIESEL GENERATOR SETS TEST RUN 1 HOUR



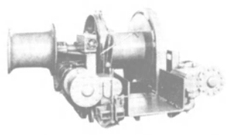
220/3/60 — 1200 RPM — Electric Machinery Co. or Delco. Brushless — will demonstrate running. (Also have 20KW sets with 220/440/3/60 — with brushes — 1200 RPM — Delco. Weight 2200 lbs.)

GM 3-268A 100 KW DIESEL GENERATOR SETS

ENGINE: GM 3-268A — 6½X7 — 1200 RPM — 80% **PF** — electric starting. **GENERATOR:** 100 **KW** — 440/3/60/1200 **RPM** — 161 amps. Dripproof — open — self-ventilated. (Class **A** insulation stator — class **B** insulation on field). **EXCITATION:** 2 **KW DC** unit — 9′ 1¾″ long — 37″ wide.

WINCHES

STEAM MOORING WINCHES

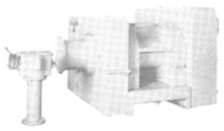


12″ X 14″ — AUTOMATIC TENSIONING with foot brake & declutchable gypsy head 20,000 LBS @ 100 FPM — FIRST LATER ALSO HANDLES 16,000 @ 150 FPM OR 50,000 @ 8 FPM.

Drum will show 1500 ft or 1½″ 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.

ALL UNITS CAN BE DEMONSTRATED RUNNING

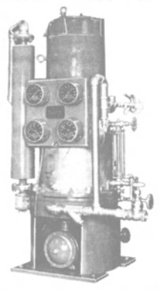
MODEL U1 UNIT WINCHES



7450 Lbs. @ 223 FPM. G.E. 50 HP Motor — 230 VDC. With controls and master switch.

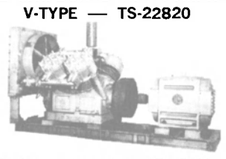
AIR COMPRESSORS

NASH MULTI-PHASE CONTROL AIR COMPRESSOR
50 CFM — 100 PSI



Model MV-673. Continuous pressure maintained by pressure control valve. Complete with motor, heat exchanger, separator, silencer, pressure control valve, water seal pressure control valve. CAPACITY: 50 CFM @ 100 PSI — 3500 RPM. Motor 27 HP — 440/3/60. Cooling water flow 35 GPM — relief valve set for 110 PSI. Vertical configuration. Pressure switch: on 80 PSIG — off 100 PSIG. Just removed from AT&T Vessel "Long Lines". Excellent condition.

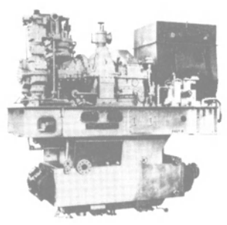
MARINE SHIPBOARD AIR COMPRESSOR
V-TYPE — TS-22820



160 CFM @ 125 lbs — two stage 870 RPM — 8X8¼X8¾ — air cooled — with intercooler. Direct — connected air compressor #2261021. MOTOR: 50 HP 440/3/60 — mfg by U.S. Motor. AIR COMPRESSOR: Mfg by Air Pumps Ltd. Excellent condition — formerly used on AT&T Vessel "Long Lines" and removed only because they needed a larger unit. Complete with inter- and after-cooler. Very good condition.

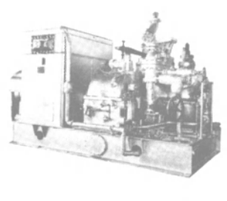
TURBO GENERATORS STEAM TURBINE — GEARS

1000 KW DELAVAL ALLIS-CHALMERS GEARED TURBO GENERATORS



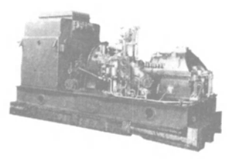
DeLaval turbine 1442 HP — 10019 RPM — class GJN — 9-stage — 1050 PSI — 950° TT. GEAR: 10019/12000. GENERATOR: Allis-Chalmers 1000 KW — 450/3/60/1200 — static excitation. Complete with condenser & switchgear optional. Send for brochure.

750 KW G.E. 7-STAGE TURBINE



450/3/60/1200 RPM — type FN3-FN24 — 10033 RPM. GEAR: 10033/1200 RPM. GENERATOR: type ATL — 6-pole — 450/3/60/1200 RPM — 0.80PF. EXCITER: 10KW 120 volts DC. Steam inlet 2½″ — 125% load — 2 hour normal steam condition. Normal steam condition 525 lbs/825°TT — 1 lb absolute back pressure at turbine exhaust flange. Steam flow 100% load 7870 lbs. OAL 11′ 4½″ — OAW 6′ ½″ — OAH 6′ 4″. Total weight 24,500 lbs.

MARINER CLASS TURBINE & GEAR ONLY



G.E. 700KW DRV618-MR73 — 10938/1200 RPM 850 PSI — 850°TT — GEI-90755 CONDENSING. Complete with rotor bearings, diaphragms, packing, etc. Gear complete — type S — 432 — Form B — 10938/1200 RPM.

TURBINE & GEAR ONLY — NON-CONDENSING

G.E. 700KW DRV318-MR1 — 10938/1200 RPM — 850 PSI — 850°TT — 24 PSIG exhaust pressure. Rotor, diaphragms, packings, bearings available.

AUXILIARY TURBO GENERATORS ROTORS ETC.

- **400KW DELAVAL ROTOR — 7-STAGE — CLASS CD — 5910 RPM**

835 lb W.P. — 840°TT — ex-Esso: Gloucester — Dallas Class — some Beth Sparrows Point & Quincy vessels, & Newport News Hulls 499-504 — in Book 820.

- **750KW DELAVAL ROTOR — 7-STAGE — CLASS G.J.**

9823 — 585/865# steam pressure

- **GEARS**

Class KD — 9283/1200 — ex-City Service "Alton Jones" type vessels

GE ROTOR
NEW
750 KW
Type FN-3-FN24 — 7-stage — 10033 RPM

WESTINGHOUSE
NEW
1250 KW
540# — 825°TT — 8050 RPM

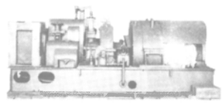
- **FOR G.E. T2 VESSELS**

G.E. DORV-325M — 5654 RPM — T2 tanker

- **WESTINGHOUSE 538KW**

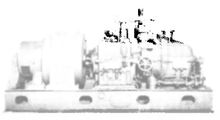
5010 RPM — T2 vessel

TURBINE & GEAR ONLY



New DeLaval type H.D. Turbine — #245204 — gear type KDC — 730 HP — 440# — 740°TT — 9977 RPM — with reduction gear output 1200 RPM. Turbine serial #245204.

G.E. 300KW TURBO GENERATOR & GEAR

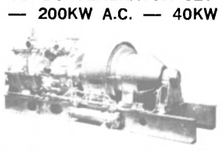


G.E. 300KW generator & 40KW D.C. exciter — 450/3/60/1200 RPM — ex USN D.E. vessel. TURBINE: DORV-325N — 4873 RPM — 400# — 50°F superheat.

300KW WESTINGHOUSE — LOW PRESSURE TURBINE & GEAR ONLY

Condensing or non-condensing designed for 300KW— 5286 RPM/1200 RPM on gear. CAPACITY: 300KW Normal 250 psi — 0°superheat — 25″ vacuum 180KW — 250 psi — 0°superheat — 3 psi back pressure 300KW — 200 psi — 0°superheat — 25″ vacuum. Steam/hour 6463 lbs — 100% load — steam/KW hr. — 20.88.

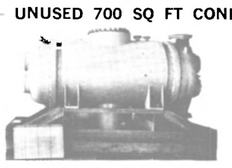
TURBO GENERATOR SET
NEW — 200KW A.C. — 40KW D.C.



Ex USN — turbine type DN — 5-stage — 10012 RPM. GEAR: s-155 — single helical. GENERATOR: 200KW — 450/3/60/1200 RPM. Steam conditions: 540# — superheat 197°/208°.

MISCELLANEOUS

2 NEW — UNUSED 700 SQ FT CONDENSERS



Mfg by American Locomotive Works. 700 sq ft — 2-pass — gunmetal waterbox & return head. ⅝″ tubes — 0.049″ (18 BWG) — cupronicel 70-30 — 100″ effective length — 476 tubes. Located San Pedro, Calif. With hot well — 20″ Center steam inlet — 9″ inlet & outlet. Shell 30 lbs/head 30 lbs.

Smit International Performs Tow Of Huge Production Platform

Five tugs of Smit International, including the 22,000-bhp Smit Rotterdam, and a Norwegian tug, have towed the deck for the Statfjord B production platform (shown above) from Stavanger, Norway, to the Yrkefjord, 36 miles north of Stavanger. The steel deck with the modules on top was built and assembled on four dummy columns in Stavanger. For the towing transport, the deck — 140 meters wide, 70 meters long, and 100 meters high (about 459 by 230 by 328 feet) — was placed on four barges.

Immediately after arrival in the Yrkefjord, the 40,000-ton deck was placed over and on the four concrete shafts of the structure. This structure was recently towed to the Yrkefjord.

Smit International Marine Services assisted with tugs and personnel in the positioning of the deck over the concrete columns. By deballasting the concrete structure, the deck was lifted off the barges. After further completion of the Statfjord B platform, the four-legged colossus will be towed to its final location in the North Sea next summer.

Among those attending recent christening of Sabine III were (L to R): **David H. Klinges,** vice president of shipbuilding, Bethlehem; Governor **Harry Hughes** of Maryland; **Richard M. Smith,** vice chairman, Bethlehem; **Mrs. Anne D. Moriniere** of Houston, sponsor of the vessel; and **John C. Estes,** assistant vice president of shipbuilding, Bethlehem.

Jackup For Houston Offshore Commissioned At Bethlehem Yard

Houston Offshore International, Inc., and Bethlehem Steel Corporation's Sparrows Point (Md.) yard recently commissioned the first mobile offshore jackup oil-drilling platform to be constructed in the United States outside the Gulf of Mexico. The rig was christened the Sabine III by its sponsor, **Mrs. Anne D. Moriniere** of Houston, wife of **John C. Moriniere,** vice president of finance for Houston Offshore International.

Several hundred guests toured the Sabine III prior to the ceremony, and comments were made by **R.M. Smith,** vice chairman, Bethlehem Steel; Governor **Harry Hughes** of Maryland; **Jerry E. Chiles,** president of Houston Offshore; and **George S. Hamilton,** general manager of the Sparrows Point yard.

"The Sabine III, now several days ahead of its delivery schedule, is the first offshore drilling rig built by Sparrows Point, and the first of five on order at the yard to be completed," Mr. **Hamilton** said. The Sabine III's keel was laid October 1, 1980, and its launching was March 15, 1981.

The rigs has been towed to a location just south of the Chesapeake Bay Bridge where the topmost sections of the three 269-foot columns and the drilling derrick will be attached. Following the erection of these final sections, the rig will begin an approximate 24-day, 2,150-mile tow to a drilling location near Galveston, Texas, where it will work for Exxon Company, U.S.A.

Sabine III is the third of four such vessels built for Houston Offshore by Bethlehem Steel and designed by the corporation's shipyard in Beaumont, Texas. The Beaumont yard delivered Sabine I in 1979 and Sabine II in 1980, and Bethlehem Singapore Private Limited, located in the Republic of Singapore, will deliver Sabine IV in June this year.

Sabine III can be operated in waters of up to 200 feet while experiencing forces resulting from 70-knot winds and 33-foot seas. It consists of a platform measuring 157 feet by 132 feet supported by three 11-foot-diameter columns fixed to a supporting mat that is 220 feet by 185 feet.

The rig, designed for deep-well drilling, features a cantilevered

Jackup drilling rig **Sabine III,** owned by Houston Offshore International, was commissioned recently at Bethlehem's Sparrows Point yard. When completed, rig will be towed to Gulf of Mexico where it will drill for Exxon Company, U.S.A.

structure. This structure provides the capability to position the drill floor over existing offshore production platforms in order to drill developmental wells or to rework existing wells. On location, the rig will have a total variable load capacity of 2,250 tons and handle hook loads of up to one million pounds on wells as far as 35 feet aft of the platform deck. Its maximum cantilever reach is 45 feet.

The Sabine III's onboard, air-conditioned living quarters will accommodate 50 persons. They include sleeping quarters, a galley, and medical, laundry, lounge, and recreation facilities. The rig was designed and built to comply with U.S. Coast Guard and American Bureau of Shipping safety and construction standards.

$7.6-Million Navy Contract Awarded To Tracor For Sonar Engineering Work

Tracor, Inc., Austin, Texas, is being awarded a $7,606,665 cost-plus-fixed-fee contract for technical and engineering support for sonar and other undersea warfare systems. Work will be performed in Rockville, Md. The Naval Sea Systems Command is the contracting activity. (N00024-81-C-6072)

New Bulletin Showing Test Results For Impellers Available From Warren

Warren Pumps Division of Houdaille Industries, Inc. has issued a four-page bulletin showing certified test results and actual power consumption calculations of different slurry pump impellers. The new bulletin also compares their design, dimensions, and quality.

For a free copy of Warren's impeller bulletin 0000/0011.1,

Write 22 on Reader Service Card

Joe B. Foster Named An Executive Vice President Of Tenneco Inc.

Joe B. Foster has been elected an executive vice president of Tenneco Inc., Houston. In his new post, Mr. **Foster** becomes a member of the company's Corporate Office and has been assigned overall corporate-level responsibility for an existing Tenneco operating unit, Tenneco Oil Exploration and Production, and Houston Oil & Minerals Corporation, whose acquisition is pending. He moves to the parent company from the presidency of Tenneco Oil Exploration and Production.

Dr. **Philip Oxley** was named to succeed Mr. **Foster** as president of Tenneco Oil Exploration and Production. He had been serving as executive vice president of that operating unit.

Mr. **Foster** joined Tenneco as a junior petroleum engineer in 1957. Assignments of increasing responsibility with Tenneco Oil led to his election as vice president in 1972, senior vice president in 1974, executive vice president in 1976, and president of Tenneco Oil Exploration and Production in 1978.

COAL RETURNS TO

C-E designed boilers will power the first six coal-fired steamships ordered in two decades. Naturally.

Combustion Engineering has long been a world leader in both marine boilers and coal-firing technology. So it's only natural that C-E boilers were selected to power the first six coal-fired steamships ordered in 20 years.

C-E designed coal-fired boilers will be aboard two 75,750 DWT bulk carriers to be built by Italcantieri, SpA for Bulkships Limited of Australia. Boilers of our design will also be on a pair of 74,700 DWT bulk carriers under construction by Mitsubishi Heavy Industries, Ltd., Japan, for The Australian National Lines. As well as on two 154,400 DWT bulk carriers to be *converted* by E. N. Bazan of Madrid for E. N. Elcano of Spain.

C-E modified a proven marine boiler design to permit coal-firing via spreader stoker. But we retained the conservative furnace rating, superheater design with vertical arrangement and wide tube spacing, and in-line main bank tubes that have been the hallmark of our oil-fired boilers.

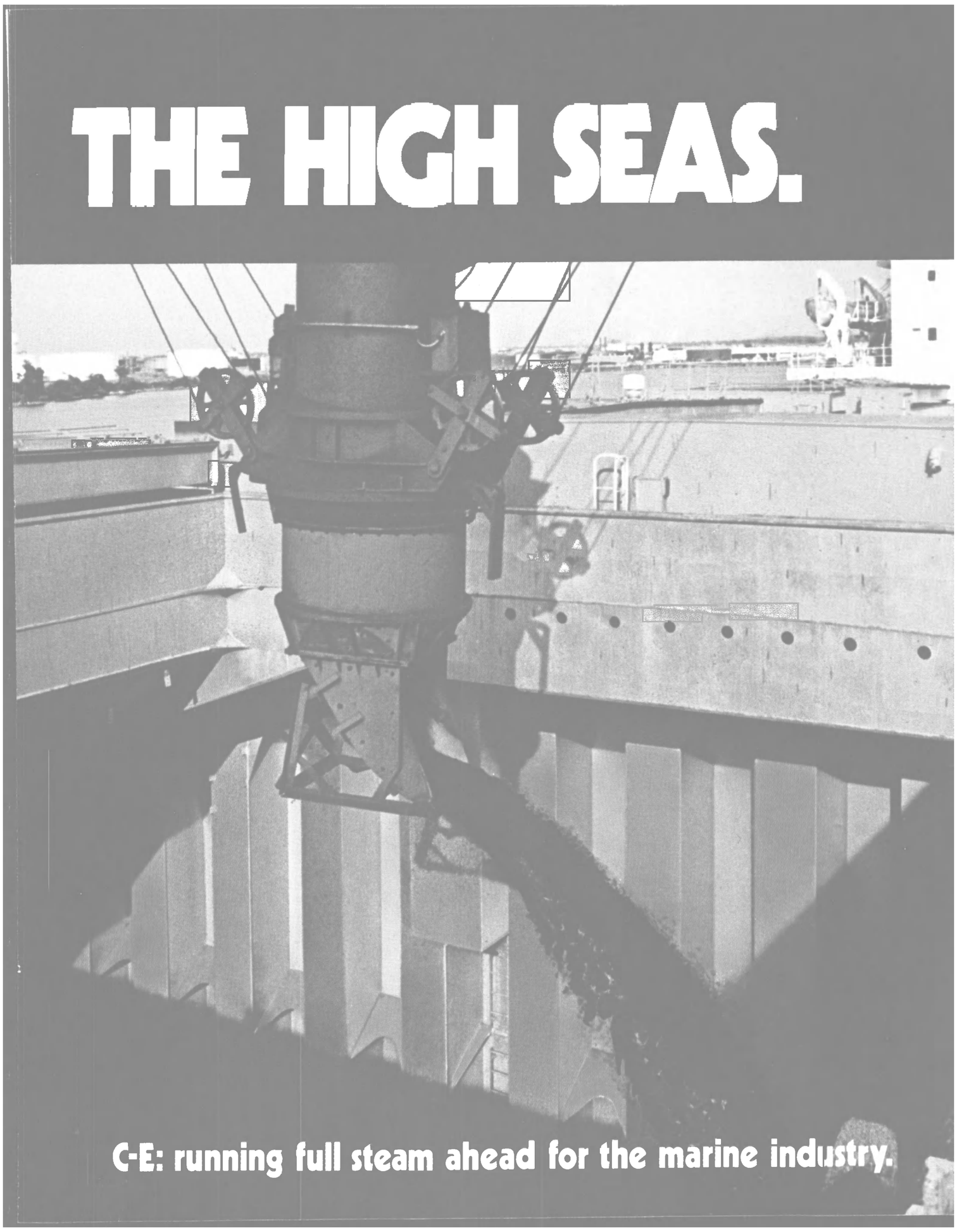
Many countries, eager to lessen their dependence on oil, are planning new coal-fired electric generating stations. C-E is ready with the technology and know-how needed to build new marine boilers for coal-fired steamships that will provide economical coal transport for these new stations.

For more about C-E marine boilers that are powering the new breed of coal-fired steamships, contact C-E Marine Power Systems, Combustion Engineering, Inc., Windsor, CT, U.S.A. 06095.

CE POWER SYSTEMS
COMBUSTION ENGINEERING, INC

Write 15 on Reader Service Card

THE HIGH SEAS.



C-E: running full steam ahead for the marine industry.

New Booklet Lists Oil Spill Prevention And Cleanup Organizations

A guide to the main international, governmental and industrial organizations concerned with oil pollution in the marine environment has been published recently in London by Witherby & Co., Ltd.

The Directory identifies organizations concerned with oil spill prevention, contingency planning, cleanup and compensation. The first of its kind, the Directory will be of practical assistance to those directly involved in dealing with marine oil spills—in government, at national and local levels, throughout industry and affected sectors of the public.

It was sponsored jointly by the International Tanker Owners Pollution Federation Limited (ITOPF), The Oil Companies Institute for Marine Pollution Compensation (CRISTAL), The Oil Companies International Marine Forum (OCIMF), and The Oil Industry International Exploration and Production Forum (E & P Forum).

Copies may be purchased by writing to Morag Hann & Co., Inc., 1 Rockefeller Plaza, Suite 2835, New York, N.Y. 10020, or to Witherby & Co., Ltd., 32-36 Aylesbury Street, London EC 1R QET, England. Price is £1.25 or US$2.75.

Donald Arroyo Named VP-Manufacturing At Equitable Shipyards

Donald J. Arroyo

J.M. Blenkhorn, president and chief executive officer of Equitable Shipyards, Inc., New Orleans, has announced that **Donald J. Arroyo** has been appointed vice president of manufacturing of the New Orleans shipyard. Mr. **Arroyo** joined Equitable in 1964 as a shipfitter, and subsequently held positions of foreman, product manager and, prior to his recent appointment, was plant general manager.

Equitable is a wholly owned subsidiary of Trinity Industries, Inc., Dallas, Texas, a manufacturer of industrial, marine, and structural products.

New Brochure Describes Goodway's Full Line Of Tube Cleaning Equipment

Goodway Tools Corporation of Stamford, Conn. has announced the availability of its new 18-page catalog featuring tube cleaning systems and boiler efficiency testers. Goodway specializes in tube cleaning equipment and offers a complete line of efficient, time-saving electric- or air-powered machines with simultaneous vacuum or water flush. The machines are designed for simplicity of operation in maintaining all types of tubular equipment, including watertube boilers, firetube boilers, condensers, and heat exchangers.

Deposits of any sort in heat transfer tubes will reduce the efficiency of the tubes and restrict the flow of fluids. Deposits left for any length of time will, in addition, cause corrosion and pitting of the tubes. Therefore, when conservation of energy and fuel saving are major considerations in plant operation, it is imperative that tubes in all kinds of heat transfer apparatus be kept clean at all times.

For a free copy of the Goodway catalog and a reference list of users,

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At McDermott Shipyards, Quality Is An Obligation Not An Option

McDermott Shipyards build to only one standard — first class. Our tugboats, such as the 105' Rebecca P. for Poling Transportation Co., our supply boats, posted drill barges, and jack-ups share special construction procedures, features, and techniques which result in the highest quality vessel.

We use computerized lofting and computer produced engineering drawings to direct multihead numerical control burning machines, a method noted for its speed and accuracy. Module components produced in this manner allow the most economical use of production manhours over the course of the construction contract.

Then we combine expert hand craftsmanship with our advanced tooling, quality control inspection and computer monitored construction schedules to build the highest quality ships and rigs and deliver them on time.

McDermott Shipyards
a McDermott division

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Seal Asks Title XI On Six Tug/Supply Vessels To Cost $24 Million

Seal (GP), Inc., Galveston, Texas, has applied to the Maritime Administration for a Title XI loan guarantee to aid in financing the construction of six diesel-powered tug/supply vessels. The applicant is a subsidiary of Seal Fleet, Inc.

The 2,500-bhp tug/supply vessels are expected to be employed in the U.S. Gulf of Mexico. Rysco Shipyard, Inc., Blountstown, Fla., will build two of the vessels. The four remaining vessels have not yet been contracted for, but all six are scheduled to be delivered before December 1982.

If approved, the Title XI guarantee would cover $18 million, or 75 percent of the vessels' combined $24-million estimated cost.

New Armco Weld Wire Accepted By U.S. Navy —Literature Available

A recently introduced welding electrode wire, Armco W-24, has been accepted for the qualified product list by the Naval Sea Systems Command, Department of the Navy, according to an Armco spokesman. The low-alloy wire is produced at the Houston plant of Armco's Southwestern Steel Division.

Acceptance by the Navy of the electrode wire was based on its performance against requirements that must be met to qualify material for general use in the fabrication of a wide range of military applications. These applications include ships, submarines, tanks, personnel carriers, and military hardware requiring welding of high yield strength, notch-tough and armor-plated steels.

The military welding specification is MIL-E-23765/2A (ships), and the grade designation is 100S-1. Armco W-24 is also classed by the American Welding Society to Specification 5.23-80, Classification EM2 for submerged arc welding. The gas shield arc welding AWS Specification is A5.28-79 and the W-24 Classification is ER100S-1.

Armco W-24 is a 1.75 percent manganese, 2 percent nickel, 0.40 percent molybdenum alloy with additions of chromium, titanium, zirconium, and aluminum. Deposits made with this alloy will produce ultimate tensile strength levels in the 105 KSI range and yield strengths in the 95 KSI range. High levels of impact toughness measured by Charpy V-notch and dynamic tear tests are significant features of the alloy. A Charpy V-notch average of 80 feet/pounds of energy absorption can be achieved at temperatures as low as −60 F. All weld metal dynamic tear test values average 640 feet/pounds.

In addition to the dynamic tear and Charpy V-notch testing, the weldments also must pass a restrictive side bend test as well as conventional tensile, radiography, and magnetic particle tests. Navy requirements involved explosion testing as well.

An Armco spokesman stated that the wire was developed for joining HY-80 (MIL-S-16216H) and ASTM pressure vessel steels such as A543. It was created to provide combinations of high strength and low temperature impact toughness.

Today W-24 is also being used to weld a variety of other high-strength steels. These include 100 KSI yield strength steels such as SSS-100, Astm A514 and A517. In addition, it is used for welding lower strength steels such as Armco NI-COP (A710 and A736) where very low temperature toughness is desired.

The wire is made fully killed and designed to be used with neutral or basic fluxes and argon-oxygen shielding gases. W-24 has been used in diameters of 1/16, 5/64, 3/32, 1/8 and 5/32 inches.

For further information on Armco W-24 welding electrode wire,

Write 17 on Reader Service Card

HBL Industries Offers Brochure Describing Its Deck Machinery Line

HBL Industries of Houston, the manufacturing and repair division of Houston Barge Line Inc., has available a 20-page bulletin describing its complete line of deck machinery. It is illustrated with photographs and drawings, and gives specifications and options for the equipment.

The HBL line includes the "O" Series anchor windlass designed for heavy-duty service with maintenance-free operation, the "W" Series worm gear windlasses for light-duty anchoring service, deck-mounted capstans with electric or hydraulic power, anchor-handling/towing winches, jackup and barge anchor winches, wire rope utility winches, and wire rope storage reels.

For a free copy of the HBL brochure,

Write 27 on Reader Service Card

Gladding-Hearn Will Build Two Hunt-Designed Police Boats For Chicago

Gladding-Hearn Shipbuilding of Somerset, Mass., has been awarded a contract by the city of Chicago to build two 44-foot police boats. The boats will be designed by C. Raymond Hunt Associates, Inc. of Boston.

The contract specifies steel hulls, aluminum superstructure, minimum top speed of 25 mph, and superior rough-water performance. To comply, the design will be based on the proven high-deadrise Hunt planing hull.

The Chicago Police Marine Division provides security and rescue patrols along the city's 25-mile waterfront covering industrial and yachting facilities. The new boats will provide improved coverage with a high-speed, all-weather capability. The steel hulls will allow operation in ice, as a lengthened shipping season on the Great Lakes is anticipated.

Hagglunds Will Market French Hydraulic Motors

AB Hagglund & Soner, a wholly owned subsidiary of ASEA AB, Sweden, has reached an agreement with SAMM SA of France to acquire its line of high-torque, low-speed, hydraulic motors. Smaller in size, the new line will be marketed and serviced from the Houston headquarters of the Hagglunds Products Division of ASEA Inc., wholly owned U.S. subsidiary of ASEA AB, and from other ASEA Inc. offices throughout the United States. Hagglunds also will stock spare parts for the motors.

Operating in the U.S. for more than 10 years, Hagglunds has been successfully marketing its products in the offshore and shipping industries. In addition to hydraulic motors, Hagglunds also markets wheel hub motors and industrial disc brakes.

For additional information on Hagglunds hydraulic products,

Write 13 on Reader Service Card

New Brochure Describes Sewage Treatment Plants From Weir Pumps Limited

An eight-page, full-color brochure describing and illustrating its marine sewage treatment plants is available from Weir Pumps Limited of Glasgow, Scotland. The Weir Biomac and Thermobiomac sewage treatment plants, designed and constructed to comply with IMCO and U.S. Coast Guard requirements, treat the waste from a ship's sanitary system to a standard whereby the final effluent can be discharged overboard in accordance with national and international legislation.

The plant, a compact packaged unit for ease of installation, is an extended aeration unit utilizing the biological and activated sludge processes to purify the organic matter in the influent. It comprises a tank divided into three sections: an inlet/aeration section; a separating/settling section; and a chlorination section.

For a free copy of this brochure,

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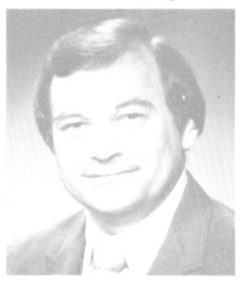
Bound Proceedings Of MariChem 80 Meeting Now Available

The Proceedings of MariChem 80—papers presented at the Third International Conference on Marine Transportation, Handling and Storage of Bulk Chemicals, MariChem 80, together with verbatim discussion—have been published by the MariChem Secretariat, Gastech Ltd., 2, Station Road, Rickmansworth, Herts, WD3 1QP, England. The cloth-bound volume is approximately 240 pages. Price is 40.00 pounds sterling inclusive of surface mail.

The proceedings includes all the formal papers presented at the meeting, the speakers' presentations, and a carefully edited verbatim account of the discussions and chairmen's comments. In adtion, there is a useful list of abbreviations associated with the chemical/gas shipping industries and, finally, a list of all participants and their affiliations.

J.D. Cain Appointed A Division Manager For Racal-Decca Survey



J.D. Cain

J.D. Cain, formerly subdivision manager, survey products, has been appointed division manager, products division, for Racal-Decca Survey, Inc. He joined the company in 1973 as a senior staff oceanographer. He is a graduate of Texas A&M University and holds a BA degree in meteorology and an MS degree in physical oceanography.

Headquartered in Houston, Racal-Decca Survey provides shallow offshore geophysical and geological surveying, hydrography, and electronic position fixing services for the acquisition of environmental data. The company is widely recognized for its surveys of offshore lease blocks for the petroleum industry.

Racal-Decca also manufactures specialized automated processing and plotting products for the offshore survey industry.

Wilson Walton Develops New Marine Incinerator —Literature Available

Wilson Walton International SAF, at the request of French shipyards, has developed a special version of the Incymar Senior marine incineration unit suitable for use aboard passenger vessels and ferries. The special unit, developed in conjunction with the Pillard Group, is designed for the consumption of waste generated by passenger complements of from 500-2,500 persons, which can amount to several tons per day, at a rate of 500 kilograms per hour.

In its passenger vessel configuration the Incymar Senior is made up as a modular system incorporating a loading hopper and conveyor belt. Drying and combustion take place on a grate system extending the whole length of the furnace, sloped at an angle of 10 degrees and made of elements actuated by air cylinders. The 27 grate elements according to a punched tape program undulate so as to propel the waste along the slope, at the same time breaking up the garbage and airing it to promote good combustion. Combustion air is blown through the grates at high pressure and so limits the fall of ash below the grates, the inclined roof ensuring heat radiates on to the waste.

For full details and free literature on the Incymar Senior,

Write 18 on Reader Service Card

DCC Orders Satellite Ground Equipment From Scientific-Atlanta

Scientific-Atlanta, Inc., Atlanta, Ga., recently received orders for satellite ground equipment from Digital Communications Corporation (DCC), a M/A-COM company. The order calls for products to be used in satellite shore stations being constructed or retrofitted for service in the INMARSAT maritime communications program.

Under one order, Scientific-Atlanta will furnish RF equipment and pilot oscillators for DCC's order to upgrade COMSAT General's present Southbury, Conn., MARISAT shore station to accommodate INMARSAT communications traffic. INMARSAT, the multination international maritime satellite commission, will provide communications service to the world's maritime fleet beginning in early 1982.

A second order calls for Scientific-Atlanta single channel per carrier (SCPC-FM) modems and baseband equipment to be delivered to DCC. The units will be used to provide INMARSAT ship-to-shore voice and telex communications service through a shore station operated by the British Telecom at the Goonhilly Downs Earth Station, England.

New Brochure Describes Fiberglass Grating With "Strength Of Steel"

A full-color 10-page brochure on its Kordek® fiberglass grating is available from International Grating, Inc. of Houston. The manufacturer claims that it has been proven tougher than steel in both flexure strength and impact strength. Containing at least 60 percent glass by weight, Kordek is said to have as much as double the strength of ordinary fiberglass gratings.

Because it is rustproof and lightweight, Kordek fiberglass grating is suitable for offshore applications. In the severest salt spray, it will last the life of the platform or drilling vessel, the manufacturer states. One-third the weight of steel grating, it reduces the structure weight, thereby increasing the amount of weight that can be stored on deck.

For a free copy of the Kordek brochure,

Write 30 on Reader Service Card

Charles Orem, President Of Bird-Johnson, Named Chief Executive Officer

Charles A. Orem

Charles A. Orem, president of Bird-Johnson Company, has been named chief executive officer, according to **Howard H. Scott,** chairman of the board. Bird-Johnson, a wholly owned subsidiary of A. Johnson & Co., Inc., is one of the world's leading manufacturers of marine propellers.

Mr. **Orem** was elected president and chief operating officer in 1980, and prior to that was executive vice president since joining the firm in 1979. Before coming to Bird-Johnson, he was director of corporate planning and development for Babcock & Wilcox Company, where he was responsible for strategic and operational planning for 17 operating divisions.

Prior to that, he served in the U.S. Navy and retired at the rank of commander in 1970. During his naval career, Mr. **Orem** commanded a fleet ballistic missile submarine and worked as a submarine warfare and undersea technology analyst for the Chief of Naval Operations.

Boland Marine Awarded $36.6-Million Navy Contract For T-AK Conversion Job

Boland Marine & Manufacturing Company, Inc., New Orleans, La., is being awarded a $36,625,837 fixed price economic price adjustment contract for conversion of a commercial design cargo ship to a fleet ballistic missile resupply ship (T-AK-286-USNS Kings Bay). The Naval Sea Systems Command is the contracting activity. (N00024-81-C-2000)

J.P. Elverdin Appointed Vice President-Shipping For United States Steel

J.P. Elverdin has been named vice president-shipping for United States Steel, it was announced by **Thomas Marshall**, group vice president-resource development. A native of Argentina, Mr. **Elverdin** holds law degrees from the University of Buenos Aires, Southern Methodist University and New York University.

He began his career with U.S. Steel in 1968 as an attorney in the law department at Pittsburgh headquarters. In 1970, he was named assistant secretary and attorney for U.S. Steel's Orinoco Mining Company in Venezuela, and was promoted to secretary and general counsel for Orinoco in 1974.

Two years later, Mr. **Elverdin** was appointed secretary of Navios Corporation, an international bulk shipping subsidiary of U.S. Steel then located in Nassau, Bahamas. In 1978, he was named vice president-commercial of Navios and was elected president the following year. After moving with Navios to New York in May 1980, he now leaves that post to assume his new duties in Pittsburgh.

Uniroyal Collapsible Rubber Drums Are Rugged —Literature Available

Portable, rugged, collapsible rubber drums designed to transport or store gasoline, oil, alcohols, lubricants, water, and other liquids, are available from the Engineered Systems Products Group of Uniroyal, Inc., Mishawaka, Ind.

Shaped like a giant wide wheel, the Sealdrums®, as it is called, has revolutionized the technology of handling liquids. The drum can be pushed, rolled, or towed, as well as carried, for maximum mobility. And, when empty, it collapses to only 15 percent of its fully loaded size for return shipping.

Sealdrums are produced in three basic sizes. The 55-gallon drum is 34¼ inches long with a diameter of 23½ inches. The 250-gallon drum is 60 inches long and has a 40-inch diameter. The giant 500 gallon drum is 62 inches long with a 53⅛-inch diameter. The 500-gallon drum holds approximately the same volume of liquid as ten 55-gallon commercial steel drums but occupies less than half the space.

Their operating temperature range is from −30 to 165 F. Ruggedly built of rubber-coated rayon tire cord with an outer surface layer of tough neoprene, Sealdrums feature various inner liners compatible with the liquid to be carried. Every Sealdrum is equipped with swivel-plate lugs for tow bar towing and with shackles for tie-down on helicopter or crane lifting.

According to **George Greener,** manager of Uniroyal's ESP Group, Sealdrums were initially developed to serve the military. If punctured, the drum is easily repaired, even when full, by inserting a special plug from the outside. This resistance to tearing or enlarging a puncture, and ease of repair, is making them a favorite for industrial use under rugged shipping conditions. They also can be stored outdoors, whereas metals or paperboard containers must be warehoused.

For further information and free literature,

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Student Paper Presented At SNAME Northern California

The annual student paper meeting of the Northern California Section of The Society of Naval Architects and Marine Engineers was held recently at the Engineers Club in San Francisco. This meeting was also Past Chairmen's Night, with many past section chairman attending as honored guests.

The technical portion consisted of a paper by **Ygal Shapir** and **Gregory J. White,** University of California, Berkeley, titled: "An Analysis of the Ultimate Strength of Deck Structures Under Inplane Loads." In the paper, a step-by-step procedure for determining the mode of failure and the ultimate strength of ship deck structures under compressive loads was developed. A comparison of several analytical theories for buckling strength in the elastic and inelastic zones was presented, and the reason for the approach taken at each step in the procedure explained.

The final results are a flow chart and an algorithm, which is easily adapted to most computer systems. A program written in FORTRAN was included in the paper, together with input and output examples. A discussion period followed presentation of the paper by co-author **White**.

Walton Rice Joins Pott's Inland Waterways Division As Operations Director

Walton H. Rice Jr.

Walton H. Rice Jr. has been appointed director of operations of the Inland Waterways Division (IWD), Pott Industries Inc., it was announced by **Robert A. Labdon,** senior vice president-operations of the division. Pott is a member of the Houston Natural Gas Corporation group of companies.

Mr. **Rice** joins the IWD from the Dundee Cement Company. His new position carries with it the responsibility for overall marine operations of Federal Barge Lines, Inc., United Barge Company, and their wholly owned subsidiaries.

Catalog Detailing Its Full Line Of Products Available From Kraissl

The Kraissl Company of South Hackensack, N.J. offers a 172-page catalog that describes, in text and drawings, the many products it supplies to the marine field. The company has been engaged for many years in the design, development, manufacture, and supply of pumps, separators, and other fluid-handling equipment.

The standard line of Kraissl products includes rotary air compressors, vacuum pumps, centrifugal pumps, rotary positive displacement liquid pumps, special valves, and separators, including strainers and filters.

In order to supply products for the many specialized applications in the original equipment field, The Kraissl Company is prepared to supply, in addition to its standard line of equipment, specially designed products for quantity applications.

For a copy of the Kraissl catalog, which will be sent with no obligation,

Write 32 on Reader Service Card

The Money Saver

Burmeister & Wain Shipyard, Copenhagen, has attracted worldwide acknowledgement with their new type of Panamax bulk carriers of approx. 64,000 dwt, having obtained a reduction in fuel oil consumption from approx. 60 tonnes daily to approx. 37 tonnes daily, at an average speed of 15 knots compared to more conventional bulk carriers of the same size.

Within 18 months the yard has signed contracts for the delivery of 17 of these bulk carriers.

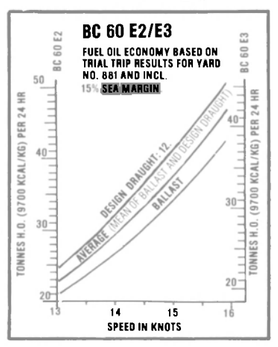
Burmeister & Wain Shipyard belongs to the pioneers in modern shipbuilding.

By continous rationalization and improvements in effectiveness the production period in the building dock has been reduced to 30 workingdays for a Panamax bulk carrier of approx. 60,000 dwt.

Through the yard's department for shipbuilding services a contract has been made for the building of bulk carriers of the new fuel saving type at Samsung Shipyard in South Korea.

Furthermore shipbuilding services have been provided in cooperation with yards in China, Canada, Greece and Egypt.

Burmeister & Wain Shipyard offers design and know-how within shipbuilding-technology, production-technique, management etc.



Burmeister & Wain Skibsværft A/S

Shipyard & Shipbuilding Services

Post Office Box 2122
Refshaleøen - 1015 Copenhagen K - Denmark
Telephone 45 - 1 57 11 33
Telex 31455 bwyrd dk, Telegrams bandwdock

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Ordering Brisk At Dravo, Including Four Towboats At Cost Of $16 Million

Orders for river towboats and barges have been at a high level at Dravo Corporation. During a recent 30-day period, for example, Dravo was awarded contracts to build four 6,000-bhp towboats, each valued at over $4 million. The towboats will be constructed by Dravo's Engineering Works Division, which operates one of the nation's largest inland river shipyards at Neville Island, near Pittsburgh.

Donald P. Courtsal, Dravo vice president and general manager of the division, said that inquiries for towboats are at "a high level reflecting the need for increased horsepower to match the large number of new barges that have been added to the nation's fleet in the past two years."

Last year, Dravo launched 319 hulls, the second highest in the shipyard's history. Mr. **Courtsal** said he anticipates that 1981 will "set a new record." During the same 30-day period, Dravo also recorded orders for 90 hopper barges, and Mr. **Courtsal** anticipates that demand will remain strong through the end of the year.

Dravo also announced that the four towboats it has been constructing for Chang Jiang Shipping Administration of the People's Republic of China will be shipped from New Orleans to China in June.

N.A. DiRenzo To Head New Philadelphia Office Of Designers & Planners

Designers & Planners, Inc., a naval architecture and marine engineering firm with offices in Washington, D.C., and Galveston, Texas, is establishing a Philadelphia Area office. It will provide services to Philadelphia naval activities and other marine-associated organizations within this proximity. The office is located at 1030 North Kings Highway (N.J. Route 41), Cherry Hill, N.J. 08034; (609) 667-7005.

Fred Serim, president, announced the appointment of **N. Anthony DiRenzo** as office manager. In this capacity, he will report to vice president **Chet Kizilkaya**.

Prior to joining the firm, Mr. **DiRenzo** was employed at the Philadelphia Naval Shipyard and the Naval Ship Systems Engineering Station for a total of 33 years. He has wide experience in maintenance and repairs of equipment and operation of submarine and surface type ships.

Western Gear Awarded $1.5-Million Contract For Six Drilling Rig Drives

J. David Shlemmer, vice president of Western Gear Corporation and manager for the Power Transmission Division, announced that Daewoo Shipbuilding and Heavy Machinery, Ltd. of South Korea has awarded Western Gear a $1.5-million contract for six propulsion drives to be installed on three Daewoo Pacesetter-class semisubmersible drilling rigs being constructed for Reading and Bates and Santa Fe International.

The new enhanced Pacesetter design incorporates the latest technology in maneuverable drilling rigs, including Western Gear's 3,400-horsepower propulsion drives featuring a 13-percent increase in horsepower rating for these newer rigs. The increased horsepower rating has met the current American Bureau of Shipping and U.S. Coast Guard regulations for the 3,400-horsepower rating.

Additionally, the thrust capacity has been increased 30 percent to 132,000 pounds to meet the enhanced requirements of the Daewoo Pacesetter rigs for speed and maneuverability in harsh marine environments.

Jan van Lier Named A Vice President Of Moore McCormack Resources

Capt. Jan A.A. van Lier

Paul R. Tregurtha, president and chief operating officer of Moore McCormack Resources, Inc., has announced that Capt. **Jan A.A. van Lier,** president of the firm's ocean bulk transport subsidiaries, has been elected a vice president of the corporation. Mr. **Tregurtha** stated that, "This appointment was made in recognition of Captain **van Lier's** leadership role in starting Moore McCormack Bulk Transport and in the development of our liquefied natural gas transportation project. Captain **van Lier** has responsibility for all our oceangoing bulk shipping activities."

He has been president of Moore McCormack Bulk Transport since it was formed in 1974. A native of Holland, his previous experience was with the Royal Dutch/Shell Group of Companies, where he held various positions all over the world for nearly 35 years. He holds a Master Mariner's license, and has some 20 years of merchant marine service, including about three years as a Suez Canal Pilot.

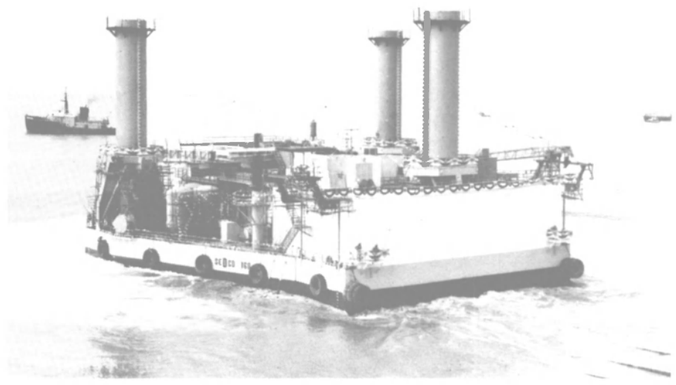
Student Papers Presented At Los Angeles SNAME

The annual presentation of student papers highlighted a recent meeting of the Los Angeles Metropolitan Section of The Society of Naval Architects and Marine Engineers. This sixth meeting of the 1980-81 season drew 38 members and guests of the Society to the Port of Los Angeles for the dinner and technical session aboard the Princess Louise.

The Ocean Sciences Engineering Department at California Polytechnic University, Pomona, under the guidance of Prof. **Nathan Friedland,** sponsored the evening's student talent. Two papers were presented: the first, titled "Microprocessor-Based Salinity and Temperature Meter," was authored and presented by **Carlos A. Avalle,** a 1980 Cal Poly graduate and now an engineer for Interstate Electronics; the second paper, titled "Proposal for the Construction and Study of an Artificial Substrate for Giant Kelp Cultivation," was authored and presented by **Edward J. Willey,** a senior majoring in ocean science engineering.

Mr. **Avalle's** paper, the product of a senior project, dealt with the classic engineering problem of identifying a need, then developing a cost-effective tool to meet the need. The need was to provide accurate measurement of inorganic salt concentration, and corresponding temperature, to determine conductivity of seawater under laboratory conditions.

The evening's second paper dealt with the problem of diminishing fossil-based energy resources by promulgating a means of enhancement of a renewable resource from the sea. The resource chosen, as the basis for Mr. **Willey's** paper, is macrocystis, more commonly known as giant kelp, from which methane gas is produced. Giant kelp is found in near-shore beds (within 100 miles of shore), in depths of up to 120 feet, and is currently farmed as an ingredient for everything from jello to beer. Algin, a kelp derivative, is used in almost anything that needs thickening, including paint and cosmetics.



Sedco Jackup Drilling Rig Christened At Promet Yard

A christening ceremony on a newly built self-elevating drilling rig (shown above) was performed recently at the shipyard of Promet Private Limited in Singapore by **Mrs. Y. Murase,** wife of the senior vice president of Abu Dhabi Oil Company. The rig is the first of three jackup rig contracts which Promet contracted with Sedco Inc., an international drilling company based in the United States, which has a present fleet of 50 rigs operating around the globe.

This rig, named Sedco 160, was designed by Baker Marine Corporation of Ingleside, Texas. Measuring 151 feet by 156 feet, the rig is capable of operating in 160-foot water depth and has accommodation facilities adequate for a 76-man crew. Sedco 160 will eventually be towed to Abu Dhabi for drilling activities.

Other orders from Sedco are Sedneth 201 and Sedneth 202, both measuring 174 feet by 162½ feet by 18 feet; they will be able to operate at water depths of up to 200 feet. In addition, Promet has been awarded a contract from Sedco to construct a semisubmersible rig that can drill in deeper waters than the jackups.

Detroit-Powered Towboat Delivered To FOSTI By Orange Shipbuilding

The towboat Fosti Sybil M. (shown above) was delivered recently by Orange Shipbuilding Company, Inc. of Orange, Texas, to Fuel Oil Supply and Terminaling, Inc. (FOSTI) of Houston. She is the fourth of a five-vessel contract from Fosti, which includes three other pushers and a tugboat.

Powered by twin GM Detroit Diesel 16V92 engines, each rated 600 bhp at 1,800 rpm, the Fosti Sybil M. has an overall length of 65 feet, beam of 26 feet, depth of 10 feet, and normal operating draft of 8 feet. Two Delco 40-kw generators are driven by Detroit 4-71 diesels. All of the engines were supplied by George Engine Company of Harvey, La. Engine monitoring equipment was furnished by the builder, and all electronic gear was owner-furnished.

The main engines turn twin Kahlenberg 66 by 58-inch propellers through Twin Disc model 520 6:1 reverse/reduction gears. The vessel is fitted with two steering and two flanking rudders. The electrohydraulic steering system was designed and supplied by Custom Hydraulics, Inc. The boat carries 17,000 gallons of fuel oil and 11,000 gallons of potable water.

Carlisle & Finch supplied one 1,000-watt and one 750-watt searchlights. The bow winch is a NABRICO 20T; Parker furnished the model 40T stern winch. The crew of five is accommodated in three staterooms, and the vessel is fitted with a spacious, fully equipped galley.

The fifth vessel in the FOSTI contract, the towboat Justin-Lindsay, is the first boat to be built in Orange Shipbuilding's new construction shop. The building has two construction bays, each 220 feet long and 60 feet wide. Three 30-ton cranes within the building facilitate the lifting of heavy units such as machinery, deckhouses, and hull sections.

When a vessel nears completion in the shop, it is transferred outside via a rail system for the final touches, then moved to the yard's new marine railway for launching. Total transit time from the building to the launching ways is about two hours.

Atlantic Dry Dock To Overhaul Navy ARDM At Cost Of $3.5 Million

Atlantic Dry Dock Corporation, Fort George Island, Fla., is being awarded a $3,487,276 firm fixed price contract for the regularly scheduled overhaul of the medium auxiliary repair drydock USS Oak Ridge (ADRM-1). Work will be performed at Kings Bay, Ga. The Supervisor of Shipbuilding, Conversion and Repair, USN, Charleston, S.C., is the contracting activity. (N62670-70-C-0003)

W.L. Kwitchoff Named VP-General Superintendent At Savannah Shipyard

David H. Green, president and chief executive officer of Savannah Shipyard Company has announced the following organizational changes. **William L. Kwitchoff** has been elected vice president-general superintendent, and will be responsible for production and overall yard operations. He is a graduate of the Maritime Administration Merchant Marine Officers Training School, Long Island, N.Y. He sailed with the Isthmian Steamship and Bull Lines following his graduation in 1950 with a 3rd Mates License.

William L. Kwitchoff

During the period 1954 to 1961, Mr. **Kwitchoff** served on active duty with the U.S. Navy as a pilot and after completing an engineering program, spent two and one-half years in the capacity of main propulsion officer. Other assignments have included boiler officer and auxiliary division officer. In 1963, he joined Bethlehem Steel Corporation's Baltimore Yard, where he worked as a ship superintendent until 1966, when he joined Savannah Shipyard Company.

William J. Foran, vice president-production, has been assigned to the newly created position of technical consultant, and will remain as a vice president. In this position, Mr. **Foran** will assume the duties and responsibilities associated with special assignments relating to ship repair, ship conversion, steel fabrication, and industrial work. He has been vice president-production since 1973. He joined the shipyard in 1935 as an apprentice, and has carried out various repair responsibilities since that time.

Lunceford Elected Board Chairman And President Of National River Academy

David G. Lunceford, manager of the Gulf Coast Branch of the Marine Department of Exxon Company, U.S.A., was recently elected chairman of the board and president of the National River Academy for the year 1981-82, **Thomas Tooker,** executive director of the academy, announced.

Mr. **Lunceford** has served as Exxon's representative on the academy's board of directors since March 1978, and has served as vice chairman since May 1979. He replaces **Frank Stegbauer,** vice president of Southern Towing Company, Memphis, who served as the chairman and president of the academy for two years.

During Mr. **Stegbauer's** term as board chairman and president, the student population increased 84 percent, resulting in the building of two student housing units. In addition, he was instrumental in initiating three new programs at the academy: a two-week basic engineering course, a one-week dietician management course, and an audiovisual aids library and program planning division.

Vu-Gage Systems Ordered By NASSCO For Tankers

Vu-Gage System, New York, N.Y., a Mobil company, has been awarded contracts for visual inspection and measuring aids to be installed on two new liquid cargo carriers, under construction for Ingram Tankships at National Steel & Shipbuilding Co. in San Diego. The Vu-Gage® units, fitted with high-impact, scratch-resistant viewing ports and manually operated underside wiper blades, permit easy direct inspection of cargo level. The units, which will be installed in 32 ports of the two new Ingram vessels, are constructed of brass and equipped with segmented stainless-steel dipsticks mounted directly below the viewing ports for precise readings near full tank levels.

The simple, easy-to-use viewing and measuring devices will supplement other automatic sounding equipment on the tankers during final topping off of cargo. They also permit routine inspection of cargo levels during various stages of loading, transporting and unloading.

For details and free literature on the Vu-Gage cargo monitoring system,

Write 19 on Reader Service Card

Wood Elected President Of Northwest Towboat Association, Seattle

Bill Wood, Marine Leasing Corporation, was elected president of the Northwest Towboat Association at its recent 15th Annual Membership Meeting. **Don Lusk,** Puget Sound Tug and Barge Company, was elected vice president; while **Bill Epping,** General Construction Company, was elected secretary-treasurer.

Other members of the board of directors elected to serve until March 1982 are **James L. Dunlap** of Dunlap Towing Company; **Don Foss** of Puget Sound Freight Lines; **Fred Meyer** of Washington Tug and Barge Company; **Jack Minkler** of Foss Launch and Tug Company; and **Jerry Russell** of Foss L & T Company.

Member companies of the Northwest Towboat Association are engaged in worldwide towing operations in addition to performing a full range of tug, barge, ship assist, log towing, and marine construction services within the Puget Sound and Alaska areas.

R.E. Fisher Appointed VP-Marine Services At SeaTec International

Richard E. Fisher has been appointed vice president, marine services, for SeaTec International Ltd. by president **William T. Jebb Jr.** Mr. **Fisher's** primary responsibilities will be business development and client contact for SeaTec's Services Division out of the company's Houston facility.

Richard E. Fisher

His prior experience includes vice president of sales for a major offshore service company, three years as a marketing manager for a diving and construction services company, and two years as a diving supervisor and operations manager for a major international underwater contracting firm. Mr. **Fisher** also worked four years as a commercial diver.

SeaTec is a marine contracting and underwater construction company with headquarters in Gloucester, Mass., and offices around the world in Houston, New York, San Juan, Singapore, Great Yarmouth, U.K., St. John's Newfoundland, Cairo, and Mexico City.

Southwest Marine Gets $5.5-Million Contract For Work On Navy Ammo Ship

Southwest Marine of San Francisco, Incorporated, San Francisco, is being awarded a $5,473,-201 firm fixed price contract for the overhaul and repair of the ammunition ship USS Pyro (AE-24). The Supervisor of Shipbuilding, Conversion and Repair, USN, San Francisco, Calif., is the contracting activity. (N62798-81-B-0050)

R.T. Hensley Joins Curtis Bay Towing As Vice President

Reginald T. Hensley

Reginald T. Hensley has been elected vice president of Curtis Bay Towing Company of Virginia, according to an announcement by **Malcolm W. McLeod**, president. Mr. **Hensley** is scheduled to become general manager of the company when **Tarleton A. Schuyler** retires from that post in June after 40 years of service.

Prior to joining Curtis Bay, Mr. **Hensley** served as manager, vessel services, for El Paso Marine Company. He entered private industry after 22 years of service with the U.S. Coast Guard.

Curtis Bay Towing operates tugs in Baltimore, Philadelphia, and Hampton Roads, from which it provides harbor, inland, coastwise, and oceangoing towing services.

DEBEG Marine Opens New U.S. Headquarters

DEBEG Marine Inc. has formally launched its entry into the U.S. and Canadian markets with the opening of its new headquarters in Salem, N.H. **Rolf D. Seichter** is president of the U.S. operation while **Robert McCarthy** is sales manager. Mr. **McCarthy** is a well-known figure in marine communication circles and was recently a sales manager with Raytheon Marine.

The leading German manufacturer of marine communications and safety equipment, the Hamburg-based DEBEG is a subsidiary of Siemens AG and AEG Telefunken. In addition to its new U.S. operation, it has subsidiaries in Rotterdam and Singapore.

Long known as a supplier of high quality communications, DEBEG was founded in 1911. Today, the company has many thousands of installations in coastal radio stations, on drilling platforms, seagoing vessels, inland waterways vessels, and on pleasure craft.

DEBEG offers a complete range of products and services worldwide. It sells virtually every type of marine communications equipment, from single units to customized total systems—including receivers, transmitters, VHF sets, radar, radiotelephone systems, satellite radio stations for telex, telephone and data transmissions, plus Loran-C navigation systems, various intercom units, and even racks and other accessories.

The company has major maintenance and stocking facilities throughout Germany and in Rotterdam, Singapore and, in the near future, various U.S. locations, and offers complete customer services. Besides major production facilities in Germany, DEBEG currently produces equipment in the U.S.

For full information,

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Another Shiplift Record...

712 FT. VESSEL LIFTED ON 604 FT. SYNCROLIFT

Cargoship Cabo Corrientes (43,600 DWT) on Syncrolift platform, in large photo, waiting to be moved to work berth via transfer system. The bow extends 108' beyond sea end of platform.

Photo above on left shows ships in transfer area/work berths at Tandanor, Buenos Aires, with platform free to service the next vessel. Middle photo is close-up of side transfer rail system on which vessels were moved from Syncrolift to work berths. Photo on right shows 16 vessels in work berths at Astilleros Canarios, S.A., Las Palmas, Canary Islands. Note Syncrolift ready to lift a 17th vessel.

After 22 years, Pearlson is still the only company in the world totally dedicated to the shiplift and transfer system needs of the marine industry.

We would like to show you how Syncrolift's efficiency can improve your earnings.

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FIRST BOX HOPPER LAUNCHED—Equitable Shipyards, Inc. recently launched the first 200 by 35 by 12-foot box type river hopper barge to be built at its New Orleans shipyard. Equitable's unique design of river hopper barges serves to continue the comany's role as a leader in marine fabrication, which has made Equitable one of the largest medium-sized shipbuilders in the world. Equitable is a wholly owned subsidiary of Trinity Industries, Inc., Dallas, a manufacturer of industrial, marine, and structural products.

Hampton Roads SNAME Meeting Featured Sailing Film-Narration

Outgoing Hampton Roads Section chairman **Donald E. Kane Jr.** (left) received certificate of Appreciation from **C.W. Coward,** a past chairman of the Section.

The Hampton Roads Section held its annual "Ladies Night" meeting at Newport News Shipbuilding recently. The feature of the evening was a sailing film-narration by **John Biddle** of Rhode Island. Renowned for his sailing films and film-lectures, he presented his 25th Anniversary Sailing-Film-Show "Silver Sails."

The 242 members, wives and guests began the evening with a social hour hosted by Newport News Shipbuilding, followed by a buffet dinner. After dinner the business portion of the evening was opened by Section chairman **Donald E. Kane**. **Roy L. Harrington** then announced the election results for the coming year. Elected officers for 1981-82 were: chairman, **Donald L. Blount,** head of Design Branch, Combatant Craft Engineering Department, Naval Ship Engineering Center; vice chairman, Mr. **Harrington,** naval architect and technical manager, Newport News Shipbuilding; secretary-treasurer, **Sam A. Tatum,** manager, Engineering Technical Department, Newport News Shipbuilding; and Capt. **David P. Donohue,** commander, Norfolk Naval Shipyard, to a three-year term on the Executive Committee.

Mr. **Biddle's** "Silver Sails" presentation began with a film-narration of the "Great Connecticut River Sunfish Marathon," which is held yearly, followed by "The 1980 Single-handed Trans-Atlantic Yacht Race," for sailing boats as large as 50 feet or more, and finally "The America's Cup Trials and Final Races of 1980." His expert narration of these films was extremely entertaining as it contained the humor of the Sunfish Marathon, the thrills and disappointments of the Trans-Atlantic Yacht Race, and the American victory in the America's Cup Race. The later parts of the show, the Trans-Atlantic Yacht Race and the America's Cup Race, proved to be highly interesting to the sailing enthusiasts present.

Puget Sound ASNE Hears Firsthand Account Of 'Prinzendam' Incident

Members and guests of the Puget Sound Chapter of the American Society of Naval Engineers met recently at the Edgewater Inn in Seattle. The speaker, Lt. Comdr. **Steven J. Corcoran,** who was operations officer onboard the USCG cutter Boutwell during the search and rescue effort, gave an excellent presentation. The subject, "The Prinzendam Incident," emphasized the cooperation between the U.S. Coast Guard, Air Force, and Canadian agencies. Many insights were gained into the problems of search and rescue and, particularly, that of transferring people from lifeboats to the rescue ships.

Another highlight of the evening was the election of the 1981-82 officers. The following slate of officers were elected: chairman, Lt. Comdr. **Mike Knight;** vice chairman, Stan **Stumbo;** secretary-treasurer, **David E. Todd;** councilors, Comdr. **William R. Nodell** and Capt. **Leo Gies.**

Rivtow Straits Orders EMD-Powered Tugboat From John Manly Yard

Rivtow Straits Ltd. of Vancouver, British Columbia, Canada, has announced the awarding of a contract for its largest vessel yet. Designed by Talbot Jackson & Associates, also of Vancouver, the twin-screw tug will be built by John Manly Shipyard in Vancouver, with delivery scheduled for late 1981.

As yet unnamed, the vessel will have an overall length of 144 feet, beam of 39 feet, depth of 20 feet 8 inches, and draft of 16 feet 9 inches. She will have a capacity for 135,000 imperial gallons of fuel oil, and 7,100 gallons of water.

Main propulsion will be by two General Motors Electro-Motive Division 16-645-E7B diesels, each with a maximum continuous rating of 3,070 bhp at 900 rpm, driving 4-bladed Western stainless-steel, 120-inch-diameter propellers.

The tug is to tow a 15,000-dwt log barge, currently under construction and scheduled for a similar delivery date. The new tugboat, Manly's Hull No. 580, is believed to be the largest and most powerful tug ever built in British Columbia. The self-dumping log barge and the tug represent a major addition to the Rivtow fleet, and furthers the company's commitment as the largest transporter of logs in the Province.

Fred Shumaker Joins McClure Associates As Vice President

Alan C. McClure Associates, Inc. of Houston, naval architects and engineers, specializing in consultation work for a range of offshore and marine transportation related activities, has announced that **Fred E. Shumaker** has joined the firm as vice president. A graduate of the University of Michigan with 15 years of experience in naval architecture and engineering management, Mr. **Shumaker** was previously manager, marine engineering, with El Paso Marine Company.

Derek C. Scovell has been promoted to senior staff engineer. He is a graduate of the University of London, with 18 years of experience in marine and offshore activities. Mr. **Scovell** has been with McClure Associates for 14 months, and was previously with Petro-Marine Engineering, Inc.

John N. Case is joining McClure as senior naval architect. He is a graduate of the University of Michigan with 23 years of experience in the marine industry. Mr. **Case** brings aboard his experience from Case Existological Laboratories Ltd.

scheduled for delivery to Sun Transport later this summer.

The Suncor Chippewa is powered by a Mitsui/B&W 6L55GFC diesel engine with a maximum continuous output of 8,040 bhp at 150 rpm that will enable the ship to maintain a service speed of 14 knots. Three 650-kva diesel generators provide electric power.

Features of the ship include automation, permitting unmanned operation of the engine room and reduced crew (30) size. Individual stainless steel cargo pumps and piping systems, one per tank, are provided to discharge the cargo in six separate segregations. Other features include a sewage storage and treatment system, a cargo tank heating system, dual 100-percent steering gear machinery and control system, and a satellite navigation system that will enable the vessel to pinpoint its position at any given time.

The Suncor Chippewa is designed to carry many types of bulk liquid chemicals and petroleum products, including those classified as type II and type III by the Inter-governmental Maritime Consultative Organization. These are types requiring special ship design and handling.

McCulloch Appointed VP-General Manager Of Foss Alaska Line

Theodore McCulloch

Theodore McCulloch has been named vice president/general manager of Foss Alaska Line (FAL), the Seattle-based subsidiary of Foss Launch & Tug Company. During his tenure with FAL, Mr. **McCulloch** has served as market development manager and most recently as sales manager with responsibility for all FAL sales and marketing activities.

He succeeds **Tom V. Van Dawark,** who has been promoted to president of Dillingham Maritime-Ocean Transportation Services Division. Announcement of the appointment was made by **Bruce J. Robeson,** president of Foss Launch & Tug. According to Mr. **Robeson,** Mr. **McCulloch** will have full responsibility for the operating activities of Foss Alaska Line.

Ingalls Gets $14.3-Million Navy Award For Long Lead Material For Aegis CG-51

Ingalls Shipbuilding Division, Litton Systems, Inc., Pascagoula, Miss., is being awarded a $14,306,896 modification to a previously awarded cost-plus-fixed-fee contract for additional long lead material for Aegis cruiser CG-51. The Naval Sea Systems Command is the contracting activity. (N00024-81-C-2021)

Sun Transport's Latest Carrier Has Many Advanced Features

Sun Transport, Inc., Aston, Pa., recently took delivery of the Suncor Chippewa, a 20,000-dwt petrochemical carrier constructed by Hayashikane Shipbuilding & Engineering Company, Ltd. of Shimonoseki, Japan. Sun Transport will operate the vessel in world trade for Sunchem Ltd. of Canada, another subsidiary of Sun Company.

The 505-foot vessel, with a beam of 74½ feet, depth of 45¼ feet, and design draft of 31½ feet, is the first of two being built by Hayashikane for subsidiaries of Sun Company. The second petrochemical carrier is

Albert Termo Named VP-Marketing And Planning At Universal Maritime

James G. Costello, president of Universal Maritime Service Corporation, has announced appointment of **Albert Termo,** a veteran marine terminal and ocean trade specialist, to a new company position as vice president of marketing and planning. The action was described by Mr. **Costello** as a step in a long-term program by the New York-based stevedoring company to expand operations into fresh areas of waterfront cargo handling that are expected to develop in the Port of New York and New Jersey in the present decade.

Mr. **Termo** was a key member of the staff of the Port Authority of New York and New Jersey for some 30 years. In this capacity, he was deeply involved in development of the port agency's extensive containership facilities in Newark and Elizabeth, N.J., and the new Red Hook terminal in Brooklyn, among others. He also participated in conversion of obsolete breakbulk piers in Newark into efficient waterfront areas that now handle part of the growing volume of bulk cargoes moving through the port district.

Universal Maritime is one of the major stevedoring and marine terminal operating companies in the United States, and one of the biggest of its type in the bistate harbor.

Norshipco Names New Officers—Wesley Payne Promoted To Senior VP

Wesley D. Payne

John L. Roper III, president and chief executive officer of Norshipco, has announced the election of two new company officers and a promotion for one current officer. The corporate changes were made by the Norshipco board of directors.

Ralph Torrech III

Wesley D. Payne was promoted to senior vice president of production; he had been a vice president of the company. The new officers are **Ralph Torrech III,** assistant vice president and manager, Berkley Plant; and **Bryce B. Fisher,** assistant vice president and general manager, Brambleton and Southern Plants. Both had held previous positions with Norshipco.

Bryce B. Fisher

James G. Price, formerly senior vice president of production, was named senior vice president of special projects.

Yugoslav Shipyards Licensed To Build Rigs Designed By Levingston

Ed Paden, president of Levingston Shipbuilding Company of Orange, Texas, has announced that a license agreement has been signed between Levingston and Viktor Lenac Shipyard, acting for itself and on behalf of Jadranbrod, the Association of Yugoslav Shipbuilding Industries, which has about 25,000 employees.

The agreement allows the various shipyards of Jadranbrod to build the Levingston Class 111-C jackup drilling platform. In a simultaneous announcement, Viktor Lenac Shipyard revealed that it has already signed a contract for the construction of its first 111-C jackup for Ina-Naftaplin, the Yugoslav national oil company. The rig will be constructed in the Viktor Lenac Shipyard in Rijeka and the Uljanik Shipyard in Pula, and will be delivered at the beginning of 1983.

Coastal Gets $9.6-Million Navy Contract For Drydock Overhaul

Coastal Dry Dock and Repair Corporation, Brooklyn, N.Y., is being awarded a $9,671,700 firm fixed price contract for the regularly scheduled overhaul of the USS Los Alamos (AFDB-7) (large auxiliary floating drydock). The Supervisor of Shipbuilding, Conversion and Repair, USN, Brooklyn, N.Y., is the contracting activity. (N62794-70-C-0010)

Walter Beam Named Vice President-Research And Development At Sperry

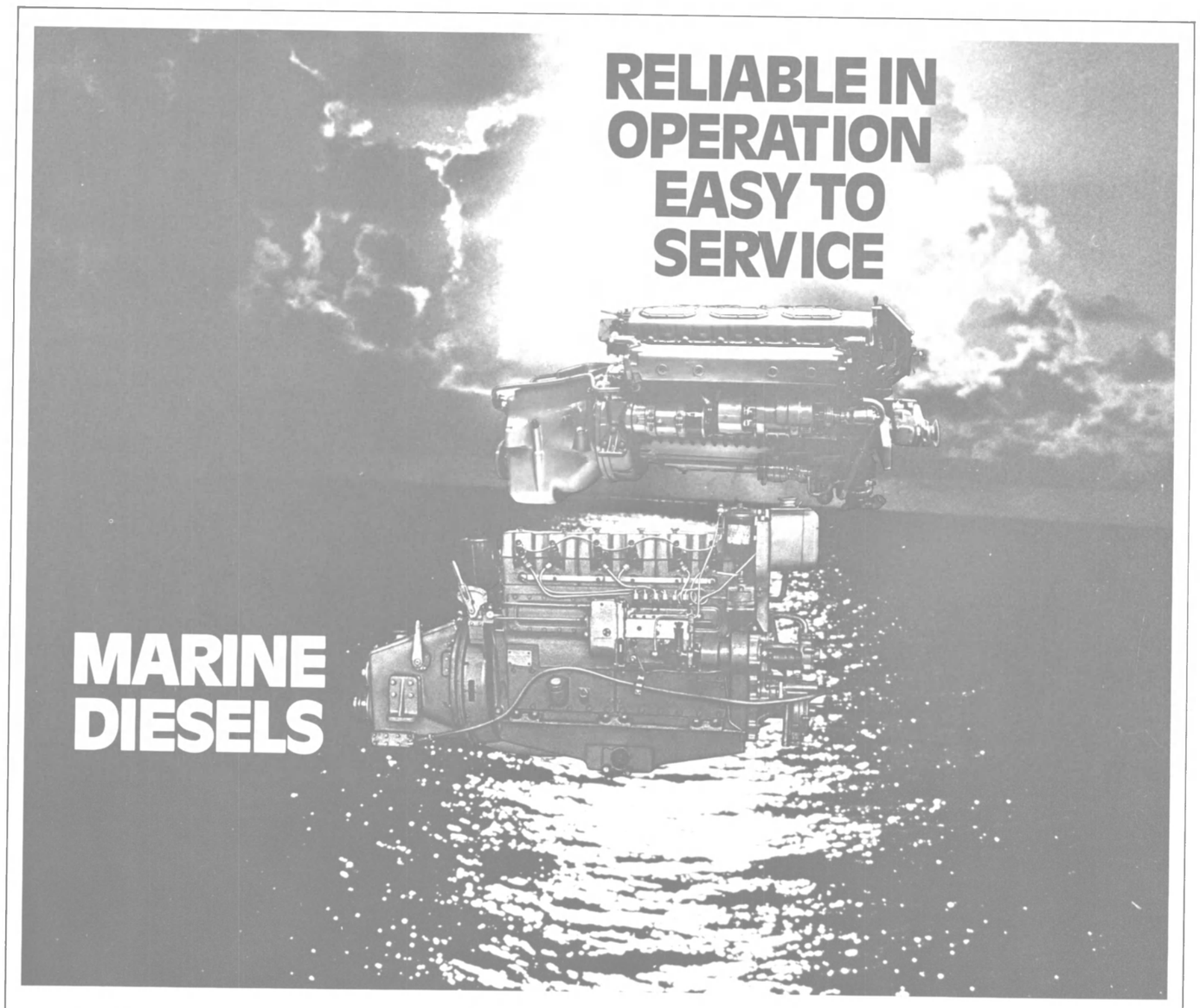
Dr. Walter R. Beam

Robert L. Wendt, president of the Sperry Division of Sperry Corporation, recently announced the appointment of Dr. **Walter R. Beam** to the newly created post of division vice president for research and development.

In his new position, Dr. **Beam** will be responsible for monitoring and advising on the status and progress of the division's contract and independent research and development projects. He will also review the division's business and technology plans and investment strategies, and will act as liaison between Sperry and the U.S. Department of Defense technical community, selected universities and trade and technical societies.

Before joining Sperry, Dr. **Beam** served from 1974 until 1981 as deputy for advanced technology in the U.S. Air Force's Office of the Secretary, and was responsible for review and approval of the Air Force's technology programs, including flight simulator technology and many communications, command, and control development programs. He served as senior Air Force member of the DOD Management Steering Committee for Embedded Computer Resources, and directed the Air Force Systems Command's COMTEC 2000 study on future computer technology.

From 1970 to 1974, he served as a technical and management consultant. Dr. **Beam** also worked with International Business Machines, first as manager of exploratory memory at IBM's Research Center, and then as director of engineering technology for IBM's Systems Development Division. He also was a member of RCA Laboratories, both as a member of the technical staff and later as manager of the microwave advanced development lab.



Models	Capacity, hp.	rpm
4 TchSP 8.5/11	25	1,500
6 TchSP 9.5/11	55	1,800
6 TchSP 15/18 (ZD6)	150	1,500
12 TchSP 25/18 (ZD12)	300	1,500

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Krupp MaK Extends License Agreement With UBE Industries

In 1977 the cooperation between Krupp MaK Maschinenbau, Kiel, and UBE Industries, Ube-City, Japan, started by signing a license agreement for the manufacture of diesel engines, and this is now extended by the license for the N 601 series including all types with six, eight, or nine cylinders, the cylinder output being 1,000 kw (1,360 bhp). The license agreement will be valid for 10 years.

The current planning at UBE includes the supply of an 8 M 601 twin-engine installation for a bulk carrier in the spring of 1982. The M 601 license will enable UBE to offer a modern and economical medium-speed diesel engine program from 2,250 to 12,300 bhp in Japan. These engines can burn heavy fuel.

Brochure Available On Oil/Water Emulsifier From Cleanodan A/S

A brochure on the Cleanofire fuel oil/water emulsifier manufactured by Cleanodan A/S of Denmark is now available. The company is represented in the U.S. by American United Marine Corporation.

Cleanofire can be installed with minimum modifications of the existing plant, independent of type of oil burner. Only one unit is necessary for a boiler plant, regardless of the number of burners. The unit is installed between the oil tank loop and oil burner loop with two three-way ball valves, so that it is possible to switch easily between operation with and without water.

The control box is arranged for a completely automatic switch in case of any failure. A separate control panel contains all necessary components for fully automatic operation.

For further information and a free copy of the brochure,

Write 35 on Reader Service Card

Levingston To Build Rig For Mexican Owner At its Port Arthur Division

Officials of Levingston Shipbuilding Company, Orange, Texas, have announced that its Port Arthur Division, Gulfport Shipbuilding, will construct a Levingston-designed offshore drilling rig. The Class 111-C jackup drilling vessel will be built for Compania Perforadora of Mexico. Triangular in shape, this unit will be 200 feet by 186 feet by 23 feet, and accommodate a crew of 54. Three 414-foot-long legs will allow this rig to operate in 300 feet of water and drill to a depth of 25,000 feet. Designed to operate under the harshest of weather conditions, this jackup will be able to withstand winds of up to 109 knots and seas of 50 feet.

Levingston officials stated that the decision to construct this rig at Gulfport is the first step in the company's commitment to expand and upgrade its capabilities to once again include the construction of new vessels at the Port Arthur location. This contract represents the first major new construction project undertaken by Gulfport since 1976. For the past several years, the yard has concentrated its efforts primarily in the area of repair work, providing to the marine and offshore industries complete repair facilities for a wide variety of vessels including conventional ships, barges, and all types of offshore drilling equipment.

Approximately 200 additional employees including all crafts as well as some unskilled labor will be hired to construct the jackup drilling rig. This increase will bring the manpower level to 650 employees and enable the shipyard to maintain its present level of ship repair work along with the construction of the drilling rig. Preliminary work on the jackup has already begun.

$1.2-Million In Marisat Terminal Contracts Goes To Scientific-Atlanta

Scientific-Atlanta, Inc., has announced the receipt of orders of a total value of approximately $1.2 million for Model 3055M Marisat satellite communications terminals from two of the largest international oil companies.

Texaco Inc. has ordered 11 communications terminals to be placed on its tankers used in U.S. Gulf and international service. The shipboard terminals will modernize ship-to-shore communications on these vessels by the use of Comsat General's Marisat satellite communications system. An order for 10 shipboard terminals has been received from Phillips Petroleum Company for equipping tankers in its international fleet. The terminals will provide telephone, telex, and data service to and from ships, ports, and company facilities throughout the world.

Scientific-Atlanta has sold more than 500 shipboard terminals for Marisat service since the program was begun in 1974. The Marisat international network is replacing previous slow and often unreliable, short-wave maritime communications. The satellite system provides instant communications contact and is credited by owners and ships' captains with improving safety and bringing about significant savings in fleet operations.

New Brochure Available On Offshore Products From Dunlop Limited

A new 24-page brochure is now available from Dunlop Limited detailing the products and services offered by the company for the offshore industry. Entitled "Dunlop Offshore," the publication provides an easy reference to the vast range of items available from a number of different Dunlop divisions.

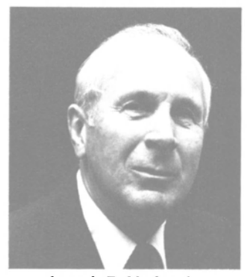
Products can be traced either through the complete alphabetical list included in the publication or under one of the eight sections covering a specific area of the offshore industry. In each section there is a description of the product and the name and address of the Dunlop division or associate company producing the goods.

For a free copy of "Dunlop Offshore,"

Write 36 on Reader Service Card

Madeo Appointed Vice President-Operations For Ocean Salvors

Joseph F. Madeo Jr. has been named vice president, operations of Ocean Salvors Company, a joint venture of Moran Towing Corporation of New York, and Crowley Maritime Corporation of San Francisco.



Joseph F. Madeo Jr.

Captain **Madeo** formerly served in the U.S. Navy in many capacities involving marine salvage, wreck removal and ocean engineering. He retired from the Navy with the rank of commander and thereafter, as a civilian, continued to work in the same areas. He was awarded the "Navy Meritorious Public Service Citation" for his contribution as Project Manager of the 1974 Suez Canal Wreck Clearance.

Ocean Salvors is an American salvage firm offering a full range of salvage and environmental services throughout the Western Hemisphere. Principal offices are in New York, N.Y.; Carteret, N.J.; and Miami, Fla.

$622,500 Contract For Atlantic Marine Yard Authorized By MSB

The Maritime Subsidy Board has authorized the award of a $622,500 contract to Atlantic Marine, Inc., Jacksonville, Fla., for the subsidized construction of a twin-screw, diesel-powered landing craft-type cargo vessel to be owned and operated by Blue Lines, Inc., Cruz Bay, V.I.

The interisland trailer carrier is intended for service in the waters of the U.S. Virgin Islands, British Virgin Islands, and Puerto Rico on short international voyages not more than 20 miles from land. It will be certified for carriage of combustible and flammable liquids in trucks approved by the U.S. Department of Transportation.

The vessel will be 83 feet 6 inches in length, with a molded beam of 26 feet. Its cargo capacity is to be 78 tons and its service speed 10.3 knots. It will have provisions for six people, including two crew members.

Construction-differential subsidy for the vessel was set at $258,500, or 41.52 percent of total cost. In addition, the board authorized $2,500 for the installation of certain national defense features.

Riva Schwartz Promoted To Sales Manager For Simrad, Inc.

Riva Gaft Schwartz

Riva Gaft Schwartz has been appointed sales manager for Simrad, Inc. She has been a member of Simrad's Marketing Department for several years. Before joining Simrad, **Ms. Schwartz** was sales administrator and advertising manager for Communication Associates, Inc.

Ms. Schwartz will be stationed in Simrad's main U.S. office in Armonk, N.Y. She will also work closely with Simrad's branch offices in New Orleans, Houston, Seattle, and San Diego.

Simrad is the U.S. distributor for Simrad high performance fish-finding equipment, Simrad/Skipper echosounders and sonar, Simrad/Taiyo Loran-C, ADF, and Weather Fax, and Simrad/Oki radar.

New Brochure Describes High-Level Tanker Alarm With Automatic Shutdown

Ian-Conrad Bergen, Inc. of Gulf Breeze, Fla. offers an eight-page, full-color brochure describing its Guard Level® 07324 high-level alarm and automatic shut-down system. It is a single unit sensor for use in chemical, crude oil, and liquefied gas tankers, and is said to have features that save time and money and insure the utmost in reliability.

The Guard Level complies with IMCO 4.14 and U.S. Coast Guard 153.408/409, and is type approved by the American Bureau of Shipping, Bureau Veritas, Det norske Veritas, Department of Transport (U.K.), and Lloyd's Register of Shipping. The unit's unique design and heavy-duty AISI 316L stainless steel construction forms a solid foundation for strong reliability and firm resistance to corrosive compounds, the manufacturer states.

For a free copy of the brochure, which is illustrated with diagrams and photographs,

Write 37 on Reader Service Card

Flagship of the Ingram Fleet

The 9000 HP M/V John M. Donnelly is the largest of Ingram Barge Company's fleet of 18 towboats. Named after the company's President, this triple screw, Hydrodyne, is now the Flagship of Ingram's Fleet. It was tailored to perform specific operations required by Ingram with great power and reliability. St. Louis Ship's HYDRODYNE design designation identifies its exclusive and thoroughly tested combination of hull

lines, nozzle and propeller design, rudder configuration and steering system. Hydrodyne Hull towboats perform better in pushing and backing, with special emphasis on improved maneuvering and steering. Let us help increase *your* profits by designing a Hydrodyne towboat to satisfy *your* operating needs. Call St. Louis Ship, today, at (314) 638-4000.

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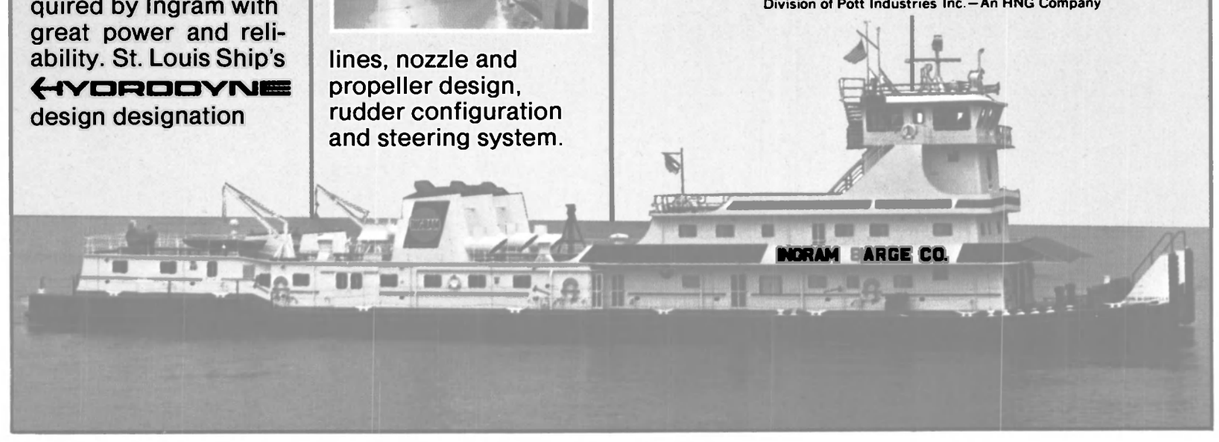

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Marinette Marine Awarded $1-Million Navy Contract For MCM Evaluation

Marinette Marine Corporation, Marinette, Wis., has been awarded a Ships System Design Study contract by the Naval Sea Systems Command to evaluate the proposed arrangements and construction techniques of the new class of Mine Countermeasure vessels (MCM) to be built in the near future.

The SSDS design contract will concentrate on review and evaluation of composite vessel construction techniques, including the utilization of wood hull structure, fiberglass superstructure, and nonmagnetic machinery components. Results of the study will be utilized by the Navy in assembling the final contract package of drawings and specifications prior to construction of the lead ship and subsequent follow-on vessels.

The SSDS study will be accomplished by Marinette in conjunction with its design support team of M. Rosenblatt & Son, Inc., Sperry, Jered Brown, and others, over a period of 11 months. Value of the SSDS contract is in excess of $1,000,000.

New Catalog Describes Campbell Chain's Line Of Marine Products

Campbell Chain Division of McGraw Edison Company, York, Pa. has just released a 30-page illustrated catalog detailing its general line of products for the commercial marine industry, including such items as chain, fittings, and Brewer-Titchener blocks, as well as accessory items including locks, snaps, and cable pullers.

For a free copy of Campbell catalog No. 2788, which includes full specifications for all the products listed,

Write 20 on Reader Service Card

Forthofer And Reardon Named Vice Presidents For Perry Oceanographics

Edward Forthofer has been named vice president of manufacturing, and **Patrick Reardon** vice president of engineering for Perry Oceanographics, Inc. of Florida, it was announced by **Hap A. Perry**, president.


Edward Forthofer

Formerly vice president of manufacturing for Pompano Manufacturing, Inc. of Pompano Beach, Fla., Mr. **Forthofer** worked on systems fabrication for General Electric, Pratt and Whitney, the U.S. Navy, and others. Prior to this, he was in charge of technical sales for a division of Gulf + Western in Manchester, Conn.


Patrick Reardon

Mr. **Reardon,** who joined Perry in February, was formerly manager of the Southeast region for C.D.I. Marine Company in Jacksonville, Fla., where he specialized in new designs for military and commercial ships. Prior to that, he was senior engineer for Deep Sea Ventures, Inc. of Glouster Point, Va., where he supervised development of ocean mining equipment.

Hitachi To Supply Four B&W Type Marine Diesels To People's Republic

Hitachi Zosen has received an order to supply four main marine diesel engines for two Chinese shipyards, Daliang Shipyard and Hudong Shipyard. The contract for this order was signed recently in Beijing in the presence of **Wu Run Ting**, deputy general manager of China Corporation of Shipbuilding Industry and Dr. **Masao Kinoshita**, president of Hitachi Zosen.

Two Hitachi B&W 8L55GFCA diesel engines will be supplied to the Daliang Shipyard on a complete knockdown basis; Hitachi Zosen will supply complete engine parts and provide guidance for assembly and shop trial. The first engine will be delivered in October 1981 and the second in February 1982. The engines will be mounted in two 27,000-dwt bulk carriers ordered from the shipyard by Hong Kong's Green Island Cement Group.

Hudong Shipyard will also be supplied with two completed engines of the Hitachi B&W 8L55-GFCA type, the first engine in February and the second in June 1982. These engines will be mounted in two 36,000-dwt bulk carriers the shipyard plans to build for the Worldwide Shipping Group of Hong Kong.

New Brochure Available On Monitor For Water Content In Fuel Oil

Nordelektro A/S of Copenhagen is marketing a patented water surveyor monitor system developed by engineer **B. Dollerup Jensen**. The system is specially designed to give continuous and accurate information on the exact water content, down to 0.1 percent, in lubricating oil and heavy fuel oil systems. The Danish firm is represented in the United States by American United Marine Corporation.

Water content is easily readable on a digital instrument, and a light indicates when a pre-set limit in the area of 0.1 to 4.9 percent is exceeded.

For additional information and a free copy of the literature,

Write 38 on Reader Service Card

Hermann Helms Named VP-International For Lykes Bros. Steamship

Hermann Christian Helms has been named to the newly created position of vice president-international for Lykes Bros. Steamship Co., Inc., headquartered in New Orleans, Lykes chairman **Joseph T. Lykes Jr.** announced.

Mr. **Helms**, who will be based in Bremen, West Germany, will serve as the senior representative of Lykes in Europe, the United Kingdom, Africa, the Near East, and Mideast, including the Soviet Union and Eastern Bloc nations of Europe. He will advise the management of Lykes Lines Agency, a wholly owned subsidiary of the company, throughout Europe and Africa on matters pertaining to sales and marketing programs and operations matters. In addition, Mr. **Helms** will work closely with Lykes headquarters in New Orleans in the development of long-range planning, including expansion in new services.

He was employed by Lykes from 1946 until 1951, serving both in Bremen and New Orleans. Upon leaving the company he joined Hansa Lines in Bremen, where he moved through the executive ranks and served as chairman of the Hansa executive board. He had also served as chairman of the German Shipowners' Association, Hamburg, and was one of the organizers of the three-nation Atlantic S.p.A. (Genoa, Italy) Container Line between North America and western Mediterranean ports.

In attendance at recent reception at New York's Waldorf-Astoria Hotel were (L to R): **Jan Burlage,** Schelde general manager; **Angela Wheeler; Wesley D. Wheeler;** and **Frans Kuypers,** Schelde technical-commercial manager.

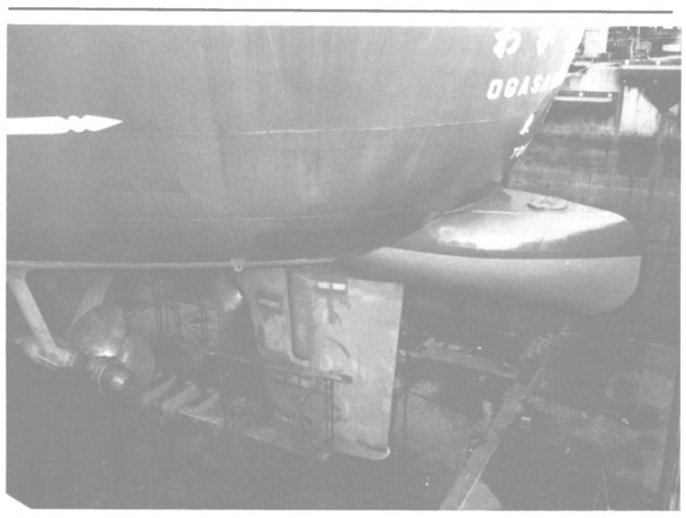
Reception Honors Wheeler's Appointment As Exclusive Agent For Schelde Yard

A gala reception was held at the Waldorf-Astoria Hotel in New York in honor of **Wesley D. Wheeler** becoming exclusive U.S. agent for Royal Schelde Shiprepairers, Flushing (Vlissingen) Holland, with the respective principals present.

The Honorable **J.J.P. Robertson,** N.Y. Consul of the Netherlands, and **J.M. Bakels,** executive secretary of the Netherlands Chamber of Commerce in the USA, were in attendance together with many dignitaries in the marine field. A Dutch flavor was added to the refreshments by having native gin and beers together with herring, cheese, and sate.

The self-contained, modern 16-year-old repair facility is 8 kilometers outside the historic town of Flushing at the crossroads of the English Channel and Scheldt River to Antwerp, Terneuzen, and Ghent. There is a very good labor supply with two full shifts normally worked from 5:30 a.m. to 10:30 p.m. daily and weekends. Extra shift and sailing workers can be arranged. A 3,000-man labor pool is available at the original main yard at Flushing, which is devoted to the production of NATO frigates, submarines, Sulzer diesels, boilers, gears, and nuclear fabrications.

Wesley D. Wheeler Associates, Ltd. of 104 East 40th Street, New York, N.Y. 10016 is a firm of international maritime consultants with nine graduate engineers in a staff of over 20. Besides representing shipyards, the firm specializes in ship surveys, design, and consulting in admiralty.



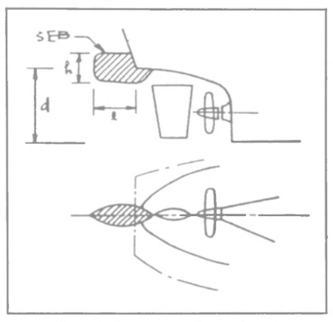
Kawasaki Stern End Bulb protrudes from center line of hull near full-load waterline. In test installation, this ship recorded five percent saving in propulsion.

New Kawasaki Stern Bulb System Provided Impressive Fuel Savings On Trial Run

The first ship equipped with a newly developed propulsive power saving system — the Kawasaki Stern End Bulb (Kawasaki-SEB) —was placed in service recently, showing excellent results. The installation was made on the 3,700-gt, 11,600-bhp Sutoretai Maru, a passenger vessel owned by Tokai Kisen Company, Ltd. and the Maritime Credit Corporation. She serves on the Tokyo-Miyake Island-Hachijo Island route.

The Kawasaki-SEB was fixed on the ship's main stern hull around the center line and near the full-load waterline. The aim is to save propulsive power by reducing wave pattern resistance and stern part local resistance by the effect of the interference between the waves generated by the bulb and by the stern hull.

The basic theory of the SEB was developed by a research group



Drawing shows side and top view of Kawasaki SEB unit.

led by Prof. Dr. **T. Inui** of Tokyo University, a world-famous authority on wave-making resistance theory. Under the guidance of this group, KHI has continued to study the SEB for practical use, and succeeded in its development. The SEB was installed on the Sutoretia Maru at a shipyard in Shimoda, a port situated on the Izu Peninsula.

In a speed trial conducted after the installation of the SEB, the ship recorded approximately 5 percent saving of propulsive power at the service speed of 20.3 knots, compared with performance when she was built. Furthermore, the ship gained about 0.25 knots more speed at the same cruising power.

When the system is installed on a large car ferry or containership, Kawasaki estimates it will produce an annual saving in fuel costs of about 70 million yen ($335,000).

Literature Available On Stearns' Protective And Flotation Clothing Line

Several fliers describing and illustrating its full line of industrial outerwear and flotation gear are offered by the Industrial Products Division of Stearns Manufacturing Company, St. Cloud, Minn.

Designed for barge workers, fishermen, and others who are exposed to the risks of falling into cold waters, the Stearns line includes vests, jackets, coveralls, raingear, life vests, and commercial life preservers. The life vests and life preservers are approved by the U.S. Coast Guard, and many meet OSHA requirements.

For further information and free literature on the Stearns line,

Write 39 on Reader Service Card

Marine Moisture's Tank Gauging Meets IMCO Rules —Literature Available

On June 13, 1980, The Marine Environmental Protection Committee of IMCO adopted resolution MEPC.5 (XIII). Recalling the 1973 ICPPS regulation that tankers should be provided with effective oil/water interface detectors for use in tank discharging effluent into the sea, the new resolution set international specifications for such devices.

The news was good for shipowners who have chosen the sonic systems manufactured by Marine Moisture Control Company, Inc. for tank gauging on their vessels. MMC's Sonic Interface Tapes, introduced in 1977, readily meet and exceed all specifications adopted by the committee.

Although the resolution calls for accuracy of ±25 mm, the MMC system measures interface to an accuracy of ± 1/8 inch, or less than 4 millimeters. And that accuracy is consistent from tank top to within an inch of the bottom.

For further information on the new IMCO specifications and a complete range of systems for petroleum cargo gauging and monitoring of liquid levels in marine slop tanks,

Write 29 on Reader Service Card

Revised Steel Plate Data Booklet Now Available From Armco

Last issued in 1976, the Armco Steel Plate Data booklet has been completely updated. Called by some "Armco's Steel Plate Bible," this 28-page book contains data on the most commonly produced carbon and alloy steel plates produced at the Houston Works of Armco's Southwestern Steel Division.

Designed for handy use, the booklet covers, in tabular form, such data as: tensile strength requirements, chemical compositions, general characteristics and uses, and other proprietary steels. Thickness ranges, widths, and maximum lengths are clearly spelled out.

For a free copy of the new booklet,

Write 40 on Reader Service Card

Bender Shipbuilding To Build Four Offshore Supply Vessels For State Boat

Bender Shipbuilding & Repair Company, Inc., Mobile, has announced signing a contract for the construction of four offshore supply vessels for State Boat Corporation of Houston. Each boat will be 192 feet by 40 feet by 14 feet.

They will be powered by two Caterpillar D399 diesels operating twin propellers via Reintjes WAV 1440 reverse/reduction gears of 4:1 ratio. Auxiliary power will be supplied by two 75-kw generators powered by GM Detroit Diesel 6-71 engines. Clear deck area is about 130 feet by 31 feet, and each boat carries 4,000 cubic feet of dry mud, 1,300 barrels of liquid mud, 65,000 gallons of fuel oil, and 168,000 gallons of ballast water.

All four vessels will be delivered in 1982.

Orders For Vessels Built To American Bureau Class Surged In 1980

Orders for vessels to American Bureau of Shipping (ABS) classification increased by a healthy amount during 1980, **William N. Johnston,** chairman and president, reported at the recent annual meeting of the members at ABS Headquarters in New York. Mr. **Johnston** said: "The increase can be attributed to three factors: first, a 40-percent increase over 1979 in contracts for large cargo-carrying vessels, including 83 tankers, 51 bulk carriers, 38 general cargo vessels, and 33 vessels of other types; second, a very sizeable increase, approximately 120 percent, in contracts for mobile offshore drilling units; and third, the continued strength in contracts for small self-propelled vessels."

During 1980, ABS received requests to class 1,066 new vessels of 9,025,000 deadweight tons or 5,515,000 gross tons. "I think it is significant the classification contracts for vessels that ABS received last year exceeded new vessels classed by 28 percent in numbers and over 50 percent in deadweight and gross tonnage," Mr. **Johnston** stated.

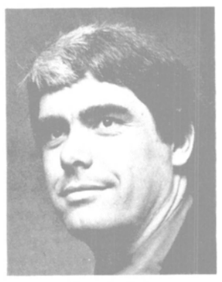
These contracts enabled the order book to climb to a year-end figure of 1,980 vessels contracted to be built or building to ABS classification in 44 countries. The vessels totaled 18,009,000 deadweight tons or 11,770,000 gross tons. ABS classed 818 new vessels of 5,188,000 deadweight tons or 3,323,000 gross tons during 1980. Also during the year, ABS classed 91 existing vessels of 3,055,000 deadweight tons or 1,680,000 gross tons.

Matson Promotes Three— John Couch Appointed Senior Vice President

Matson Navigation Company has promoted **John C. Couch** to senior vice president, **Barrick L. Prince** to vice president, and **Merle Kelai** to assistant vice president, sales, it was announced by **J.P. Gray,** president. Mr. **Couch,** a vice president since February 1978, will continue as Matson's area manager for southern California. Mr. **Prince** will continue as area manager for northern California, the position he has held since July 1980, and Mr. **Kelai** will continue as Hawaii sales manager in Honolulu, the post he has held for the past eight years.

Mr. **Couch** joined Matson in San Francisco as assistant to the senior vice president, engineering and marine operations, in 1976.

John C. Couch



Barrick L. Prince

He later headed Matson's freight division and served as president of Matson Terminals, Inc. He was appointed vice president, area manager, southern California, in July 1980.

Mr. **Prince** started in Los Angeles as assistant sales manager in 1976. He was promoted to sales manager, southern California, in April 1977, and was appointed general sales manager at San Francisco headquarters in December 1979. Mr. **Kelai** started with Matson in Honolulu in 1963. He became Honolulu district sales manager in 1969, and was promoted to Hawaii sales manager in 1973.

Macawber To Prepare Coal-Handling Manual Under MarAd Contract

Macawber Engineering, Inc., pneumatic conveying specialists of Maryville, Tenn., has been awarded a contract by the Maritime Administration for the preparation of a manual for shipboard coal-handling and ash disposal systems.

There has been a tremendous resurgence of interest in coal-fired ships throughout the world during the past 12 months, and already four coal-fired ships are in building at yards in Italy and Japan. Macawber Engineering has already won contracts for all the important coal-conveying equipment onboard these ships. The company claims to be the only group in the world currently able to convey coal in an environmentally safe, clean, and automatic way onboard ship. The manual will be prepared under a cost sharing (50/50) contract with MarAd.

Macawber president **Mike Crawley** said: "This will be the first manual to be prepared on this subject. It is intended to assist the U.S. maritime industry in understanding the new technology necessary for the new generation of coal-fired ships. It will also assist the industry to understand the requirements for equipment selection for new or retrofitted coal-fired ships."

Hartzell Marine Blowers Meet Federal Specs— Literature Available

The Hartzell Propeller Fan Company, Piqua, Ohio, has announced that its Series 44, 50, and 56 line of marine duty blowers (axial flow) are now certified for performance by the Air Movement and Control Association. These fans, which are available to meet Federal Marine Specifications, are available in sizes from 12 to 60-inch diameter, and a static pressure range up to 14-inch water gauge.

These fans are available with a wide assortment of optional accessories, including inlet bells, vibration isolators, special motors, and corrosion-resistant coatings. Among other Hartzell products available are centrifugal fans and blowers, heat exchanger fans, and gas and steam air make-up units.

For further information and free literature,

Write 41 on Reader Service Card

Rick Comoglio Appointed Sales Engineer For EG&G Sea-Link Systems

Rick Comoglio

EG&G Sea-Link Systems of Herndon, Va., has announced the appointment of **Rick Comoglio** as sales engineer. Prior to joining Sea-Link, he was employed by B-K Dynamics and Alcoa Marine Corporation (Ocean Search). He brings several years of ocean-related electronic experience to Sea-Link Systems ranging from operation of positioning systems and tethered submersible vehicles to consulting to the offshore oil industry.

EG&G Sea-Link Systems manufactures a wide variety of underwater acoustic remote control/navigation and current meter products. These can be used in diverse applications from offshore drilling to ocean-bed mining and from oceanographic research to tracking submarines and rescue operations.

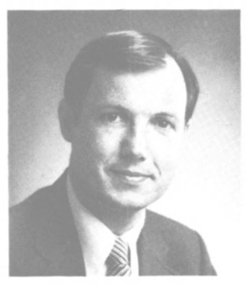
Ingalls To Build Second Jackup For Bonito Offshore

Bonito Offshore II Inc. of Houston, has signed a contract with Ingalls Shipbuilding of Pascagoula, Miss., to build a second Friede and Goldman design L-780 (Mod 2) cantilevered jackup drilling rig. The offshore rig is scheduled for delivery in December 1982.

The rig will be capable of drilling in 300 feet of water to depths of 25,000 feet. The mobile unit will be 180 feet long and 175 feet wide, and will have accommodations for 90 personnel. The rig will be available for contract when completed in 1982.

Ingalls Shipbuilding, the only North American contractor currently building L-780 design jackups under Friede and Goldman license, now has 17 rigs under construction, including 13 jackups and four submersible rigs.

Barclay Imle Named Vice President And Secretary Of Sivad Offshore



Barclay C.B. Imle

E. Ted Davis, president of Sivad Offshore of Houston, recently announced the election of **Barclay C.B. Imle** as vice president and secretary. Mr. **Imle** will also serve on the board of directors. Sivad Offshore provides the oil industry with the precision fabrication of leg sections and components of jackup drilling rigs.

Prior to joining Sivad, Mr. **Imle** served as manager of technical sales at Schill Steel Company, Houston. He has a BS in metallurgical engineering from Lafayette College in Pennsylvania, and an MBA from the University of Houston.

Drew Promotes Three In Ameroid Marine Division— Kay Named Vice President

Raymond M. Burke, vice president and general manager, has announced three promotions in the Ameroid Marine Division of Drew Chemical Corporation. **John P. Kay** has been named vice president-development; **John R. Wolf** director of sales-North and South America; and **Jack E. Woolen,** manager-development.

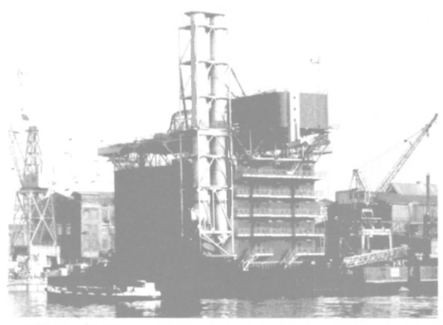
Mr. **Kay** has been assigned the responsibility of development projects including new ventures for the Ameroid Marine Division. He previously served as sales director for Drew's U.S. and Caribbean markets, as well as managing director for Drew's Singapore subsidiary.

Mr. **Wolf** will be responsible for the sales, marketing, technical and financial segments of the U.S. region. Most recently, he held the position of marketing manager-mechanical goods, with responsibility for new ventures and for marketing the equipment line of the Ameroid Marine Division.

Mr. **Woolen** will be responsible for the development of the inland waterways market, as well as coordinating the activities of the offshore business of the U.S. Prior to his promotion, he served as Western regional manager with responsibility for port and account sales in the Southwest and West Coast sales regions.

Drew Chemical, a subsidiary of United States Filter Corporation, New York, is a major supplier of products and services for water management and specialty chemicals for the industrial and marine markets.

Big Living Quarters Module For North Sea Production Rig Delivered By Blohm + Voss Yard

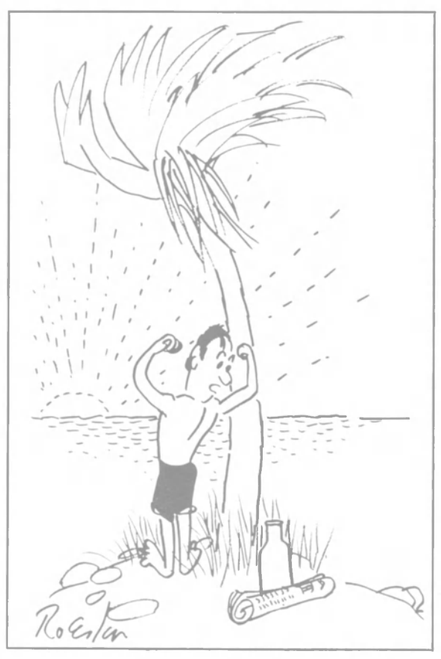


The living quarters module Fulmar A (shown above), one of the biggest and most completely equipped units of its kind, has been designed and built for operation on the production platform of the Shell/Esso Group and the Gas Council/Amoco Group in the Fulmar A Field of the North Sea.

The new module has a number of innovations and superlatives. The structure is 36 meters long, 20.5 meters wide, and 25.5 meters high (about 118 by 67 by 84 feet) including the helicopter deck with double hangar, which for the first time was assembled at the Blohm + Voss shipyard.

The unit's exhaust tower, which is 45 meters (147.6 feet) high with a base area of 5 by 8 meters (16.4 by 26.2 feet), is said to be the only one in the world fitted to a living quarters module. Another innovation: this module is built in the stiffened plate design instead of by the box girder method normally used for offshore units.

When the Fulmar A reached its destination some 500 kilometers from Hamburg, a semisubmersible crane ship with a total lifting capacity of 2,700 tons lifted the module up to the deck of the platform, which is more than 40 meters (131.2 feet) above the water level.



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National Supply Promotes Three In Sales—Petersen Named VP-Marketing

National Supply Company, Houston-based producer of oilfield equipment, has named **A.J.R. Petersen, Phillip P. Musmeci,** and **John L. Lajoie** to top offices in a reorganization of sales responsibilities for its National Drilling Equipment Division. The moves are taken to better serve unprecedented rig demand throughout the world, said **Robert E. Harris,** president of the division. The firm is the world's largest maker of drilling machinery oil, gas, and geothermal exploration.

Mr. **Petersen,** head of the expanded marketing management staff, has been promoted from general manager to vice president of marketing to reflect the increased responsibility. To assure close direction over rapidly expanding sales activity, two new managerial positions have been created, reporting to Mr. **Petersen**. Mr. **Musmeci** becomes manager-domestic sales, and Mr. **Lajoie** manager-international sales. The functions each account for approximately half of the annual division sales volume.

A.J.R. Petersen

Mr. **Musmeci** has more than 25 years of experience with National Supply in sales and managerial positions, both domestically and internationally. He was most recently responsible for two National Supply subsidiaries — Par Industries, Inc. shipyard in New Iberia, La., specializing in offshore drilling barges and platforms, and Derrick Service International, Inc., maker of masts, derricks, and substructures for drilling rigs.

Phillip P. Musmeci

Mr. **Lajoie** advances to the new position of manager-international sales after serving as manager for Latin America sales. He has 19 years' experience with National Supply in international drilling equipment and sales management.

John L. Lajoie

Headquartered in Houston, National Supply is one of four operating groups of Armco, sixth largest U.S. steelmaker and diversified manufacturer.

Sperry Awarded $51-Million Development Contract For Spanish Navy Ships

Sperry Corporation, Sperry Systems Management, Great Neck, N.Y., is being awarded a $51,107,457 cost plus award fee contract for services for Spanish Navy carrier and frigate combat systems development. The Naval Sea Systems Command is the contracting activity. (N00024-81-C-7064)

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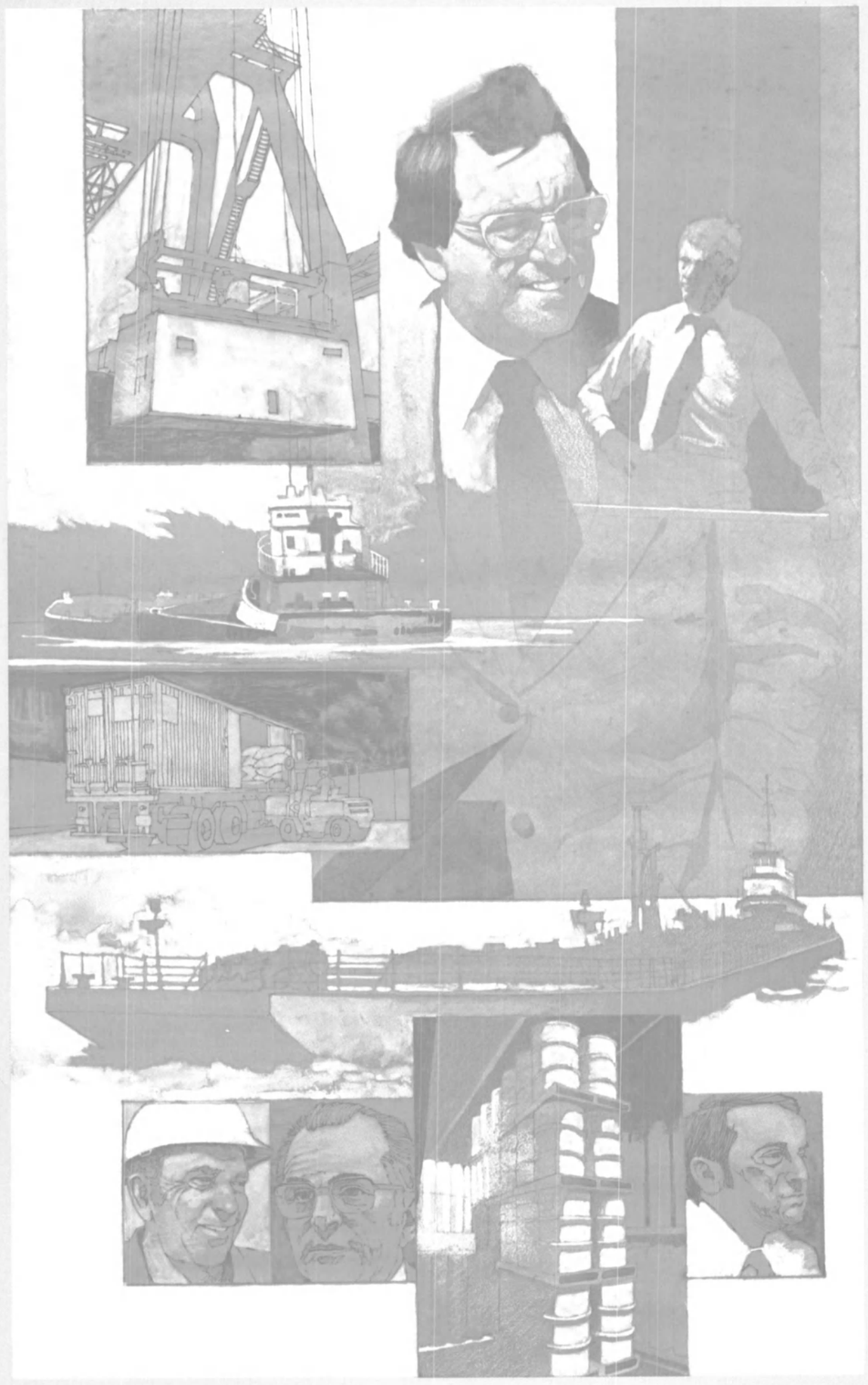

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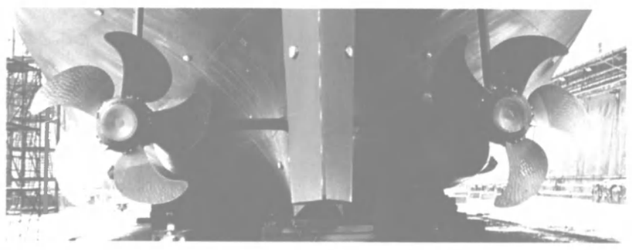

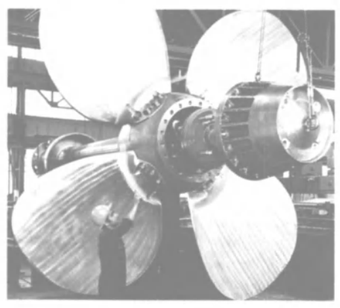

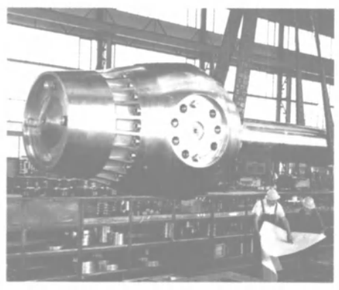

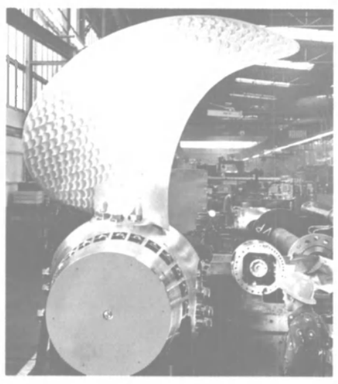

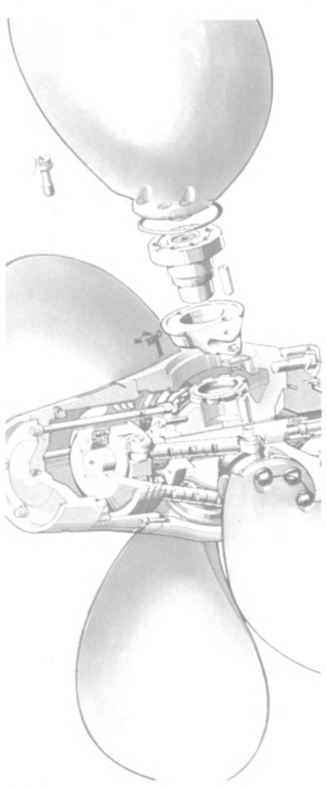

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VP 52

Boston VLCC Companies Ask For Title XI Aid On Tanker Retrofits

Boston VLCC Tankers, Inc. II, Boston VLCC Tankers, Inc. IV, and Boston VLCC Tankers, Inc. VI have applied to the Maritime Administration for Title XI guarantees to aid in financing the retrofitting of the tankers Massachusetts, New York, and Maryland, respectively, in compliance with new U.S. Coast Guard requirements.

Each of the 265,000-dwt, 35,000-shp tankers was built at Bethlehem Steel Corporation's Sparrows Point, Md., shipyard. The Maryland and New York were delivered in October 1975 and the Massachusetts in October 1976. New inert gas and crude oil washing systems are to be installed in the vessels. The tankers operate worldwide but are in the domestic trade at six-month intervals.

If approved, Title XI guarantees would cover $3 million ($1 million per vessel), or 87½ percent of the estimated cost of $3,428,574 for the reconstruction of the three ships.

Barton Named Port Engineer For Pott's Inland Waterways Division

Aubrey Barton

Aubrey (Jerry) Barton has been appointed to the position of port engineer of the Inland Waterways Division, Pott Industries Inc., it was announced by **Richard D. Rogers,** vice president-engineering and terminals of the division. Pott is a member of the Houston Natural Gas Corporation group of companies.

Mr. **Barton's** new position with IWD carries with it the responsibility for towboat and machinery maintenance for Federal Barge Lines, Inc.; United Barge Company; and their wholly owned subsidiaries.

New Gems Flow Switches Designed For Heavy Duty—Literature Available

The FS-200 M SB Series flow switches from Gems Sensors Division, Plainville, Conn., have been designed to provide accurate flow detection for marine applications requiring rugged duty, dependability, and high repeatability. They are particularly well suited for monitoring coolant water flow to radar and other communication equipment requiring constant monitoring of temperature of the electronic tubes.

The FS-200 M SB can also be used very effectively to monitor oil lubrication flow to bearings and other rotating surfaces in marine shipboard applications. Designed with socket-welded connections, these units can be silver-brazed into ship lubrication and coolant lines to meet marine standard requirements.

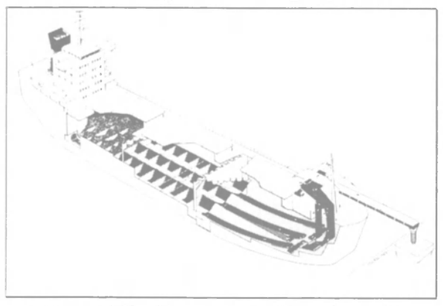
A broad range of fixed flow rate settings are available and material of construction can be bronze, Monel or stainless steel. The units are corrosive-resistant to seawater, etc., and can be used to trigger alarms or flow-indicating equipment, should flow decrease to a point where the equipment being lubricated would be in jeopardy. Stock size (¾-3 inches), socket-weld units with standard SPDT, 20-watt reed switch output capabilities can be calibrated horizontally or vertically, depending upon orientation aboard ship.

For more information and free literature,

Write 28 on Reader Service Card

MARINE SOCIETY HONORS LOWMAN—The chairman of the board of Farrell Lines Incorporated, **George F. Lowman** (left), was the honored guest and featured speaker at the recent 211th Annual Dinner of The Marine Society of the City of New York held at the Plaza Hotel. Presenting an emblem of the Marine Society to Mr. **Lowman** is Capt. **Thomas H. Pineault,** president of the Society.

Selfbulk Vessel Provides Versatile Cargo-Handling System



The selfbulk vessel (drawing shown above) is said to represent the latest advancement in self-unloading bulk carriers with its versatile system solution. It also offers great flexibility, as the Selfbulk vessel can also carry cargoes other than bulk—a great step forward in overall economy.

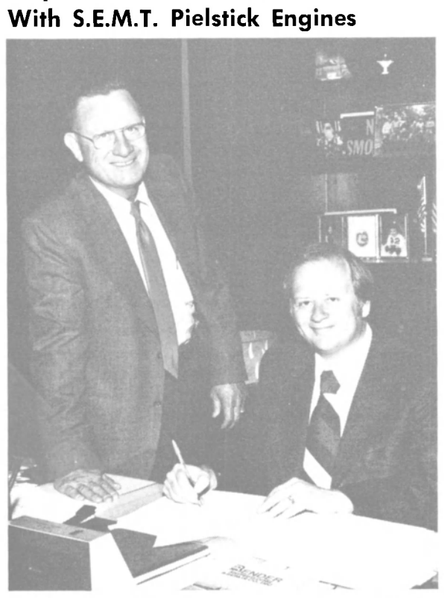
The heart of the Selfbulk vessel is Nordstroms' self-unloading system, which is based on proven technology and practical experience from vessels in operation as far back as the mid-50s. The design criteria required the creation of a system with very

high unloading capacity, meeting stringent environmental demands, as well as providing extremely high system reliability. The self-unloading systems can be designed for all sizes of vessels, and can also be adapted to existing vessels suitable for conversions. Nordstroms is presently working on two different types, Selfbulk 10 of 10,000 dwt with an unloading capacity of 3,000 tons per hour, and a bigger version, Selfbulk 40, of 40,000 dwt on 12 meters draft, and self-unloading capacity of about 5,000 tons per hour.

The shore terminals have also been taken into consideration, and therefore total turn-key transportation system can be offered when required, thereby ensuring total system reliability with trouble-free operation.

The Selfbulk vessel is the result of a unique cooperation between Nordstroms, B.L. Marine Consult AB, and Shipcraft Inc. represented by Arne Larsson & Company AB in Stockholm. In practice this means that a shipowner is presented with a complete project solution. Nordstroms, with its long experience of self-unloading equipment, and Shipcraft, representing not only the broker's side but also ship design and shipping economics, can together ensure that the Selfbulk vessel will offer the maximum trading potential for any particular prospective owner. The marketing of the Selfbulk vessels is in the hands of Arne Larsson & Company AB in Stockholm, and Nordstroms Marine Systems in Enkoping, Sweden.

Bender Yard Awarded Contract To Re-power Towboat 'Great America' With S.E.M.T. Pielstick Engines



Great American Boat Company president **Walter Todd** (seated) signs contract for re-powering towboat Great America. Looking on is **Thomas E. Ellison,** senior vice president of Bender Ship Repair, Inc. of Mobile.

Walter Todd, president of Great American Boat Company, has announced the signing of a contract with Bender Ship Repair, Inc. of Mobile to do the re-powering work for the towboat Great America.

"We are doing a tremendous amount of work on this vessel," said Mr. **Todd**. "The original designer would have trouble recognizing it. The vessel had a reputation of having a draft problem but in studying the vessel we found it actually had a trim problem that could not be solved with the existing tank arrangements. To solve the trim problem, we've changed the tanks around completely. The center of gravity of the vessel has been changed with the new machinery, so we will have an excellent vessel operating at an acceptable draft on the Mississippi River," he said.

The new power plant will consist of two S.E.M.T. Pielstick 12PA6V280 diesel engines, which will be operated to produce 3,600 bhp each, driving 117-inch-diameter, stainless steel propellers in new Kort nozzles through Falk model 3548 reverse/reduction gears.

The main engines will burn No. 5 heavy fuel, which is approximately 600 Redwood Sec. I. The vessel will carry 80 percent heavy fuel and 20 percent No. 2 diesel fuel. The latter will be used to run the diesel generators and for starting and stopping the Pielstick diesels. Once the main engines are started, they will remain on heavy fuel for all running and maneuvering.

"Our company feels it is necessary for inland waterway operations, where fuel is such a large part of operating costs, to position itself so that in buying our primary energy source for moving the boats we are not competing in tight markets where shortages and high prices will occur," Mr. **Todd** said.

As a result of the re-powering and based on the current price spread between No. 2 diesel and No. 5 heavy fuels, coupled with the fuel efficiency of the Pielstick engines, the owner estimates fuel savings in the first year of approximately $1 million compared with an average 7,200-bhp towboat on the inland waterways today.

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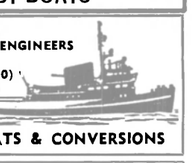

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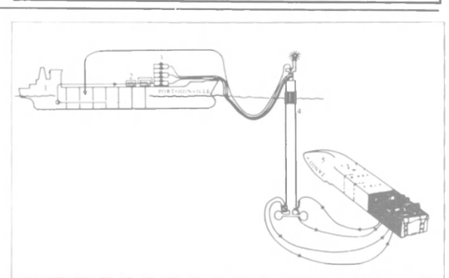
Sulzer Pumps Helping To Prevent Oil Pollution On Coast Of Brittany

The castastrophic damage resulting from the sinking of the oil tanker Amoco Cadiz off the coast of Brittany had hardly disappeared from the headlines when the tanker Tanio suffered a similar fate in the same area. This 26,000-dwt vessel sank to a depth of 120 meters with its cargo of 10,000 tons of heavy oil, which is now being recovered.

The oil is being salvaged with a pump installation comprised of six Sulzer eight-stage casing pumps driven by 210-hp Sulzer diesel engines, each with a discharge capacity of 117 cubic meters/hour at a delivery head of 270 meters. The three circuits are each served by two pumps, whereby the water is preheated to 60 C in order to liquefy the coagulated oil:

An injection circuit forces seawater in the cargo tanks. This also prevents the hull of the ship from collapsing when the tanks are emptied. A flushing system sprays heated seawater onto the oil intake point. An ejection circuit, by means of underpressure, transfers the oil mixed with heated water to the tanks of a salvage tanker.



Simplified diagram showing the salvaging of oil from the Tanio. (1) Salvage tanker Port Joinville; (2) Preheater; (3) Six Sulzer pumps; (4) Pump column; (5) Wreck of the oil tanker Tanio.

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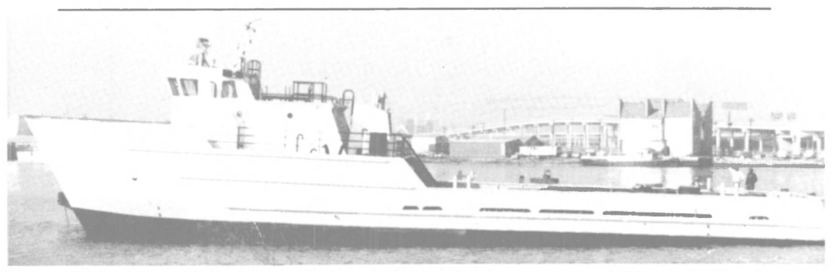

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Item 4 . . . . Three split-hull nonpropelled hopper barges of 600 cubic meter capacity.

Funds for the procurement are available from a loan awarded to A.N.P. by the World Bank. Proposals will be accepted from prequalified bidders, from countries which are members of the Work Bank. Equipment supplied under this procurement must originate from countries which are members of the Work Bank or Switzerland or Taiwan.

Expressions of interest and requests for prequalification questionnaires are invited from shipbuilders with previous experience in the construction of similar equipment and should be addressed to:

Administration Nacional de Puertos
Edificio Portuario
Montevideo, Uruguay

with copies to:

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OFFERS: Plainly marked on the envelope "Offer on P.T. #23" will be received by the undersigned on an individual lot, combined lot or complete lot basis up to 2:00 p.m., Pacific Daylight Saving Time, July 3, 1981, for the following five (5) slide systems located "as is and where is" at the British Columbia Ferry Corporation's Refit Complex, 12800 Rice Mill Road, Richmond, B.C., Canada.

Each of the five lots (slide systems) consists of:

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Note: B.F. Goodrich advises that these slides can can be modified to shorter lengths for lower deck to water heights

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Slide and boarding platform—nylon fabric coated with neoprene in a bright yellow colour
Maximum vertical height (deck to water)—55 feet
Overall length of slide—75 feet
Weight of slide and platform—1750 pounds
Container size—50½"h x 84½"w x 43½"d
Inflation system container size—39"h x 100"w x 36"d
Related spare parts are included—list available at the site

To view or for further information including examination of detailed drawings of the escape system contact Mr. R.J. Burke, Supervisor of Stores at the above address, telephone (604) 277-3121.

Offers must be accompanied by a certified cheque made payable to the Minister of Finance for 10% of the bid. If the successful bidder subsequently withdraws his offer, the 10% payment shall be liable to forfeiture.

The highest or any offer will not necessarily be accepted, but the bearer of the successful bid will be required to pay the 6% S.S. tax.

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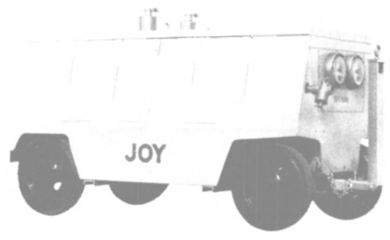

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JOY 1600 CFM S/N 104258	$29,500.00
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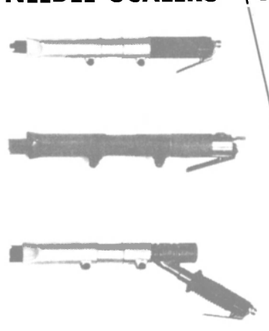

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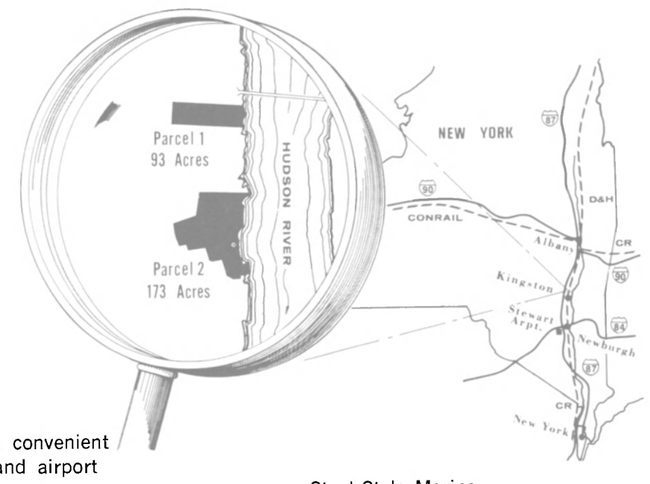

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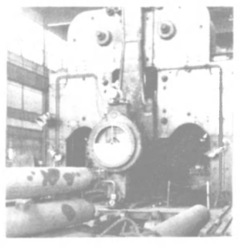

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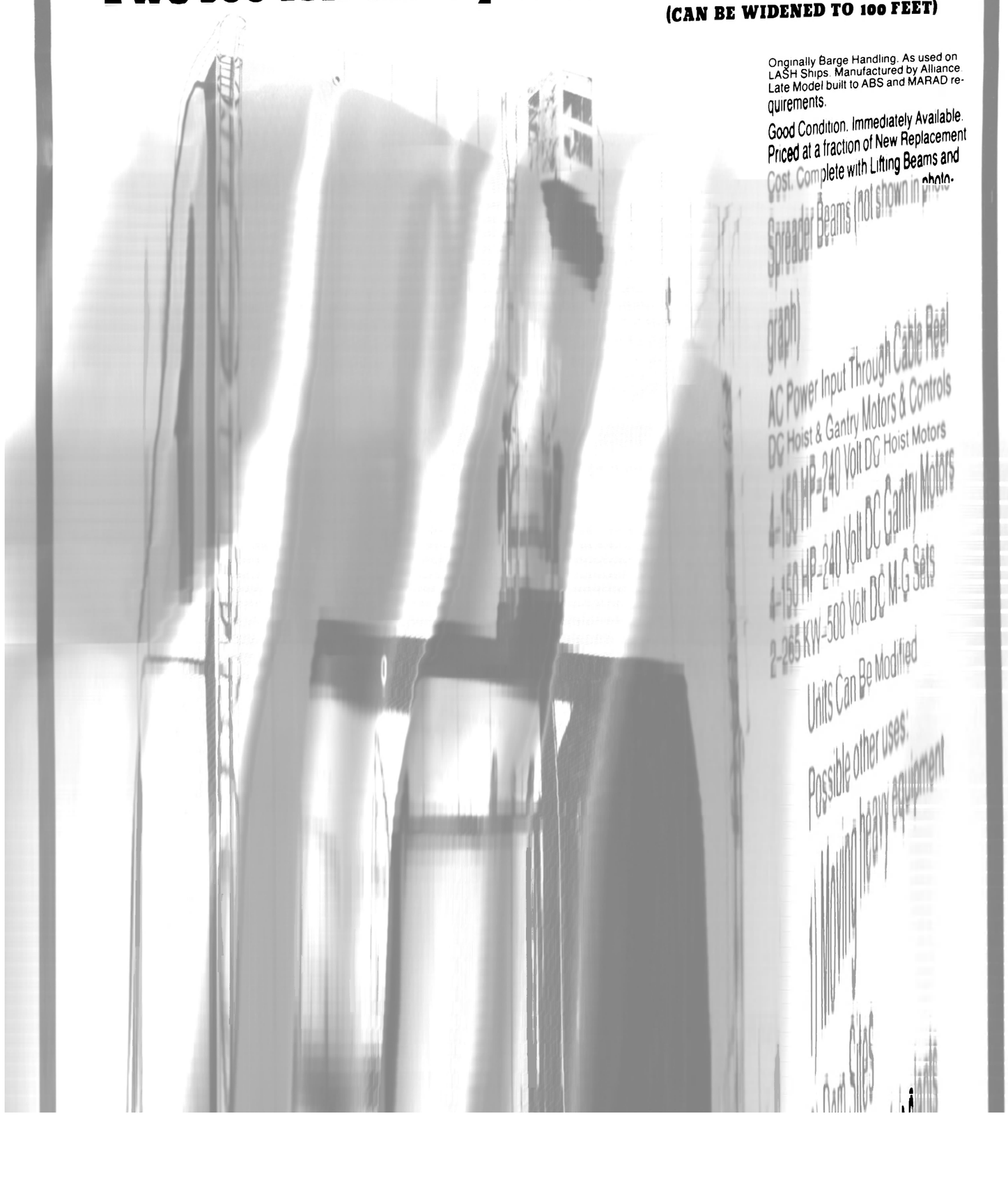
70-foot Track Span

(CAN BE WIDENED TO 100 FEET)



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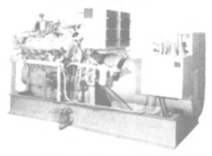
250KW GM 12-V-71
DIESEL GENERATOR SETS
AIR START



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HATCHES

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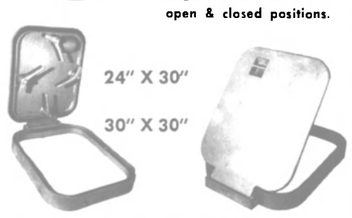
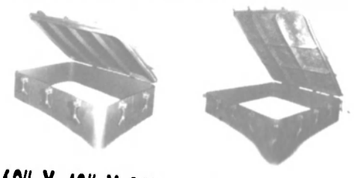
FLUSH HATCHES

54' X 77"

14-Dog — operated from top side by T-key, with dogs marked to show open & closed positions.



4 Dogs on underside—topside flush, with T-Key openers.



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10-DOG

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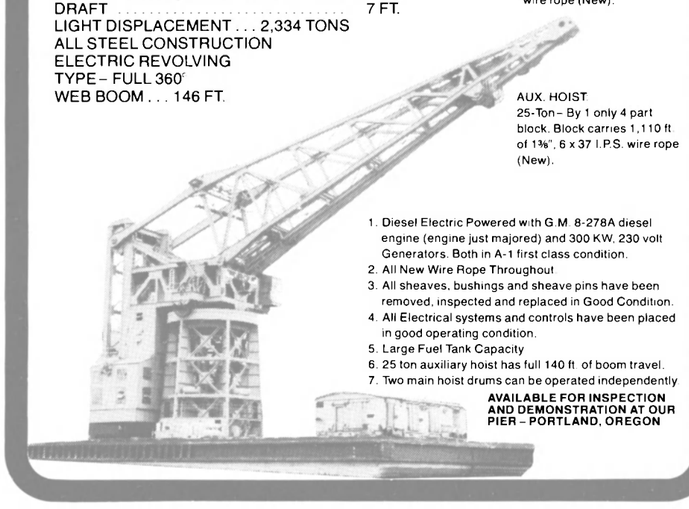

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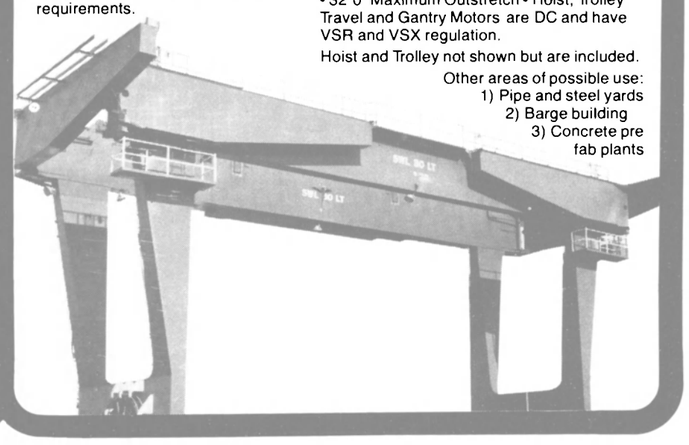
Hoist and Trolley not shown but are included.



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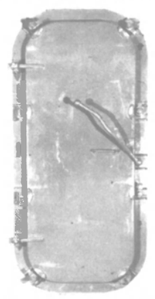

QUICK-ACTING LEVER OPERATED WATERTITE DOORS

26" X 66"
8-DOG
Rights & Lefts

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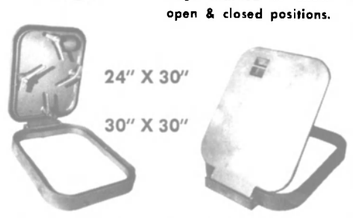
HATCHES

NEW UNUSED FLUSH HATCHES

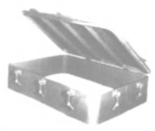
54' X 77"

14-Dog — operated from top side by T-key, with dogs marked to show open & closed positions.



24" X 30"
30" X 30"

4 Dogs on underside—topside flush, with T-Key openers.



60" X 42" X 12"
10-DOG

72" X 72" X 12"
16-DOG

36" X 26" 7-DOG
TANKER EXPANSION
TRUNK

42" X 42" X 9"
7-DOG
SPRING
LOADED

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
Marine Warehouse (301) 752-1077
TWX: 710-234-1637

M&T Model O-2D Marine Outboard Diesel Driven Propulsion Units

Equal-to-new-condition. Driven by GM 6-71 diesel—165 HP @ 1800 RPM—2-cycle—6 cylinders. Weight 9300 lbs—48" X 24" propeller. Unit shown with outboard shaft in elevated position. Distance from deck to bottom of skeg 89". 4 Units immediately available.

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
Marine Warehouse (301) 752-1077
TWX: 710-234-1637

UNUSED EX-U.S.N. FUME-TIGHT DOORS

3-Dog — 3 hinge — with 26" X 78" clear opening. OA height of frame 87½" — OA width of frame 35½". Two doors have 10" portlights installed. RH & LH available. Inquire for details.

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
Marine Warehouse (301) 752-1077
TWX: 710-234-1637

ELECTRO-PNEUMATIC PROPULSION CONTROL

for speed control and reversing

PORT & STARBOARD

For 12-567A engine and Falk reduction gear. As used for USN LST vessels. Bridge and engine room control.

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
Marine Warehouse (301) 752-1077
TWX: 710-234-1637

NEW — UNUSED NIJUIS FIRE PUMP

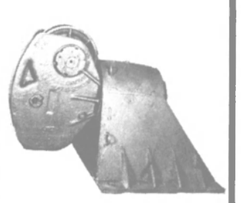
550 GPM @ 323' head @ 1800 RPM

$1975

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
Marine Warehouse (301) 752-1077
TWX: 710-234-1637

SURPLUS BERGER FAIRLEADS



2 Model 620 — for 1⅝" wire — 20" sheave. Located San Francisco, Ca.

$3959 Each

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
Marine Warehouse (301) 752-1077
TWX: 710-234-1637

NEW — QUICK-ACTING OVAL HATCHES

4-Dog — wheel operated with wheel top and bottom. 24" X 16" — with 4" coaming

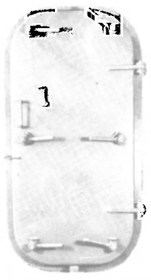
THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
Marine Warehouse (301) 752-1077
TWX: 710-234-1637

FOR SALE

NEW WATERTIGHT DOORS

Steel Dogs



6-Dog right and left hand hinged doors with frames. Constructed of 1/4" steel plate and meet Coast Guard regulations for above deck as well as below deck use. All dogs are bronze bushed. Also available with 8" bronze portlights.

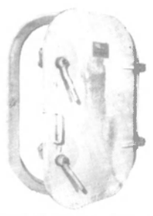
SIZE

26"x48" 26"x66"
26"x60" 30"x60"

EACH DOOR

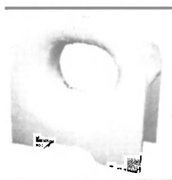
IMMEDIATE DELIVERY

NEW SMALL STEEL WATERTIGHT DOORS



24" X 36"
2-DOGS
5 Right Hand
2 Left Hand
IMMEDIATE DELIVERY

NEW 7" RADIUS PANAMA CHOCKS



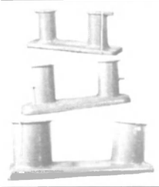
(MEET PANAMA REGULATIONS)
14" X 10" CLEAR OPENING

With extended legs for welding to deck. 14" Wide on base—length 28" — height 27¼". IMMEDIATE DELIVERY FROM STOCK.

NEW UNUSED 12"X6½" PANAMA CHOCKS FOR SMALL VESSELS

Closed chocks — 12" X 6½" inside opening — 23" overall outside — 8" high — 15" high — 7" radius — weight 110 lbs. IN STOCK.

GOOD - USED DOUBLE STEEL BOLLARDS in stock



10", 12", 14", 20"

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Marine Warehouse (301) 752-1077
TWX: 710-234-1637

NEW MODEL 614-0 MOORING FAIRLEADS for 1¼" WIRE

14" Diameter sheave — 12" shank opening — tepered roller bearing. Weight 1135 lbs.

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
Marine Warehouse (301) 752-1077
TWX: 710-234-1637

WORTHINGTON HIGH PRESSURE AIR COMPRESSORS

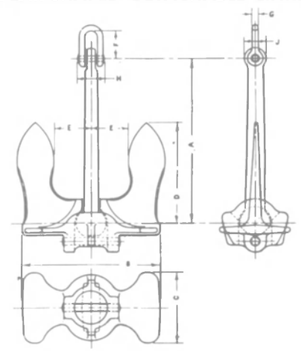
10 CFM — 600 lbs. 7½ HP
440/3/60 A.C. Motors

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
Marine Warehouse (301) 752-1077
TWX: 710-234-1637

ANCHORS -- CHAIN

DETACHABLE LINKS
PEAR-SHAPED DETACHABLE LINKS



LARGE BALDT-TYPE ANCHORS
NEW — UNUSED LLOYD'S OR ABS CERTIF.
12000 LBS & 8000 LBS

IN STOCK—FOR MOORING—NO CERTIF.

- 3000 LB DANFORTH
- 5300 LB BALDT
- 4300 LB BALDT
- 14750 LB BALDT
- 10750 LB BALDT

ANCHOR CHAIN

- 2¾" — New — Grade 3 — Certif.
- 3" — New — Grade 3 — Certif.
- 3¼" — New — Grade 3 — Certif.
- 3⅜" — Grade 3 — Certif.
- 1⅛" — Dilak

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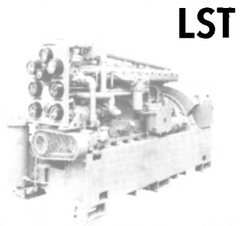
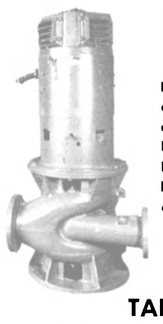
Marine Warehouse (301) 752-1077
TWX: 710-234-1637

LST MACHINERY



100KW GBD-8 DIESEL GENS.

120/240 VDC—417 amps—stab shunt—1200 RPM—Delco generator—Self-excited. ENGINE: Superior GBD-8—8-cyl—5½X7—150 HP—30 volt electric starting. Reconditioned to ABS. Dry wt. 10,000 lbs—DAL 124"—65 11/16" high—42" wide. Hgt necessary to pull piston 68". Fuel consumption 0.620 lbs/hr.



GARDNER-DENVER BALLAST PUMP

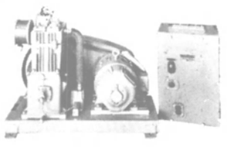
Bronze — 1500 GPM — 56' head or 25 bs — 8" suction — 6" discharge. MOTOR: Century 30 HP 230 VDC 110 amps 1750 RPM. 40°T rise — stab. shunt — ballbearing — dripproof. Controls available.

TAILSHAFTS

Diameter: 6 1/8" Length: 21' 2 5/8"

GOULD FIRE & BILGE PUMP

250 GPM & 100 lbs—4" suction—3" discharge—2200 RPM—bronze—manufactured by Gould. Direct connected to 30 HP 230 volt DC Louis-Allis motor.



CLUTCH TIRE AIR COMPRESSOR

Model 320—4 X 2½ X 3"—10/15 CFM—100/150 PSI—700 RPM. MOTOR: 3 HP—230 volts DC—1750 RPM.

COMBINATION LUBE OIL & SALT WATER COOLING PUMPS

Model 3630—mfg by Goulds—1150 RPM. Rotary lube oil pump one end (35 GPM @ 15 PSI—1½"X1½")—salt water circulating pump other end (35 GPM @ 15 PSI—2" X 1½") G.E. Motor model 5B254A1988—type B—Frame 254—3 HP—230 VDC—11.9 amps—1150 RPM compound—Cont. 40°C temp rise. Ball bearing.

THE BOSTON METALS COMPANY

313 E. Baltimore St. 752-1077 Baltimore, Md. 21202
TWX: 710-234-1637

BUYERS DIRECTORY

AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION
Adrick Cooling Corporation, 30 B. Remington Blvd., Ronkonkoma, NY 11779
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
James D. Nall Co., Inc., 3195 NW 20th Street, Miami, FL 33142
York Division (Borg-Warner Corp.), P.O. Box 1592, York, PA 17405

ANODES—Cathodic Protection
Engelhard Industries Division, 2655 U.S. Route 22, Union, NJ 07083
Kaiser Aluminum & Chemical Corp., 300 Lakeside Dr., (Rm 2039KB), Oakland, CA 94643
Wilson Walton International Inc., 66 Hudson Street, Hoboken, NJ 07030

BEARINGS—Rubber, Metallic, Non-Metallic
Johnson Rubber Co. (Marine Div.), 16025 Johnson St., Middlefield, Ohio 44062
Lucian Q. Moffitt, Inc., P.O. Box 1415, Akron, Ohio 44309
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wisc. 53186

BLASTING—Cleaning—Equipment
Aurand, 1270 Ellis Street, Cincinnati, OH 45223
Butterworth Systems Inc., 224 Park Ave., Florham Park, NJ 07932
GMMC/Porta-Shotblast, 1112 Davidson Road, Nashville, Tenn. 37205
Goff Corporation, One Pleasent Grove Rd., Seminole, OK 74868

BOILERS—Tube Cleaning
Clayton Manufacturing Company, 486 No. Temple City Blvd., El Monte, CA 91731
Combustion Engineering, Inc., Windsor, Connecticut 06095
A.B. Murray Company, Inc., P.O. Box 476, Elizabeth, NJ 07207

BROKERS
B.R.I. Coverage Corporation, 156 Williams Street, New York, NY 10038
Capt. Astad Company, Inc., P.O. Box 53434, New Orleans, La. 70153
Crown Assets Disposal Corp., 300 Notre Dame St., Ville St.-Pierre, Quebec, Canada H8R 3Z6
Hughes Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
Mowbray's Tug and Barge Sales Corp., 21 West St., N.Y., N.Y. 10006

BUNKERING SERVICE
Belcher Company of New York, Inc., 48-02 54th Avenue, Maspeth, NY 11378
Gulf Oil Trading Co., 1290 Ave. of the Americas, N.Y., N.Y. 10019

CARGO TRANSFER & ACCESS EQUIPMENT
MacGregor-Comarain, Inc., 135 Dermody St., Cranford, N.J. 07016

CHAINS
Neptunia, Via Giovanni da Verrazzano, 12 16 165 Genova, Italy

CHOCKING SYSTEMS
Philadelphia Resins Corp., 20 Commerce Drive, Montgomeryville, Pa. 18936

CONTAINERS—Cargo Container Handling
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501

CONTROL SYSTEMS—Monitoring
Arnessen Marine Systems, Inc., One Battery Plaza, New York, NY 10004
Henschel Corporation, 14 Cedar St., Amesbury, Mass. 01913
Megasystems, Inc., 5909 West 130th Street, Cleveland, OH 44130
Pan American Systems Corporation, P.O. Drawer 400, Belle Chasse, LA 70037
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.
Transamerica Delaval, Inc., Gems Sensors Division, Cowles Road, Plainville, CT 06052

COUPLINGS
Bird-Johnson Co., 110 Norfolk St., Walpole, MA 02081

CRANES—HOISTS—DERRICKS—WHIRLEYS
Blohm & Voss Company, 55 Morris Avenue, Springfield, NJ 07081
Clyde Iron, a unit of AMCA International Corp., Suite 102, 2300 West Loop South, Houston, TX 77027
M. P. Howlett, Inc., 410 32nd St., Union City, N.J. 07037
National Supply Company, 1455 West Loop South, Houston, TX 77027
J. D. Neuhaus, Witten-Heven, Hebezeuge, D 5810 Witten-Heven, West Germany
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501

DECK MACHINERY—Cargo Handling Equipment
Appleton Machine Co., Marine Division, 618 S. Oneida St., Appleton, WI 54911
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, Wash. 98134
Navire Cargo Gear (SEA) Pte. Ltd., 9th Floor Orchard Towers, Orchard Road, Singapore 0923

DIESEL ACCESSORIES—CYLINDER LINERS
B & W Marine Service, One State Street Plaza, New York, N.Y. 10004
General Thermodynamics Corporation, 210 South Meadow Road, P.O. Box 1105, Plymouth, Massachusetts 02360
Golten Marine Company, Inc., 162 Van Brunt Street, Brooklyn, NY 11231
Twin Disc, Incorporated, Racine, Wis. 53403

ELECTRICAL EQUIPMENT
Argo Marine, Div. of Argo Intl., 140 Franklin St., New York, N.Y. 10013
Federal Pacific Electric Company, P.O. Box 1800, Somerville, NJ 08876
Marine Safe Electronics of Canada Ltd., 101 Jardin Dr., Suite 24, Concord, Ontario, Canada L4K 1B6
Oceanic Electrical Mfg. Co., Inc., 159 Perry Street, N.Y. 10014
Port Electric Supply, 157 Perry Street, N.Y., N.Y. 10014
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, Ore. 97201

EMULSIFICATION SYSTEMS
Hoffert Manufacturing Company, Inc., 1700 East Church Street, Jacksonville, FL 32202

EQUIPMENT—Marine
ATCO Marine Corp., 603 Dean Street, Brooklyn, NY 11238
Argo Marine, Div. of Argo Intl., 140 Franklin St., New York, N.Y. 10013
Comet Marine Supply Corp., 157 Perry St., New York, N.Y. 10014
Conhagen/USMP Company, Inc., 4475 South Clinton Ave., South Plainfield, NJ 07080
Consafe Inc., P.O. Box 40339, Houston, TX 77040
Kearfott Marine Products, 550 South Fulton Ave., Mount Vernon, N.Y. 10550
J. H. Menge & Company, Inc., P. O. Box 23602, New Orleans, La.
John P. Nissen, Jr. Company, Glenside, PA 19038
Rockwell International, Power Tool Division, 400 N. Lexington Ave., Pittsburgh, PA 15208
Schnitzer-Levin Marine Co., 445 Littlefield Ave., So. San Francisco, CA 94080
Schwepper Beschlag GmbH, Postfach 101110, 5620 Velbert 1, West Germany
Stal Laval Inc., 525 Executive Blvd., Elmsford, NY 10523
Sudoimport, 5 Kalyaevskaya, Moscow K-6, USSR
Unitor Ships Service A/S, Mastemyr, 1410 Kolbotn, Norway
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wisc. 53186
Xorbox, Division of Greene & Kellogg, Inc., 290 Creekside Dr., Tonowanda, NY 14150

EVAPORATORS
Aqua-Chem Inc., P.O. Box 421, Milwaukee, WI 53201
Riley-Beaird, Inc., P.O. Box 1115, Shreveport, La. 71130

EXPANDED METALS — METALS
Fibergrate Corporation, P.O. Box 344610, Dallas, TX 75234
Lukens Steel Company, Coatesville, PA 19320
Millard Controlled Metals, 5 Louise Drive, Ivyland, PA 18974

FANS—VENTILATORS—BLOWERS—HEATEXCHANGERS
Coolmar Heatexchangers B.V., P.O. Box 54156 3008 JD Rotterdam, (The Netherlands) Waalhaven Z.Z. 52
Hartzell Propeller Fan Company, 901 S. Downing Street, Piqua, OH 45356
Joy Manufacturing Co., 338 So. Broadway, New Philadelphia, Ohio 44663
Zidell Explorations, 3121 S.W. Moody St., Portland, Ore. 97201

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

FINANCING—Leasing
Continental Illinois National Bank, 231 S. LaSalle, Chicago, IL 60693
Greyhound Leasing & Financial Co., Greyhound Tower, Phoenix, AZ 85077
Kidder, Peabody & Co., Inc., 10 Hanover Square, New York, N.Y. 10005
Warburg Paribas Becker, Inc., 2 First National Plaza, Chicago, Ill. 60670

FUEL OIL ADDITIVES—Analysis & Combustion Testing
Rolfite Products Inc., 300 Broad Street, Stamford, CT 06901

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

GALLEY EQUIPMENT
Kiefer Corporation, 2202 W. Clybourn, Milwaukee, WI 53233

GANGWAYS
Rampmaster Inc., 1226 N.W. 23rd Ave., Fort Lauderdale, Fla. 33311

HATCH & DECK COVERS—Chain Pipe
Hayward Marine Products, 900 Fairmount Avenue, Elizabeth, NJ 07207
Lockstad Company, Inc., R D 2 Burnett Road, Mendham, NJ 07945
MacGregor-Comarain, Inc., 135 Dermody St., Cranford, N.J. 07016
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Julius Mock & Sons, Inc., 20 Vesey St., New York, NY 10017

HULL CLEANING
Butterworth Systems Inc., 224 Park Ave., Florham Park, N.J. 07932
Phosmarin Equipment, 21, Boulevard de Paris, 13002 Marseille, France
Sub Enterprises, Inc., P.O. Box 16531, Irvine, CA 92713

HYDRAULICS
Fluid Technology, Inc., 10626 Phillips Highway, Jacksonville, FL 32224
Hydranautics, 6338 Lindmor Drive, Goleta, CA 93017
Voss, Inc., Building J, 7029 Huntley Road, Columbus, Ohio 43229

INERT GAS—Generators—Systems
ATCO Marine Corporation, 603 Dean St., Brooklyn, NY 11238
Camar Corporation, P.O. Box 460, Worcester, MA 01613
Foster Wheeler Boiler Corp., 110 So. Orange Ave., Livingston, N.J. 07039
Fredriksstad mek. Verksted, N. American Agents, American United Marine Corp., 575 Madison Ave., New York, N.Y. 10022
Peabody Holmes Ltd., 17-27 Garratt Lane, London SW 18 4BY

INSULATION—Cloth, Fiberglas
Bailey Carpenter & Insulation Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231

INSURANCE
Adams & Porter, 1819 St. James Place, Houston, Texas 77027
Adams & Porter, 1 World Trade Center, Suite 8433, New York, N.Y. 10048
Alexander & Alexander, Inc., 1185 Ave. of the Americas, New York, N.Y. 10036
B.R.I. Coverage Corporation, 156 Williams St., New York, NY 10038
Midland Insurance Co., 160 Water St., New York, N.Y. 10038

JOINER—Watertight Doors—Paneling
Masonite Commercial Division, Dover, OH 44622
Waltz & Krenzer, Inc., 400 Trabold Road, Rochester, NY 14624

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

LIFEBOATS & DAVITS
Schot Davit Corporation, 226 West Park Place, Newark, DE 19711

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights
Browning Marine, Inc., (Aqua Signal), P.O. Box 806G, St. Charles, IL 60174
Oceanic Electrical Mfg. Co., 157 Perry Street, New York, N.Y. 10014
Oreck Corp., 100 Plantation Rd., New Orleans, LA 70123
Perko Inc., P.O. Box 6400D, Miami, Florida 33164
Phoenix Products Company, 4785 North 27th Street, Milwaukee, WI 53209
Port Electric Supply Corp., 157 Perry Street, New York, N.Y. 10014

LNG CONTAINMENT
McDonnell Douglas Astronautics Co., 5301 Bolsa Ave., Huntington Beach, CA 92647

MACHINE TOOLS
Republic-Lagun Machine Tool Co., 1000 E. Carson St., Carson, CA 90749

MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING
General Electric Company — Bldg. 2, Rm 216, Schenectady, N.Y. 12345
Schnitzer-Levin Marine Co., 445 Littlefield Ave., So. San Francisco, CA 94080

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

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS
Advanced Marine Enterprises, Inc., Suite 500, 2341 Jefferson Davis Highway, Arlington, Va. 22202
Agemar, Ave. 17 No. 108-129, P.O. Box 1465, Maracaibo, Venezuela
American Standards Testing Bureau, Inc., 40 Water Street, New York, N.Y. 10004
Amirikian Engineering Co., Chevy Chase Center Bldg., Suite 505 35 Wisconsin Circle, Chevy Chase, Md. 20015
J.L. Bludworth, P.O. Box 2441, Corpus Christi, TX 78403
Jacksonville, Florida 32211
Del Breit Inc., 326 Picayune Place (Suite 201), New Orleans, LA 70130
C.D.I. Marine Co., Regency East, Suite 222, 9951 Atlantic Blvd.,
CTS & Associates, 11320 S.W. 108 Court, Miami, Fla. 33176
CADCOM, 107 Ridgely Ave., Annapolis, MD 21401
Childs Engineering Corp., Box 333, Medfield, Mass. 02052
John P. Colletti & Associates, P.O. Box 13378, Pittsburgh, PA 15243
Columbia-Sentinel Engineers Western, Inc., P.O. Box 21542, Seattle, WA 98111
Crandall Dry Dock Engrs., Inc., 21 Pottery Lane, Dedham, Mass. 02026
Crane Consultants Inc., 15301 1st Ave., So. Seattle, Washington 98148
C.R. Cushing & Co., Inc., One World Trade Center, New York, N.Y. 10048
Norman N. DeJong & Associates, Inc., 1734 Emerson St., Jacksonville, Fla. 32207
Design Associates Inc., 14360 Chef Menteur Highway, New Orleans, LA 70129
Designers & Planners, Inc., 82 Beaver Street, New York, NY 10005
Donhaiser Marine, Inc., 11511 Katy Freeway, Houston, TX 77079
Francis C. Ducote, P.E., P.O. Box 644, Kenner, LA 70063
Parker C. Emerson & Associates, 17935 Cardinal Drive, Lake Oswego, Oregon 97034
Christopher J. Foster, Inc., 16 Sintsink Drive East, Port Washington, N.Y. 11050
Friede and Goldman, Ltd., 225 Baronne St., New Orleans, La. 70112
Giannotti & Associates, Inc., 703 Giddings Ave., Suite U-3, Annapolis, MD 21401
Gibbs & Cox, Inc., 40 Rector Street, New York, N.Y. 10006
John W. Gilbert Associates, Inc., 58 Commercial Wharf, Boston, Mass. 02110
The Glosten Associates, Inc., 610 Colman Bldg., 811 First Ave., Seattle, WA 98104
Phillip Gresser Associates, Ltd., 3250 South Ocean Blvd., Palm Beach, FL 33480
Morris Guralnick Associates, Inc., 620 Folsom Street, Suite 300, San Francisco, CA 94107
Hampton Roads Engineering, Inc., 119 E. Little Creek Rd., Norfolk, VA 23505
J.J. Henry Co., Inc., Two World Trade Center—Suite 9528, New York, N.Y. 10048
Hoffman Maritime Consultants Inc., 9 Glen Head Road, Glen Head, NY 11545
Hydronautics, Incorporated, 7210 Pindell School Road, Howard County, Laurel, Maryland 20810
Jantzen Engineering Co., 6655-H Amberton Drive, Baltimore, Md. 21227
James S. Krogen & Co., Inc., 3333 Rice St., Miami, Fla. 33133
Littleton Research and Engrg. Corp., 95 Russell St., Littleton, Mass. 01460
Lucander Designs, P.O. Box 711, San Perlita, TX 78590
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
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, Ohio 44114
Marine Design Inc., 401 Broad Hollow Road, Rte. 110, Melville, N.Y. 11746
Marine Technical Associates, Inc., 195 Paterson Avenue, Little Falls, NJ 07424
Maritime Service Company, 1357 Rosecrans St., Suite B, San Diego, CA 92106
Rudolph F. Matzer & Associates, Inc., 13891 Atlantic Blvd., Jacksonville, Fla. 32225
Mechanical Resources Inc., 191 Cambridge Avenue, Jersey City, N.J. 07307
George E. Meese, 194 Acton Rd., Annapolis, Md. 21403
Metritape, Inc., 33 Bradford Street, Concord, MA 01742
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., 911 Western Ave., Seattle, WA 98104
Robert B. Niederberger, P.E., 507 Evergreen Road, Severna Park, MD 21146
Captain Conrad P. Nilsen, 66 Beverly Road, Bloomfield, NJ 07003
Norgaard and Clark, 114 Sansome St., San Francisco, CA 94104
Ocean-Oil International Engineering Corporation, 3019 Mercedes Blvd., New Orleans, La. 70114
Offshore Power Systems, 8000 Arlington Expressway, Jacksonville, FL 32211
Oromar International Enterprises, Inc., P.O. Box 13069, Port Everglades, FL 33316
PRC Guralnick, 5252 Balboa Ave., San Diego, CA 92117
Pacific Industries Inc., 1440 Canal Street, Suite 1915, New Orleans, LA 70112
Pearlson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, Florida 33156
S.L. Petchul, Inc., 1380 SW 57th Ave., Fort Lauderdale, Fla. 33317
Pilotage Consultants, Inc., P.O. Box 3, Atlantic Highlands, NJ 07716
M. Rosenblatt & Son, Inc., 350 Broadway, New York, N.Y. 10013 and 657 Mission St., San Francisco, Calif.
Sargent & Herkes, Inc., 611 Gravier St., New Orleans, La. 70130
Schmohl and Schmahl, Inc., 1209 S.E. Third Ave., Fort Lauderdale, Florida 33316
Seacor Systems Engineering Associates, Corp., P.O. Box 2030, 19 Cherry Hill Industrial Park, Perina Blvd., Cherry Hill, NJ 08003
Seaworthy Engine Systems, 36 Main Street, Essex, CT 06426
George G. Sharp, Inc., 100 Church St., New York, N.Y. 10007
T. W. Spaetgens, 156 West 8th Ave., Vancouver, Canada V5Y 1N2
R.A. Stearn, Inc., 253 N. 1st Ave., Sturgeon Bay, WI 54235
Richard R. Taubler Inc., 8 Columbia St., Milford, Del. 19963
Thames Engineering Consultants Inc., P.O. Box 589, New London, Ct. 06320
Timsco, 622 Azalea Road, Mobile, AL 36609
Corning Townsend III, 18 Church St., Georgetown, CT 06829
Undersea Systems, 112 W. Main St., Bay Shore, N.Y. 11706
Wesley D. Wheeler Assoc., Ltd., 104 E. 40th St., Suite 206, New York, NY 10016
Thomas B. Wilson, 920 North Avalon Blvd., Wilmington, CA 90744
Wind Ship Development Corporation, 690 Main Street, Norwell, MA 02061
Wink Incorporated, 8020 Maya Blvd., New Orleans, LA 70126
XPLO Corporation, 229 Fifth Street, Gretna, LA 70053

NAVIGATION & COMMUNICATIONS EQUIPMENT
AAT Communications Corporation, 1854 Hylan Blvd., New York, NY 10305
American Hydromath Co., Buckwheat Bridge Rd., Germantown, N.Y. 12526
Apelco Marine Electronics, Division of Raytheon, 676 Island Pond Rd., Manchester, NH 03103
Communication Associates, Inc., 200 McKay Road, Huntington Station, N.Y. 11746
Comsat General Corp., 950 L'Enfant Plaza, S.W., Washington, D.C. 20024
Dantronics Company, P.O. Box 204, Bocca Raton, FL 33432
DEBEG Marine, Inc., 10 Manor Parkway, Salem, NH 03079
Electro-Nav Inc., 840 Bond Street, Elizabeth, NJ 07201
EPSCO, Inc., 411 Providence Highway, Westwood, Mass. 02090
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
Griffith Marine Navigation, Inc., 134 North Avenue, New Rochelle, NY 10801
Harris Communications, RF Communications Division, 1680 University Avenue, Rochester, NY 14610
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Hose McCann Telephone Company, Inc., 9 Smith Street, Englewood, NJ 07631
ITT Mackay Marine, 2912 Wake Forest Road, Raleigh, N.C. 27611
Intermarine Electronics, Inc., Flowerfield Bldg. #7, St. James, N.Y. 11780
Iotron Corp., 5 Alfred Circle, Bedford, MA 01730
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, 241 Erie Street, Jersey City, NJ 07302
Maritel, Inc., 139 Old Solomon's Island Road, Annapolis, MD 21401
Nav-Com, Inc., 711 Grand Blvd., Deer Park, NY 11729
Navidyne Corp., 11824 Fishing Point Drive, Newport News, VA 23606
Navigation Communications Systems, Inc., 20100 Plummer Street, Chatsworth, CA 91311
North American Philips Communication Corp., 91 Mckee Road, Mahwah, N.J. 07430
RCA Service Co., Building 204-2, Camden, N.J. 08101
Racal-Decca Marine, Inc., P.O. Box G, #1 Commerce Blvd., Palm Coast, FL 32037
Radar Devices, Inc., 2955 Merced Street, San Leandro, CA 94577
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
Simrad Inc., 1 Labriola Court, Armonk, N.Y. 10504
Southern Marine Research, Inc., 1401 N.W. 89th Court, Miami, FL 33172
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.
Texas Instruments Inc., P.O. Box 226080, M/S 3107, Dallas, TX 75265
Tracor, Inc., Industrial Products Div., 6500 Tracor Lane, Austin, Texas 78721

OILS—Marine—Additives
B. P. Marine North America Trading, Plaza 9, 900 Route 9, Woodbridge, NJ 07095
Ferrous Corporation, P.O. Box 1764, Bellevue, WA 98009
Gulf Oil Company—U.S. (Domestic Oils), 909 Fannin Street, Houston, TX 77001
Gulf Oil Trading Co., 1290 Ave. of Americas, New York, N.Y. 10019
Houston Marine Services, Inc., 505 Atrium One, 11811 1-10 East, Houston, TX 77029
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
Mobil Oil Corporation, 150 East 42nd St., New York, N.Y. 10017
Texaco, Inc. (International Marine), 135 East 42nd St., N.Y., N.Y. 10017

OIL/WATER SEPARATORS
Alfa-Laval, Inc., 2115 Linwood Avenue, Ft. Lee, NJ 07024
Butterworth Systems Inc., 224 Park Ave., Florham Park, N.J. 07932
Sigma Treatment Systems, 2 Davis Ave., Frazer, PA 19355

PAINTS—COATINGS—CORROSION CONTROL
American Abrasive Metals, 460 Coit Street, Irvington, NJ 07111
Belzona Molecular Metalife Inc., 224 7th Street, Garden City, NY 11530
"CONSOL" manufactured by Hanline Bros., Inc., 1400 Warner St., Baltimore, MD 21230
Devoe Marine Coatings Co., P.O. Box 7600 Louisville, KY 40207
Eureka Chemical Company, 234 Lawrence Ave., So. San Francisco, CA 94080
International Paint Co., 17 Battery Place North, Suite 1150, New York, N.Y. 10004
Jotun-Baltimore Copper Paint Co., 501 Key Highway, Baltimore, MD 21230
Mobil Chemical Co., Maintenance & Marine Coatings Dept., P.O. Box 250, Edison, N.J. 03817
Palmer Products Inc., P.O. Box 8, Worcester, PA 19490
Selby, Battersby & Company, 5220 Whiby Avenue, Philadelphia, PA 19143
Woolsey Marine Industries, Inc., 1250 Broadway, New York, NY 10001

PETROLEUM SUPPLIES
Houston Marine Services, Inc., 505 Atrium One, 11811 1-10 East, Houston, TX 77029
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002

PIPE-HOSE—Cargo Transfer, Clamps, Couplings, Coatings
Camlock Flange Sales Corp., 449 Sheridan Blvd., Inwood, L.I., N.Y. 11696
CUNICO Corp., Cooney Pipe & Copper Works Div., 214 N. Hawaiian Ave., Wilmington, CA 90748
Hydro-Craft, Inc., 4223 Edgeland, Royal Oak, Mich. 48073
Kubota Ltd., 2-47, Shikit Sshigashi 1-Chome, Naniwa-Ku, Osaka 556-91, Japan
Penco Division/Hudson Engineering Co., 1114 Clinton St., Hoboken, N.J. 07030
Sanchem, Inc., 1600 South Canal Street, Chicago, IL 60616
Tioga Pipe & Supply Company, 2450 Wheatsheaf Lane, Philadelphia, PA 19137

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

PROPULSION EQUIPMENT—Bowthrusters, Diesel Engines, Gears, Propellers, Shafts, Turbines
Alco Power Inc., 100 Orchard St., Auburn, N.Y. 13021
Alsthom-Atlantique, 2 quai de Seine, 93203 Saint-Denis, France
Armco Steel/Advanced Materials Div., 703 Curtis St., Middletown, OH 45043
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, La. 70150
Bird Johnson Company, 110 Norfolk St., Walpole, Mass. 02081
Burmeister & Wain Alpha Diesel AS, DK-1400 Copenhagen K, Denmark
Burmeister & Wain Diesel, Inc., 50 Broadway, New York, NY 10004
Caterpillar Tractor Company, Engine Division, Peoria, IL 61629
Colt Industries' Fairbanks Morse Engine Division, Beloit, Wisc. 53511
Combustion Engineering, Inc., Windsor, Connecticut 06095
Electro-Motive Division, General Motors Corp., LaGrange, Ill. 60525
Elliott Company, (Div. of Carrier Corp.), Jeanette, PA 15644
General Electric Co., Diesel Power Products, 2901 E. Lake Rd., Erie, PA 16531
Kawasaki Heavy Industries, Ltd., 2-4-1 Hamamtsu-cho, Minato-ku, Tokyo, Japan
MTU of North America, Inc., 10450 Corporate Drive, Sugar Land, TX 77478
Maritime Industries, Ltd., 6307 Laurel St., Burnaby, B.C. Canada V5B 3B3
Michigan Wheel, 1501 Buchanan Ave., S.W., Grand Rapids, MI 49507
Omnithruster Inc., 15418 Cornet Ave., Santa Fe Springs, CA 90670
Oosterhuis Industries, Inc. (Marine Engineering, Inc.), P.O. Box 30587, New Orleans, LA 70190
P.J. Plishner Marine, 2 Lake Avenue Ext., Danbury, CT 06810
Port Electric Turbine Div., 155-157 Perry St., New York, N.Y. 10014
Propulsion Systems Inc., 21213 76th Ave., So., Kent, WA 98031
Schottel of America, Inc., 8375 N.W. 56 Street, Miami, Fla. 33166
Skinner Engine Company, P.O. Box 1149, Erie, PA 16512
Steamco Corporation, 364 Stowe Avenue, Orange Park, FL 32073
Tacoma Boat Co./Escher Wyss, 1840 Marine View Dr., Tacoma, WA 98422
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, Salina, KS 67401
Voith Schneider of America—U.S. Agent: Eli Sharprut, 347 Evelyn St., Paramis, N.J. 07652

PUMPS—Repairs—Drives
Barco Corporation, 16 Bahama Circle, Tampa, FL 36606
Penco Division/Hudson Engineering Co., 1114 Clinton St., Hoboken, N.J. 07030
Transamerica Delaval, IMO Pump Division, P.O. Box 447, Monroe, NC 28110
Warren Pumps, Inc., Bridges Ave., Warren, Mass. 01083

REFRIGERATION—Refrigerant Valves
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
Port Refrigeration Div., 157 Perry Street, New York, N.Y. 10014

ROPE—Manila—Nylon—Hawsers—Fibers
American Mfg. Co., Inc., Willow Avenue, Honesdale, Pa. 18431
Samson Ocean Systems, Inc., 99 High Street, Boston, Mass. 02110
Tubbs Cordage Company, Orange, CA 92668

RUDDER ANGLE INDICATORS
Electric Tachometer Corp., 68th & Upland St., Philadelphia, Pa. 19142
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Hose McCann Telephone Co., Inc., 524 W. 23rd St., N.Y. 10011
Modular Systems, Division of Warren Pumps Houldaille
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.

SAFETY EQUIPMENT
ACR Electronics, Inc., 3901 North 29th Avenue, Hollywood, FL 33020

SANITATION DEVICES—Pollution Control
Argo Marine Pollution Systems Division, 140 Franklin St., New York, N.Y. 10013
Chapman Engineers (Omnipure Division), 6101 Southwest Freeway, Suite 100, Houston, TX 77057
Envirovac (Division of Dometic Inc.), 1260 Turret Drive, Rockford, IL 61111
Marine Moisture Control Co., Inc., 449 Sheridan Blvd., Inwood, L.I., N.Y. 11696
Marland Environmental Systems, Inc., N. Main Street, Walworth, WI 53184
Microphor, Inc., P.O. Box 490, Willits, CA 95490
Red Fox Industries, P.O. Drawer 640, New Iberia, LA 70560
St. Louis Ship FAST Sewage Systems, 611 East Marceau St., St. Louis, Mo. 63111
Sigma Treatment Systems, 2 Davis Ave., Frazer, PA 19355

SCAFFOLDING EQUIPMENT—Work Platforms
Patent Scaffolding Co., 2125 Center Ave., Fort Lee, N.J. 07024
Trus Joist Corp., P.O. Box 60, Boise, Idaho 83707

SHACKLES
West Footscray Engineering Works P/L, 52 Cross Street, West Footscray, Melbourne, Victoria, 30 12. Australia

SHAFT SEALS, REVOLUTION INDICATOR EQUIPMENT
Bird-Johnson Co., 100 Norfolk St., Walpole, MA 02031
Electric Tachometer Corp., 68th & Upland St., Philadelphia, Pa. 19142
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Penco Division/Hudson Engineering Co., 1114 Clinton St., Hoboken, N.J. 07030

SHIPBREAKING—Salvage
American Ship Dismantlers, Inc., Division of Schnitzer Industries, 3300 N.W. Yeon Avenue, Portland, Ore. 97210
The Boston Metals Co., 313 E. Baltimore St., Baltimore, Md. 21202
Levin Metals Corporation, 1310 Canal Blvd., Richmond, CA 94807
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, Ore. 97201

SHIPBUILDING STEEL
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., One State Street Plaza, N.Y. 10004

SHIPBUILDING—Repairs, Maintenance, Drydocking
A.D.M. (Amsterdam Drydock Mfg.), Maatschappij bv, P.O. Box 3006, 1003 AA, Amsterdam, Holland
AMT, Inc., 2400 N.W. 39th Avenue, Miami, FL 33142
Asmar Shipyards Co., Astilleros y Maestranzs de la Armada, Prat 856, Piso 14, Casilla 150-V, Valpariso, Chile, S.A.
Astilleros Espanoles S.A., 17 Padilla, P.O. Box 815, Madrid, Spain
Astilleros Unidos de Veracruz, S.A., San Juan de Ulua S/N, Apdo. Postal 647, Veracruz, Ver., Mexico
Avondale Shipyards, Inc., P.O. Box 52030, New Orleans, La. 70150
Bay Shipbuilding Corporation, 605 North Third Avenue, Sturgeon Bay, WI 54235
Bender Shipbuilding & Repair, P.O. Box 42, Mobile, AL 36601
Bergeron Industries Inc., P.O. Box 38, St. Bernard, La. 70085
Bethlehem Steel Corp., One State Street Plaza, N.Y. 10004
Blohm & Voss Company, 55 Morris Avenue, Springfield, NJ 07081
Bludworth Bond Shipyard Inc., P.O. Box 5065, Houston, TX 77012
Boeing Marine Systems, P.O. Box 3707, Mail Stop 14-11, Seattle, WA 98124
Cantieri Navali Riuniti, Via Cipro, 11, 16100 Genova, Italy
Carrington Slipways Pty, Ltd., Old Punt Road, Tomago, N.S.W., Australia 2322
Centramor, One World Trade Center, Suite 3557, New York, N.Y. 10048
China Shipbuilding Corp., c/o Allegro Transportation Supply Co., One Penn Plaza, Room 1606, New York, NY 10119
Conrad Industries, P.O. Box 790, Morgan City, La. 70380
Curacao Drydock Co., Inc., P.O. Box 153, Willemstad, Curacao, Netherlands Antilles
Curacao Drydock, 26 Broadway, Suite 741, New York, N.Y. 10004
Delattre-Levivier, Tour Fiat, Cedex 16, 92084 Paris La Defense, France
Dorbyl Ltd., Military Road, 1 Industrial Sites, West Bank, 5201 East London Republic of South Africa
Dravo Steelship Corp., R.4, Box 167, Pine Bluff, Ark. 71602
Equitable Shipyards, Inc., P.O. Box 8001, New Orleans, La. 70122
FMC Corp., Marine & Rail Equipment Div., 4700 N.W. Front Ave., Portland, Oregon 97208
Galveston Shipbuilding Co., P.O. Drawer 2660, Galveston, TX 77553
HBC Barge, Inc., Grant Building, Pittsburgh, PA 15219
Halifax Industries Ltd., P.O. Box 1477, Halifax, Nova Scotia, Canada, B3K 5H7
Halter Marine, Inc., P.O. Box 29266, New Orleans, La. 70189
Havre de Grace, Havre de Grace, Md.
Hitachi Shipbuilding & Engrg. Co., Ltd., 47 Edobori 1-Chome, Nishi-Ku, Osaka, Japan
Hong Kong United Dockyards Ltd., P.O. Box 534, Kowloon Central Post Office, Kowloon, Hong Kong
Hudson Shipbuilders, Inc., P.O. Box Q, Pascagoula, MS 39567
Jackson/Engineering Company, Inc., 2945 Richmond Terrace, Staten Island, NY 10303
Jeffboat, Inc., Jeffersonville, Ind. 47130
Keppel Shipyard Ltd., P.O. Box 2169, 325, Telok Blangah Road, Singapore 4
Levingston Shipbuilding, P.O. Box 968, Orange, TX 77630
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134
McDermott Incorporated, 1010 Common Street, New Orleans, LA 70160
MacGregor Land & Sea, Inc., 135 Dermody Street, Cranford, NJ 07016
Mangone Shipbuilding Co., 819 South 80th Street, P.O. Box 5446, Houston, TX 77012
Marine Fabricators, P.O. Box 246, Green Cove Springs, FL 32043
Marinette Shipyard Co., Inc., P.O. Box 645, Cohoes, New York 12047
Midland Marine Corporation, One Pennsylvania Plaza, New York, NY 10001
Misener Industries, Inc., 5353 Tyson Avenue, P.O. Box 13625, Tampa, Fla. 33681
Mississippi Marine Towboat Corp., P.O. Box 539, Harbor Front Industrial Park, Greenville, MS 38701
Monark Boat Co., P.O. Box 210, Monticello, Ark. 71655
Nashville Bridge Company, P.O. Box 239, Nashville, TN 37202
National Steel & Shipbuilding Corp., San Diego, Calif. 92112
Newpark Shipbuilding & Repair, P.O. Box 5426, Houston, TX 77012
Newport News Shipbuilding & Dry Dock Co., 4101 Washington Ave., Newport News, Va. 23607
North American Hydraulics, P.O. Box 278, Brampton, Ontario Canada L6V 2L1
O.A.R.N. (Officine Allestimenta-Riprazioni Navi), P.O. Box 1395, Genoa, Italy 16100
Pacecо, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501
Pearlson Engineering Co., P.O. Box 8, Kendall Branch, Miami, Fla. 33156
Perth Amboy Dry Dock Co., Perth Amboy, N.J. 08862
Port Allen Marine Service, Inc., P.O. Box 108, Port Allen, LA 70767
Port Houston Marine, Inc., 7220 J.W. Peavy Drive, Houston, TX 77012
Port of Portland, P.O. Box 3529, Portland, OR 97208
Promet (PTE) Ltd., 27 Pandam Rd., Jurong Industrial Estate, Singapore 22
S.E.B.N., Societa Estercizio Bacini Napoletani, Via Marinella Varco N.6 (80133) Naples, Italy
St. Louis Shipbuilding—Federal Barge, Inc., 611 East Marceau, St. Louis, Mo. 63111
STE Marie Yard & Marine, Inc., 741 East Portage Ave., Sault Ste Marie, MI 49783
Savannah Shipyard Co., P.O. Box 787, Savannah, GA 31402
Sembawang Shipyard Ltd., Sembawang, P.O. Box 3, Singapore 9175
The Service Machine Group, Inc., P.O. Box 2664, Morgan City, LA 70308
Setenave-Estaleiros Navais De Setubal, P.O. Box 135, Setubal, Portugal
Southwest Marine, Inc., P.O. Box 13308, San Diego, Ca 92113
Sudoimport, 5 Kalyaevskaya, Moscow K-6, USSR
Sun Ship Inc., Chester, PA 19013
Swiftships Inc., P.O. Box 1903, Morgan City, LA 70380
Tacoma Boatbuilding Co., Inc., 1840 Marine View Drive, Tacoma, WA 98422
Tandanor (Piacentini), Antartida Argentina 555 Darsena Norte, (1104) Buenos Aires-Republica Argentina
Thomas Marine Inc., 37 Bransford Street, Patchogue, NY 11772
Todd Shipyards Corp., 1 State St. Plaza, New York, N.Y. 10004
Total Transportation Systems Inc., 813 Forest Dr., Newport News, VA 23606
Total Transportation Systems (International) A/S, Bjornegarden, P.O. Box 28, N5201 Oslo, Norway
Tracor Marine, P.O. Box 13107, Port Everglades, Fla. 33316
Tug Barge Systems, Inc., subsidiary of Ingram Corp., 4100 One Shell Square, New Orleans, La. 70139
Union Dry Dock & Repair Co., Foot of Pershing Road, Weehawken, N.J. 07087
Wiley Manufacturing, a unit of AMCA International Corp., P.O. Box 97, Port Deposit, MD 21904

SHIPPING
Candia Shipping (USA) Inc., One World Trade Center, Suite 1611, New York, NY 10048

SHIP STABILIZERS
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.

SMOKE INDICATORS
Robert H. Wager Co., Inc., Passaic Avenue, Chatham, N.J. 07928

STUFFING BOXES
Johnson Rubber Co. (Marine Div.), 16025 Johnson St., Middlefield, Ohio 44062

SURVEYORS AND CONSULTANTS
Francis B. Crocco, Inc., P.O. Box 1411, San Juan, Puerto Rico 00903
Hull & Cargo Surveyors, Inc., 99 John St., New York, NY 10038

TANK CLEANING
Butterworth Systems Inc., 224 Park Ave., P.O. Box 352, Florham Park, N.J. 07932
Environmental Chemicals, Inc., 487 Division Street, Boonton, NJ 07005
Penco Division/Hudson Engineering Co., 1114 Clinton St., Hoboken, N.J. 07030
Salwico, Inc., 5 Marine View Plaza, Hoboken, NJ 07030

TANK LEVELING INDICATORS
Transamerica Delaval, Inc., Gems Sensors Division, Cowles Road, Plainville, CT 06052
Vu-Gage System, 150 E. 42nd St. (Room 910), New York, NY 10017
Zesco, Inc., 3131 Brian Park, Suite 1095, Houston, TX 77042

TERMINALS—Oil-Transfer
Caicos Petroleum Services Div., Federal Chicago Corp., 2222 North Elston Avenue, Chicago, IL 60614
Delong Corp., 29 Broadway, New York, N.Y. 10006
Transportation Concepts & Techniques Inc., 1020 West Main Street, Charlottsville, VA 22903

TOWING—Barges, Vessel Chartering, Lighterage, Salvage, etc.
Bay-Houston Towing Co., 805 World Trade Bldg., Houston, Texas 77002
Chotin Transportation, Inc., 580 Walnut St., Cincinnati, Ohio 45202
Curtis Bay Towing Co., Mercantile Bldg., Baltimore, Md. 21202
Henry Gillen's Sons Lighterage, 21 West Main St., Oyster Bay, N.Y. 11771
Great Lakes Towing Company, 1800 Terminal Tower, Cleveland, OH 44113
Gulf Fleet Marine Corporation, Canal Place One, Suite 2400, New Orleans, LA 70130
James Hughes, Inc., 17 Battery Pl., New York, N.Y. 10004
McAllister Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
McDonough Marine Service, P.O. Box 26206, New Orleans, La.
Moran Towing & Transportation Co., Inc., One World Trade Center, Suite 5335, New York, N.Y. 10048
Ocean Salvors Company, One World Trade Center, New York, NY 10048
Smit International (Americas) Inc., 17 Battery Place, New York, NY 10004
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

TRAINING SERVICES—Simulator
Ship Analytics, Park Circle, Centerport, NY 11721

VALVES AND FITTINGS
American United Marine, 575 Madison Avenue, New York, NY 10022
Dover Corporation, Norris Division, P.O. Box 1739, Tulsa, OK 74101
Hayward Marine Products, 900 Fairmount Avenue, Elizabeth, NJ 07207
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Marland Environmental Systems Inc., N. Main St., Walworth, WI 53184
Parker-Hannifin Corporation, 17325 Euclid Avenue, Cleveland, OH 44112
Voss, Inc., Building J, 7029 Huntley Road, Columbus, Ohio 43229
Robert H. Wager Co., Inc., Passaic Avenue, Chatham, N.J. 07928
Waukesha Bearings Corp., P.O. Box 798, Waukesha, WI 53186
Winel, Inc., 34655 Mills Road, North Ridgeville, OH 44039

WATER PURIFIERS
Everpure, Inc., 660 N. Blackhawk Dr., Westmont, IL 60559
Halogenic Products Corporation, P.O. Box 27488, Salt Lake City, UT 84127

WINCHES AND FAIRLEADERS
Bloom Inc., Highway 20, West Four Miles, Independence, IA 50644
Clyde Iron, a unit of AMCA International Corp., Suite 102, 2300 West Loop South, Houston, TX 77027
Gearmatic Co. Ltd., 7400 132nd Street, Surrey, B.C., Canada
Markey Machinery Co., 79 South Horton St., Seattle, Washington 98134
Smith-Berger Manufacturing Corporation, 3236 16th Avenue S.W., Seattle, WA 98134

WINDOWS
Kearfott Marine Products, A Singer Co., 550 South Fulton Avenue, Mt. Vernon, N.Y. 10550

WIRE AND CABLE
Anixter Bros., Inc., 4711 Golf Road, One Concourse Plaza, Skokie, Illinois 60076
Seacoast Electric Supply Corp., 225 Passaic St., Passaic, NJ 07055
Seacoast Electric Supply Corp., 1505 Oliver St., Houston, TX 77007

WIRE ROPE—Slings
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., One State Street Plaza, N.Y. 10004

ZINC
Smith & McCrorken, 153 Franklin St., New York, N.Y. 10013

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.

Marathon Launches Glomar Adriatic I

The Jackup **Glomar Adriatic I** slips into the water at Marathon LeTourneau's Gulf Marine Division at Brownsville. The rig is a Marathon Class 116-C, cantilever self-elevating, offshore drilling platform. At launching, the platform's derrick and other drilling components, along with the remaining sections of its three legs, had yet to be installed. The Glomar Adriatic I, which is being constructed for Global Marine Drilling Company, will be capable of operating in water depths up to 300 feet.

Pushboat **Bengal Sundance** is powered by two Cummins KTA 1150 diesel engines.

Bayou Black Shipyard Delivers Crewboat And Pusher To Sundance

Bayou Black Shipyard of Gibson, La., recently delivered the pushboat Bengal Sundance and the crewboat Sundance 7 to Sundance Marine of Houston. The steel hull of the Bengal Sundance has a length of 60 feet, beam of 25 feet, and depth midship of 9 feet. The all-aluminum Sundance 7 is 42 feet long with a beam of 13 feet and a midship depth of 6.5 feet.

Main propulsion for the Bengal Sundance is provided by twin Cummins KTA 1150 diesels, each rated 470 bhp at 1,800, driving 4-bladed, 58 by 44 inch stainless steel propellers through Twin Disc model 520 reverse/reduction gears. Shafts are 6-inch cold rolled steel, built up with stainless. Starting air for the main engines is provided by two compressors.

A special feature of the pushboat is the 36-inch-wide, ½-inch-thick push knees fabricated by the shipyard. The main cabin and pilothouse are constructed of aluminum, giving the boat a lower center of gravity. Another advantage of the aluminum construction will be reduced maintenance.

Electric power for the Bengal Sundance is supplied by two GM Detroit Diesel 30-kw generator sets. Electronic equipment includes an Epsco model 504 radar, two Drake MR-155 VHF radios, and a Raytheon Ray 350 loudhailer system. The boat will be used primarily in moving inshore drilling rigs and barges.

The Sundance 7 is powered by two GM Detroit Diesel Allison 6-71 engines, each rated 174 bhp at 1,800 rpm, driving 3-bladed, Columbian 28 by 30-inch propellers via 2-inch stainless steel shafts. Fuel is carried in an independent 300-gallon tank located in the lazerette. The engines are electric-start, with power provided by two 12-volt dc batteries.

Electronic equipment in the

GM Detroit Diesel Allison 6-71 engines power all-aluminum crewboat **Sundance 7.**

Sundance 7 includes a standard Horizon VHF-FM radio and a model 240 Furuno radar. Main engine controls are Morse model MT; the steering system is a self-contained hydraulic type. The vessel is certified by the U.S. Coast Guard to carry a total of 16 passengers and a crew of two.

Admiral John M. Will—Navy And Merchant Marine Leader—1900-1981

Admiral **John Mylin Will,** USN (ret.), who played a leading role in America's maritime community following a distinguished 40-year Navy career, died on May 8 at Walter Reade Army Hospital. He was 81.

Adm. John Mylin Will

While in the service, Admiral **Will** was regarded as one of the most versatile of Naval leaders; a technical man with a master's degree in engineering, a daring combat leader, a top submarine warfare expert, and an able administrator. During World War II, as a submarine squadron commander, his ships penetrated deep into enemy waters to inflict heavy damage on enemy shipping.

When he retired from the Navy, he was Commander of the Military Sea Transportation Service with more than 300 vessels and crews in his command. Today that division is known as Military Sealift Command.

Admiral **Will** joined American Export Lines in 1959 as president, a position he held until 1965, and was named board chairman in 1960 and remained in that position until 1971. During that period he also served as president and chairman of the board of First Atomic Ship Transport Inc. (FAST), charterers and operators of the Nuclear Ship Savannah.

New Brochure Describing Load-Moving Systems Offered By Hydranautics

Shipyard Systems by Hydranautics, an eight-page, four-color illustrated brochure, describes the company's heavy-load-moving systems for shipbuilding and repair. Systems described include ship lift systems, wheeled translation systems, skidding translation systems, drydock transfer systems, and walking translation systems.

The brochure describes how Hydranautics products operate to drydock and launch ships from an elevator, translate ships or ship sections throughout the yard, extrude ships under construction down shipways, and transfer ships into and out of floating drydocks.

For a free copy of the brochure,

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New Catalog Describing Full Line Available From Stanley Hydraulic Tools

The 1981-82 edition of the Stanley Hydraulic Tools catalog is now available, containing the company's full line of hydraulic-powered hand tools, power units, and accessories for marine construction, utility, and municipal applications.

Featuring many new models, the catalog's easy-reference format presents each tool group in alphabetical order, with full specifications and ordering information on the same page.

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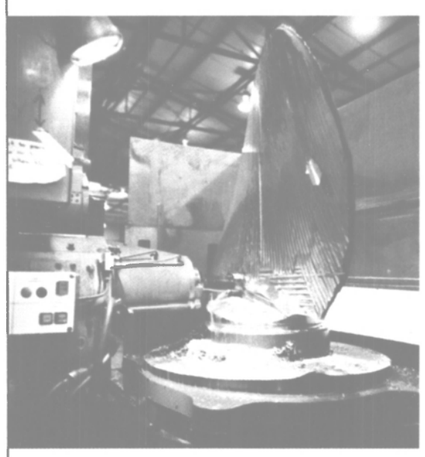

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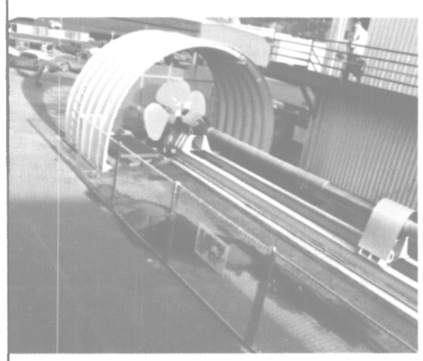

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