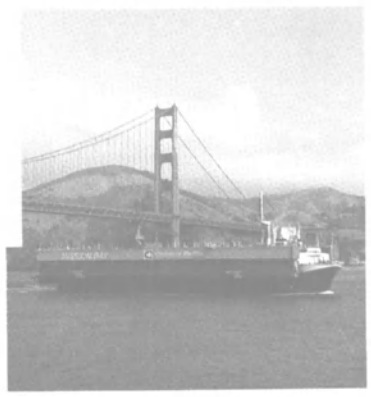
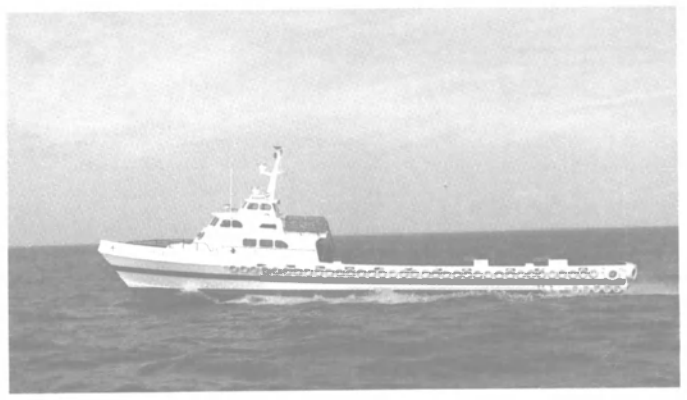
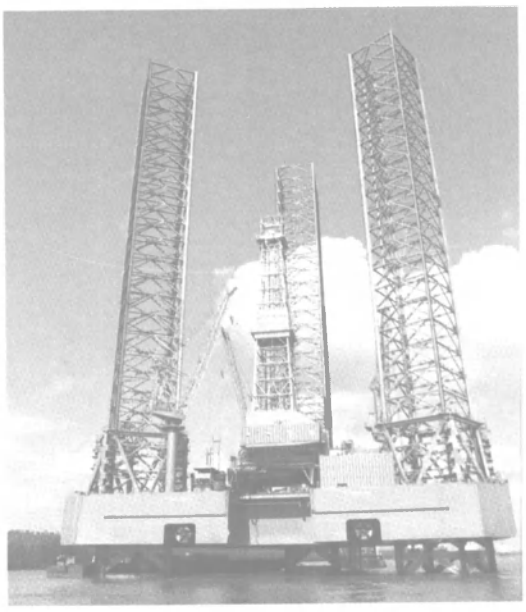
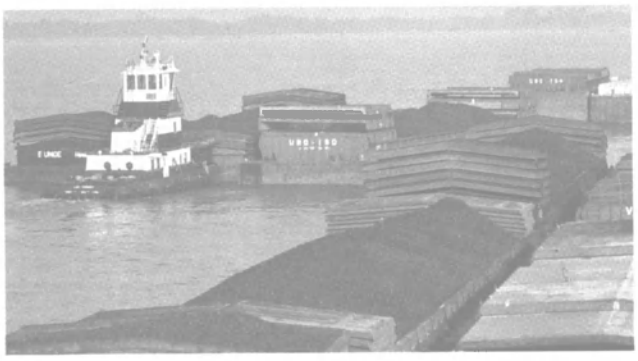
MARITIME REPORTER
AND
ENGINEERING NEWS







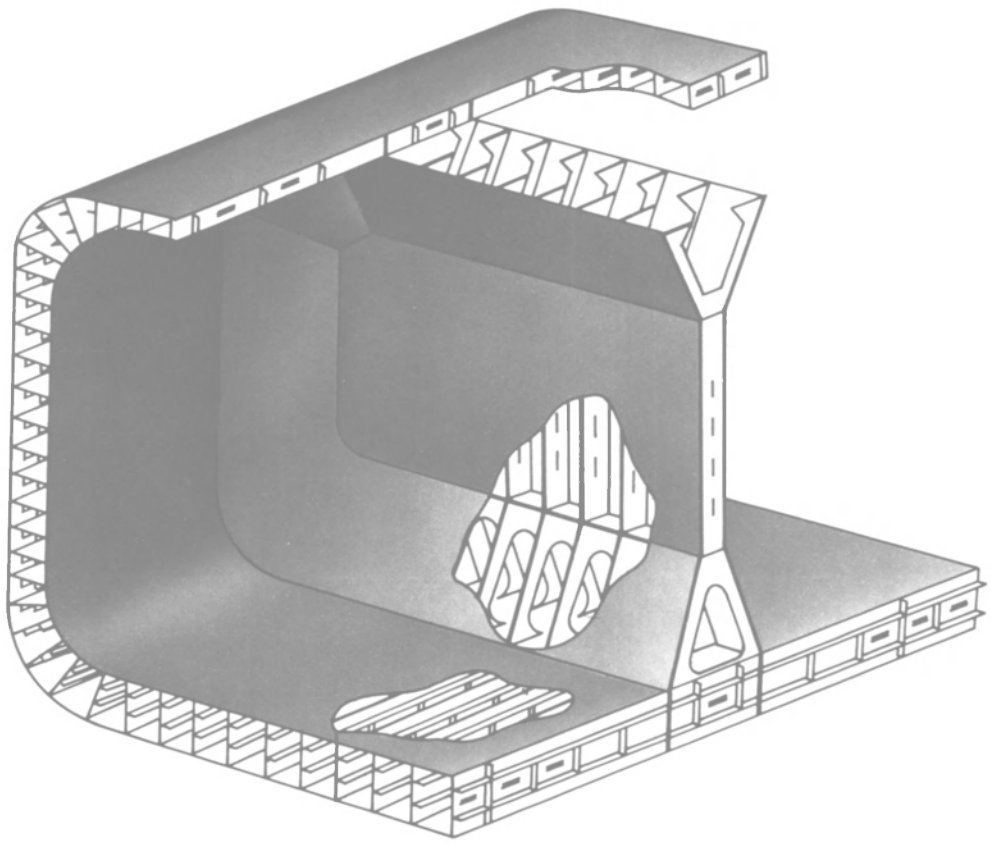


1985 YEARBOOK

JUNE 1985 DOUBLE ISSUE

INTRODUCING THE EPOCH MARK II SERIES.

A new era in product oil carrier design.



Hitachi Zosen has developed the EPOCH MARK II series which has a unique structure not found on conventional ship designs.

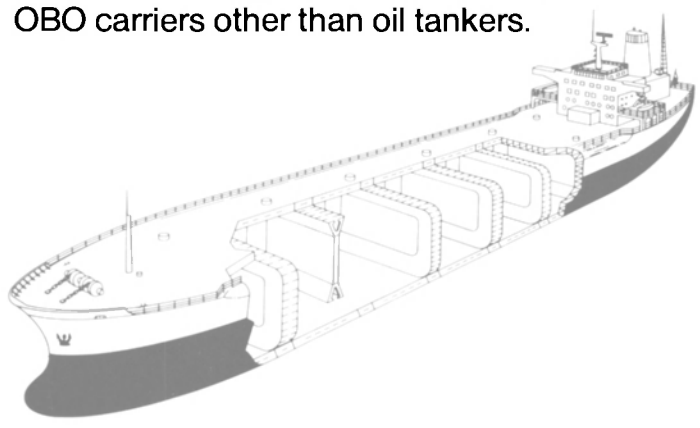
Revolutionary in concept, the MARK II incorporates a unidirectional girder system combined with a complete double hull structure.

While a ship's hull is customarily designed with a grillage of longitudinal and transverse members for strength, this system uses only longitudinal members in a double hull to provide sufficient strength.

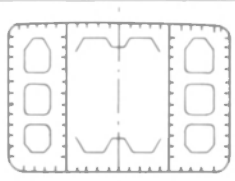
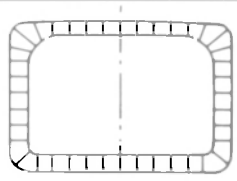
This unidirectional girder system results in unprecedented structural simplicity and completely flush surfaced cargo tank interior. MARK II product oil carriers provide unrivaled advantages in performances over more conventional designs.

The EPOCH MARK II series is available in 40, 60 and 80 thousands dwt designs. And has won the approval of leading classification societies (ABS, BV, LR, NK, NV). At present many worldwide patents are under application.

Hitachi Zosen is also expanding this new structural system for the development of combination cargo carriers such as PROBO or OBO carriers other than oil tankers.



The Superior Performance of the EPOCH MARK II Series:

		Conventional	EPOCH MARK II
Tank configuration			
Cargo/ballast segregation		★	★★★
Unloading efficiency	unloading time	★	★★★
	stripping	★	★★★
Cargo tank cleaning	cleaning time	★	★★★
	completeness	★	★★★
Gas free	cargo tank	★	★★★
	ballast tank	★★	★★
Cargo tank heating		★	★★★
Cargo purity		★	★★★
Maintenance	cargo tank coating	★	★★★
	ballast tank coating	★★	★★
	hull construction	★	★★★
Safety	crack free	★★	★★★
	stranding & collision	★	★★★

★★★: Excellent ★★: Good ★: Normal

We build industries

Hitachi Zosen

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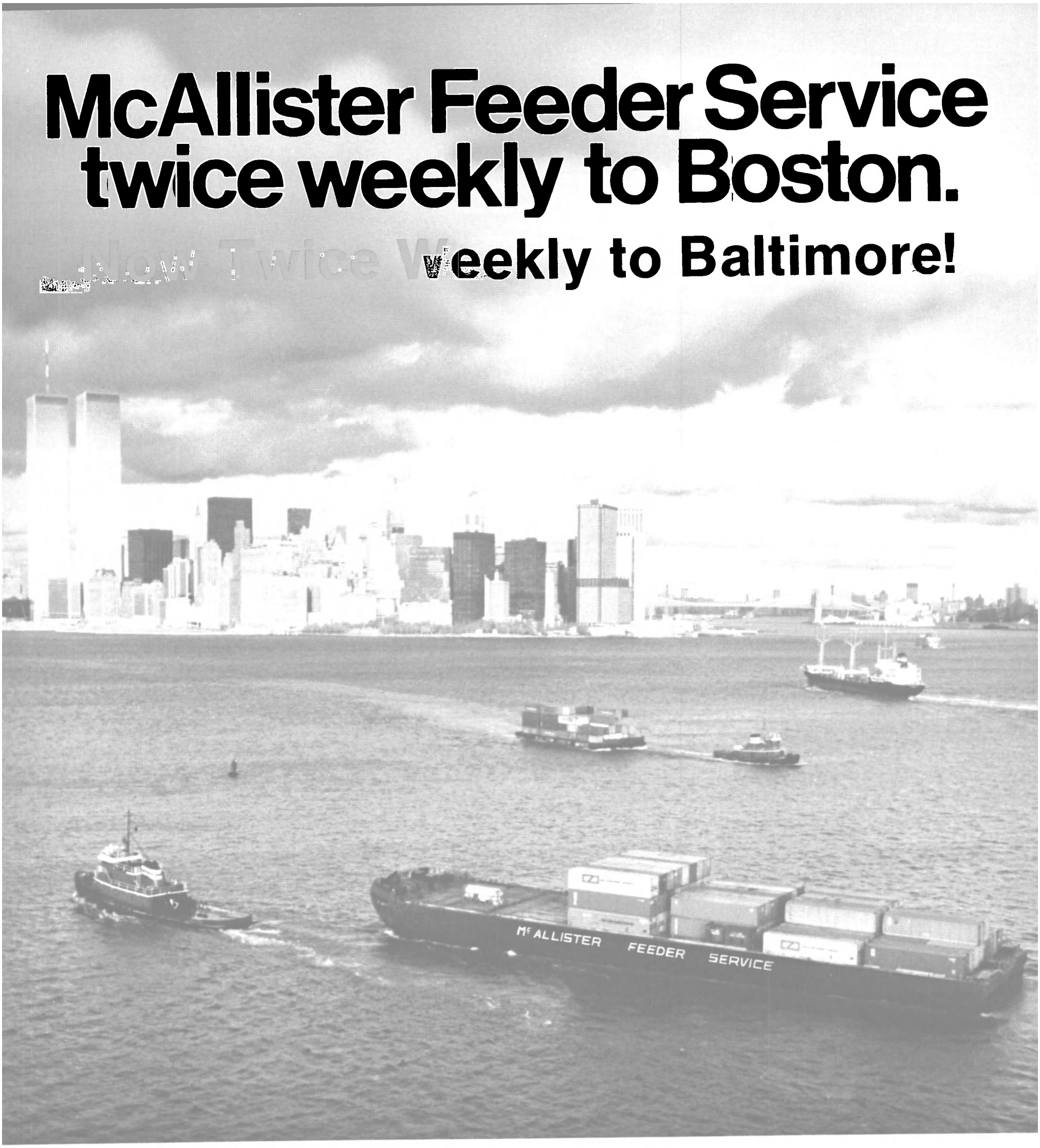

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ON THE COVER

Cover photos: Clockwise—Continental Maritime's new drydock, Mission Bay, arrives in San Francisco; Aluminum Boat-built supply vessel, Oriole; M/T San Andres during conversion at Conastil, Cartagena, Colombia; the 755-foot long PFC. James Anderson Jr., lengthened by 157 feet at Bethlehem Steel's Sparrows Point, MD yard, on sea trials; HMCS Iroquois; Federal Barge Lines; (center top) Royal Princess, built by Wartsila, on sea trials; (center bottom) the Rowan Gorilla III, built by Marathon LeTourneau, shown at Belle Chasse, LA prior to its departure for the East Coast of Canada.

$11.9-Million Contract Awarded To Litton For USS Preble Overhaul

Litton Industries Incorporated, Ingalls shipbuilding Division, Pascagoula, Miss., is being awarded an $11,999,000 fixed-price-incentive contract for the regular overhaul of the USS Preble (DDG-46). Work will be performed in Pascagoula, and is expected to be completed in May 1986. Contract funds would have expired at the end of the current fiscal year. There were 21 bids solicited and five offers were received. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

Marathon Delivers Jackup Rig To Penrod Drilling

Marathon LeTourneau Company's Gulf Marine Division announced that it has delivered a Class 82-SD-C cantilever offshore jackup drilling rig to Dallas-based Penrod Drilling Company from its Brownsville, Texas, rig fabrication yard.

Designated the Penrod 99, the jackup has an estimated value of $35 million, including owner-furnished equipment. The rig is outfitted with 360-foot legs and can drill in waters up to 25 feet deep.

According to Penrod, the rig is under contract to drill for Exxon in Mobile Bay. Penrod 99 is built and equipped with certain modifications, referred to by Penrod as "No Discharge," for operations in environmentally sensitive areas.

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McDermott Gets Contract From SOHIO To Build Offshore Drilling Platform

McDermott Marine Construction, a major operating unit of McDermott International, Inc., has received a contract from SOHIO Petroleum Company for the design, fabrication, and installation of a deepwater drilling and production platform in 860 feet of water off the coast of Texas in East Breaks block 165 of the Gulf of Mexico.

The 40-well-slot structure is scheduled to be completed and installed by November 1986. Its eight-leg jacket (base) will be installed in one piece with a launch weight of 24,000 short tons. It will have both skirt piles and main piles, and support a 5,000-ton deck.

The SOHIO structure is being designed by McDermott's Hudson Engineering in Houston, and will be fabricated by its Fabrication Division in Morgan City, La. The jacket will be transported and launched by McDermott's Intermac 650. The primary construction barge for the installation will be McDermott's Derrick Barge 22, which has a lifting capacity of 1,600 tons.

Shipboard Safety Criteria Monitored By Siemens Computer —Literature Available

Marine computers are used to calculate and check shipboard safety criteria, primarily stability and cargo distribution, but also material stresses. The rugged Siemens SIMAC marine computer is this type of microcomputer which runs on the concurrent CP/M-86 standard operating system used worldwide.

A ship cannot be optimally laden without checking the safety criteria. To check the safety of a ship, the classification societies have made such marine computers mandatory for various types of vessels such as container ships, bulk carriers and tankers. A vessel's economic efficiency may be greatly improved by accurate and easy calculations. The COSYMAC (Computer System for Marine Calculations) program system developed by Flensburger Schiffbau-Gesellschaft is the basis for the cargo-dependent calculation of stability and of the structural stressing of the ship.

The operating system of the SIMAC marine computer makes it possible to process several different programs at the same time, thus also allowing the computer to be used for general shipboard calculations such as stores control, spare-parts stocking and any kind of administration tasks on board.

Data is entered by interactive communication at the ergonomically arranged video terminal. A printer is connected to the terminal which registers the results in the form of tables and curves.

For additional information and literature on the Siemens' SIMAC marine computer,

Circle 46 on Reader Service Card

Puroflow Gets Canadian Order For Ultraviolet Water Purification Systems

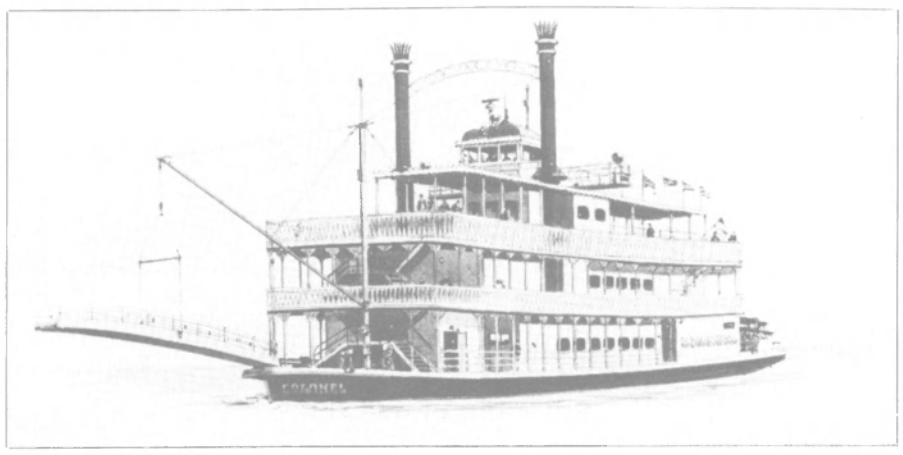
Two new CN Marine icebreaking ferries are being fitted with advanced ultraviolet water purification systems that will provide pure potable water without the use of chlorine or other harsh, expensive chemicals.

Orders have been received by Puroflow Marine Corporation of Newport News, Va., to supply U/V water treatment systems for the two vehicle ferries under construction at Davie Shipbuilding Ltd. in Lauzon, Quebec. The first vessel, the MV Caribou, is scheduled for delivery in October this year.

The Puroflow water purification systems use high-intensity, ultraviolet light to disinfect water without any of the bad taste or odors of chemical-based systems. Moreover, the U/V process imparts no corrosive, irritating, or allergenic properties to the water being treated, and it eliminates the need to store expensive, potentially hazardous chemicals aboard the ship.

For more information on Puroflow water treatment systems,

Circle 51 on Reader Service Card



Artist's conception of the Victorian-style sternwheel riverboat Colonel under construction at Moss Point Marine shipyard in Escatawpa, Miss.

Moss Point Marine To Build Victorian-Style Sternwheel Riverboat

A brand new Victorian-style sternwheel riverboat reflecting the elegance of a bygone era is now under construction at Moss Point Marine, Inc., Escatawpa, Miss., for the Moody Foundation of Galveston. Texas.

The 152-foot-long Colonel will be able to accommodate up to 800 passengers on historical and jazz dinner cruises of the Galveston Bay harbor beginning in the summer of 1985.

She will be able to serve 500 for dinner and will be equipped with catering facilities, bars, bandstands and hardwood dance floors. Her two main salons, the Galveston Room and the Texas Room, which can host separate parties, will each serve 250. The Colonel will feature large windows affording passengers unobstructed viewing while allowing more people to use them. She will also have a large, open promenade deck at the upper level which can accommodate up to 500 passengers. A souvenir shop will also be located on the promenade deck.

COLONEL
Suppliers' List

Main engines	(2) Caterpillar
Gears	Caterpillar
Engine controls	WABCO
Steering system	SSI
Bearings	B.F. Goodrich (Cutless)
Generator & engines	Caterpillar
Main & emergency switchboard	Continental Electric
Distribution Panels	Continental Electric
Bilge/ballast/fire pumps	Goulds
Oily water pump	Viking
A/C pump	Goulds
Air compressors	Quincy
Sanitary Fittings	Crane
Radar	Sitex
VHF radio	Horizon
Anchors	Danforth
Paint	International
Ballast tank coating	Texaco
Boom winches	Beebe
Watertight doors	Marhil
Capstan	Skipper
Exterior lights	Pauluhn
Search & Navigation lights	Perko
Flood lights	Hubbel
Muffler	Maxim
Water heater	Crane
Air conditioning	Carrier
Batteries	Delco
Alarm	SSI
General Alarm System	Henschel
Powered phones	Henschel

The idea for the vessel began with **Bobby Moody**, a director of the Moody Foundation, while viewing Paris from a sightseeing boat on the River Seine. He envisioned a beautiful sternwheeler which would show tourists the many interesting sights of Galveston Bay while becoming a tourist attraction itself.

With no prior knowledge of paddlewheelers, or their operations, the Moody Foundation made a nationwide review of similar vessels and their operators. The foundation concluded that the New Orleans-based Creole Queen was the best type of boat for Galveston, and its operator, New Orleans Paddlewheels, Inc., was ideally suited to operate the boat, as well as provide technical assistance on design, selection of a shipbuilder, and construction oversight.

The Colonel will be operated by New Orleans Paddlewheels (Texas), Inc.

Mr. **Moody** said New Orleans Paddlewheels president **Warren Reuther** is uniquely qualified as he is an experienced, successful riverboat operator, as well as a former shipbuilder.

Mr. **Reuther** said Moss Point Marine, Inc. was selected to build the Colonel because of the shipyard's demonstrated ability to build high-quality vessels, and the ease of dealing with the yard's management and construction workers.

The Colonel will be 152 feet in length with a 40-foot beam and 8-foot 6-inch depth. She will be powered by two Caterpillar 3408 diesel engines developing 365 hp each at 1,800 rpm. They will turn two stainless-steel, five-bladed 52- by 46-inch-diameter propellers through Caterpillar 7221 reverse/reduction gears.

Fifty-six tons of Carrier air conditioning and heating will keep the Colonel's passengers comfortable year-round. Power for the air conditioning and other ship's services will be provided by two Caterpillar 3306 diesels through Delco 135 kw, 60-cycle generators.

An EMI, electro-hydraulic steering system located at three stations will guide the vessel, and steering will be enhanced by a 100-hp Propulsion Systems, Inc. bowthruster.

The rich Victorian red carpeting will be provided by a mill in Kittyminster, England, and the decorative wrought iron "Bird of Paradise" and "Pontalba" trim will come from a foundry in Birmingham, Ala.

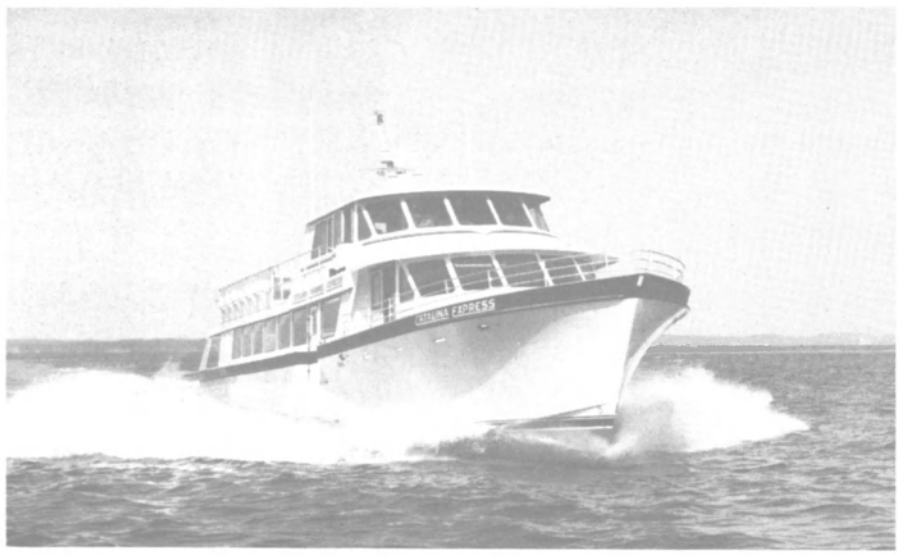
The sternwheeler is named after W. L. Moody Sr., a Confederate colonel during the Civil War. He founded several enterprises including banks and a cotton company in Galveston.

Coastal Conference Slated For August 13-16 In Newfoundland

The Associate Committee for Research on Shoreline Erosion and Sedimentation, in cooperation with Memorial University of Newfoundland, will present Canadian Coastal Conference 1985 on August 13-16 at the Hotel Newfoundland in St. John's. This conference is being organized as a forum for inter-disciplinary discussion of Canadian scientific research and engineering practice in the coastal zone.

Session topics will include coastal processes and engineering, erosion and sedimentation, nearshore wave dynamics, and ice interaction with the coast and coastal structures.

For further information contact **D.H. Willis**, National Research Council, Building M-32, Montreal Road, Ottawa, Ontario K1A OR6, Canada; (613) 993-6629.



Fiberglass Passenger Vessel Built By Westport For Catalina Channel

Westport Shipyard, Inc., Westport, Wash., has delivered a 90-foot fiberglass vessel to Catalina Channel Express Lines for service on passenger routes between Los Angeles Harbor and Catalina Island.

Catalina Channel Express Lines, which already is equipped with Westport-built vessels, serves both Avalon, and Two Harbors at the Isthmus of the southern California resort island. The new vessel will carry the name Catalina Express (shown above), in keeping with its status as the flagship of the fleet.

According to **Doug Bombard**, president of Catalina Channel Express Lines, the boat will be able to carry as many as 149 passengers at speeds of up 30 knots on a run. Mr. **Bombard** operates the company with his son **Greg,** who also serves as a skipper in the fleet.

The 1,700-hp, 21-foot-wide vessel was built in Westport's adjustable fiberglass mold with hull lines designed by **Edwin Monk Jr.**, of Bainbridge Island, Wash. **Jack Sarin**, also of Bainbridge Island, designed the deckhouse and the interior arrangements which include airline-type seating in the main cabin. A VIP lounge has been installed aft in the wheelhouse, while the top deck features open seating.

Westport built the 80-foot Avalon Express, which was delivered last year, as well as an earlier 56-foot fiberglass vessel for the California operation.

The Catalina Express is driven by two 850-hp Detroit Diesel engines supplied through Pacific Diesel of Portland, Ore. Wagner Engineering steering controls were supplied by Hough Marine, Seattle. The Seattle firm of Alaska Diesel Electric furnished a 12-kw Northern Lights generator for electrical power.

Furthermore, the vessel's bow thruster came from Wesmar Marine Electronics Company, Bothell, Wash. Spencer Fluid Power of Seattle supplied the vessel's hydraulic system, which is arranged so that an additional hydraulically driven generator can be added to the system.

Among other equipment, the boat has a Naiad Roll Control System to smooth out the ride in heavy seas.

Over the past several years, the firm in Westport, which is managed by brothers **Randy** and **Rick Rust**, has turned out a number of 65-foot and up fiberglass vessels. Vessels which have been built by the **Rust** brothers, in addition to the Avalon Express, include the 85-foot Wesmar VI, an extensively appointed electronics showcase boat operated by Wesmar Marine Electronics; the 80-foot Glacier Spirit, in excursion service in Alaska; and the 95-foot luxury yachts Platypus and Domino, the latter now in service as a charter vessel in the Mediterranean.

The **Rusts,** originally from Tacoma, equipped the Westport plant with a number of advanced fiberglass tools, including a semiautomatic fiberglass impregnator from Venus Products, Inc., Kent, Wash. The brothers are now building an additional adjustable fiberglass mold with the bow section designed by Nickum & Spaulding Associates, Seattle. This mold will allow construction of vessels of up to 120-feet in length.

Westport expects to use their new adjustable fiberglass mold to produce a 112-foot hull, which will be delivered to a Canadian firm for finishing a yacht.

For further information concerning Westport Shipyard,

Circle 338 on Reader Service Card

Alberti Named Managing Director Of Selesmar

Carlo Alberti, formerly general manager of Selesmar S.p.A. of Firenze, Italy, has been appointed managing director of the company. He joined Selesmar in 1981 when the company purchased the Marine Radar Division of Salenia of Rome. Mr. **Alberti** had been director of the Division.

Marine Transport Lines To Get $79.6-Million Navy Contract To Operate Ships

Marine Transport Lines, Inc. of Secaucus, N.J., has been tentatively awarded a $79.6-million, three-year contract for the operation of 12 Navy-owned survey and oceanographic ships now operated by Civil Service mariners employed by the Navy's Military Sealift Command. The final award will be made pending a 60-day appeal process that began on May 10.

MTL was one of four ship operators that submitted offers under the Office of Management and Budget Circular A-76 to determine if the 12 ships could be operated by civilian contractors at less cost to the Government.

Nine of the ships operate out of the MSC Area Command at Bayonne, N.J. They are the United States Naval Ships Bartlett, Bowditch, Dutton, Harkness, Hess, Kane, Lynch, Wilkes, and Wyman. The three other ships operate out of the MSC Area Command in Oakland, Calif. They are the USNS Chauvenet, De Steiguer, and Silas Bent.

New Facility Opened By Lips Propellers At Todd-Seattle Shipyard

Lips Propellers has opened a new facility at Todd Shipyard on Harbor Island, Seattle, Wash.

Headed up by **James (Kimo) Mackey,** the new plant will specialize in propeller service, both in drydock and wherever needed in Puget Sound and up the Inland Waterway. Formerly plant manager of Lips Oakland facility, Mr. **Mackey** was instrumental in the creation of a mobil repair team to provide emergency, on-location service to damaged propellers.

Together with mechanical engineer **Tom Wilcox,** Mr. **Mackey** has designed specialized equipment to make on-site repairs according to the high quality standards established by Lips. This equipment includes a pitchometer for the accurate measurement of propellers up to 24 feet in diameter, a 75-ton propeller balancing machine, and a 200-ton propeller press, all of which may be transported by truck to job sites.

Most owners and operators prefer to undertake repairs in shipyards, and the Lips plant will likely do the bulk of its work in the Todd facility. The Mobile Repair Team is on call 24 hours a day, seven days a week, for vessels that cannot make it to drydock.

Lips Propellers is a propeller manufacturing and repair company serving vessel owners and operators with propellers precisely fitted to their needs. The firm is headquartered in Chesapeake, Va. For free literature on Lips propellers and Lips propeller service,

Circle 45 on Reader Service Card

Samson Offers Brochure On Passive Mooring Systems For Supply Vessels

Bow and stern mooring systems that improve supply boat operations in hostile environments are described in a brochure just prepared by Samson Ocean Systems, Inc. Defined as passive systems, they utilize the special load-elongation characteristics of Samson two-to-one braided ropes to modulate peak loads and simultaneously generate the required restoring forces to maintain the supply vessel within a predetermined area. This reduces the chance of collisions with offshore rigs, simplifies tie-up procedures and reduces the danger and high cost of rope breakage.

Samson passive systems have been designed for more than 50 jackups, semi-submersibles, and production platforms. The brochure includes operational procedures, illustrates key components and specially designed hardware, and describes typical systems. A user's list is also included.

For a free copy of the supply vessel mooring brochure,

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SOME OF THE BEST THINGS ABOUT FAIRBANKS MORSE DIESELS TODAY NEVER GET SEEN

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Like our new service training school. Advanced parts warehousing, Modernized service centers. Dedicated field service personnel.

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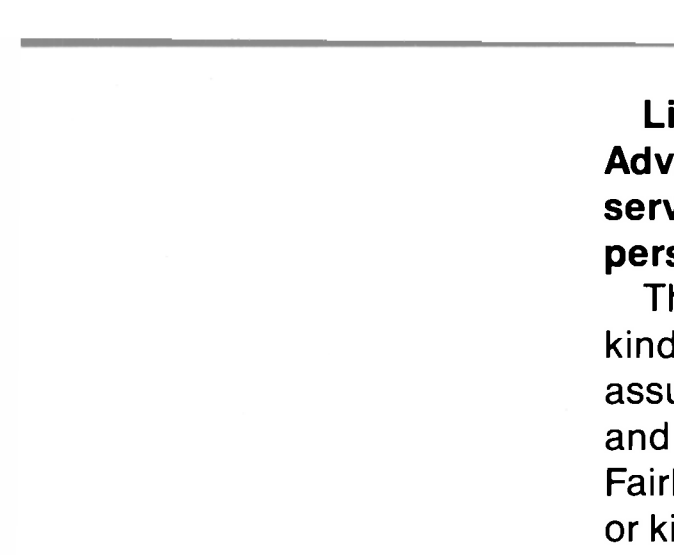
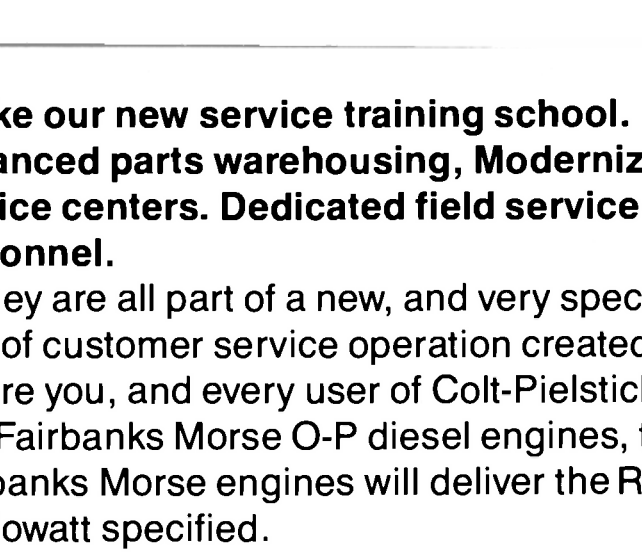




Training

Our completely new and modern service school is designed to give our customers and service personnel the finest in hands-on training on O-P and Pielstick engines. The school has two completely installed engines, plus specially created sound-proof class rooms with the most modern audio visual and video tape equipment available for training aids. The school is staffed by Fairbanks Morse skilled service personnel.

* S.E.M.T. — Pielstick is a registered trademark of Societe d'Etudes de Machines Thermiques Paris, France.

Advanced Centralized Distribution and Warehousing

Newly established and stocked regional warehouse in Reno, Nevada, and central parts distribution center in Indianapolis, Indiana, maximize parts inventory control and parts distribution effectiveness to all Service Centers and Sales Offices. A new fuel injection and governor overhaul service facility in Reno also provides complete service with the newest state-of-the art equipment. These facilities also maintain stocks of rebuilt and exchange assemblies in all Fairbanks Morse service locations to complement their new parts inventories.

Modern Service Facilities

Newly modernized and expanded service facilities in Beloit, New Orleans, Norfolk, Reno, Seattle, and now San Diego have the capability to handle complete engine rebuilding including engine disassembly to bare cylinder block, cleaning and reassembly. They can also rebuild blowers, fuel pumps and accessory components. The centers are also computer integrated with the centralized warehouses in Reno and Indianapolis to quickly process requirements for special and made-to-order parts.

Marathon LeTourneau To Construct World's Largest Bottom Supported Mobile Offshore Drilling Unit

Rowan Companies, Inc. has contracted with Marathon LeTourneau Company, a Marathon Manufacturing company, a subsidiary of The Penn Central Corporation, for the construction of the world's largest bottom supported mobile offshore drilling unit (MODU).

The MODU, a larger version of the highly successful Gorilla Class, will feature 605-foot legs and will be capable of operating in water depths of 450 feet with hurricane force winds of 115 mph and waves of 57 feet.

The $85-million MODU will be constructed at Marathon LeTourneau's Vicksburg, Miss., facility with delivery scheduled for the third quarter of 1986. Upon delivery the rig is committed for a drilling program in the Gulf of Mexico.

Commenting upon the investment decision, Rowan chairman **C. R. Palmer** stated: "Numerous tracts currently under lease are beyond the water depth capability of existing bottom supported MODUs. We believe the new Gorilla IV, an enhanced version of our three existing Gorilla rigs, will provide an extremely cost efficient option for exploration and development drilling, particularly for those customers operating in the Gulf of Mexico."

Mr. **Palmer** continued: "Rowan is confident of a bright future for offshore drilling, particularly for technologically superior equipment operating in hostile marine environments. Evidence of that confidence is demonstrated by the fact that since 1980 Rowan has ordered ten mobile offshore drilling units, which includes six enhanced Class 116-C units, and with the fourth Gorilla Class jackup rig ordered today our investment in hostile environment rigs will exceed $700 million".

Rowan Companies, Inc. serves the petroleum industry as a contract driller, onshore and offshore in domestic and international areas, operates a fleet of charter helicopters and fixed wing aircraft and also engages in petroleum exploration and production.

For more information,

Circle 326 on Reader Service Card

New Brochure On Caterpillar Remanufactured Products Line Available

A new brochure now available from Caterpillar features a comprehensive look at the company's remanufactured products offering. The brochure details how all the parts are remanufactured and tested to original factory specifications for like-new performance. Quality products and low prices are shown to equate to real value for the user. For a copy of this brochure on Caterpillar Remanufactured Products,

Circle 29 on Reader Service Card

Project Carriers Renamed Hansa-Line AG—Relocates Headquarters To Bremen

Project Carriers AG of Bad Schwartau, West Germany, has recently been renamed Hansa-Line AG and has relocated its headquarters to Bremen. The move to Bremen and the securing of a state surety of eventual operational finance credit has assured the company of recovery from the setback it suffered from the collapse of its Danish charterers. Future prospects of the company are regarded as promising.

GEC Rolls-Royce Gensets Selected For Shell/Esso Tern Offshore Platform

Three GEC Rolls-Royce electrical generating sets worth $18 million have been ordered to power the Shell/Esso Tern offshore production platform in the northern sector of the North Sea.

Two ERB-1 generating sets, each powered by a Rolls-Royce Industrial RB211 gas turbine developing 30,840 hp, and one EAS-1 generating set powered by a Rolls-Royce Industrial Avon gas turbine developing 18,440 hp, will provide the platform's electrical power. All three units have dual fuel capability using local associated gas or diesel fuel.

The RB211 sets will be supplied as complete, single-lift modules suitable for three-point mounting on the exposed top deck of the platform. The Avon-powered set will be designed for installation within a conventional module located on a three-point mounted base.

This order brings the total number of offshore generating sets sold by GEC Rolls-Royce and its parent companies to 51, representing more than 1.34 million hp of installed power.

Formed in 1984, GEC Rolls-Royce (Power Generation) is a joint venture company owned equally by Rolls-Royce and the General Electric Company of Great Britain. This new company's activity covers the marketing, sales, engineering, and project management of gas turbine power generation systems above 13,400 hp.

For free literature on GEC Rolls-Royce generator sets,

Circle 49 on Reader Service Card

FMC Receives $101.8-Million Contract To Build Assault Vehicles

FMC Corporation, Ordnance Division, San Jose, Calif., has been awarded a $101,875,000 fixed-price-incentive contract for LVT-7A1 amphibious assault vehicles. Work will be performed in San Jose, and is expected to be completed in June 1986. $1,664,000 of the contract funds would have expired at the end of the current fiscal year. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

McLean Elected President & Chief Operating Officer Of United States Lines

Malcom P. McLean Jr. has been elected president and chief operating officer of United States Lines, Inc. of Cranford, N.J., a major U.S.-flag shipping line with trade routes to and from Europe and North, Central, and South America; South and East Africa; the Mediterranean; the Middle East; Southeast Asia; the Far East; Guam; and Hawaii. The announcement was made by **William B. Bru**, chairman and chief executive officer.

Mr. **McLean** joined U.S. Lines in 1978. In addition to serving as president and COO of the shipping company, he is a member of the USL board of directors, and vice president and director of its parent company, McLean Industries, Inc.

New Nav/Position Firm Formed In Gulf

NCS International, one of the largest navigation/positioning contractors in the US has announced the formation of a Houston-based division called Aquanav. This new division will provide the offshore drilling and construction industry with professional, high accuracy positioning primarily in the Gulf of Mexico and US coastal waters. A variety of navigational systems will be employed, including Syledis, Argo, Mini-Ranger, UHF Transponder, as well as conventional techniques.

For more information concerning Aquanav,

Circle 27 on Reader Service Card

NASSCO Elects Baumler VP-Marketing

Richard J. Baumler

The board of directors of NASSCO recently announced the election of **Richard J. Baumler** as vice president, marketing.

In this position, he will report to **Alfred W. Lutter Jr.,** senior vice president, business affairs. Reporting to Mr. **Baumler** will be **James M. Temenak,** director of marketing, and **Trevor Lucey,** manager, marketing.

Mr. **Baumler** brings over 30 years of marine experience to NASSCO. A graduate in marine engineering from New York State Maritime College, he sailed as a merchant mariner on the SS America and served in the US Navy as an engineering officer before joining Newport News Shipbuilding.

Subsequent to his service at Newport News, Mr. **Baumler** served as vice president-operations at Saint Johns Shipbuilding & Dry Dock Company, New Brunswick, Canada; vice president, ship construction, at Sea-Land Service, Inc., Elizabeth, N.J.; and most recently as president of Tampa Shipyards Inc., Tampa, Fla.

Mr. **Baumler**'s knowledge of the shipbuilding and shipping industries and its leaders will enhance NASSCO's marketing strength.

Envirovac Offers Literature On Type I And II ORCA Line Sewage Treatment Systems

Envirovac Inc. of Rockford, Ill., is offering free literature on Type I and Type II ORCA sewage treatment systems that are designed specifically for rugged marine operating conditions.

ORCA physical/chemical treatment systems, the first marine sanitation devices to be controlled and operated by microprocessor control, are compact and lighweight—general dimensions and sizing information are given on the last page of the four-page ORCA bulletin. Eight standard units are available (two Type I and six Type II); all are U.S. Coast Guard certified, and Type II units are also IMO approved. All units are microprocessor controlled and easy to maintain.

For free literature containing technical data, sizing information, flow diagrams and photographs,

Circle 328 on Reader Service Card

New Brochure From Westinghouse Discusses Combustion Trim Control

The Combustion Control Division of Westinghouse Electric Corporation, Orrville, Ohio, now has available a 12-page brochure that explains automatic combustion trim control using excess oxygen (O_2) or carbon monoxide/excess oxygen (CO/O_2) flue gas analysis.

The brochure, AD 106-125, outlines combustion, efficient combustion, proper boiler maintenance and types of automatic combustion trim controls available for all sizes of boilers. One portion is dedicated to a discussion on when carbon monoxide/excess oxygen flue gas analysis becomes a cost-effective basis for automatic combustion trim control. It also provides a nomograph for a boiler owner or operator to calculate fuel savings attainable on his/her boiler using automatic combustion trim control. A tearout card in the brochure allows the reader to request a free combustion efficiency analysis by providing basic combustion data on his/her boilers.

To obtain a free copy of the brochure,

Circle 21 on Reader Service Card

Raytheon Introduces JRC Color And Digital Rasterscan Radar Unit

Raytheon Marine Company of Manchester, N.H., has just introduced the new model JMA-3410 color radar that provides high-resolution color in a compact, digital, rasterscan unit. Raytheon is offering this advanced model, which is manufactured by Japan Radio Company, as exclusive distributor in the U.S., to bring the best in radar to vessel owners who want multi-color features. Raytheon designs and produces a full line of radar equipment for all types of vessels, and was the first to introduce rasterscan radar with monochrome displays.

The JMA-3410 radar presents continuous color images in 10 ranges from ¼ to 72 nautical miles on a rectangular CRT measuring 14 inches diagonally. Low-intensity targets appear in green, middle-intensity targets in yellow, strong targets in red, and moving target vectors are plotted in blue. Monochromatic display can also be selected by the operator; this feature, not found in most color radars, is useful for enhanced clarity in some overly crowded conditions.

The digitally processed rasterscan images of the JMA-3410 stay on the screen until the data is updated by the next antenna sweep. The picture is therefore a continuous bright image, easy to see in all conditions (except direct full sunlight) without a viewing hood.

For additional information on the JMA-3410 radar,

Circle 39 on Reader Service Card

Gray Named Director Of Offshore Marketing For Blue Water Marine

George D. Gray

Blue Water Marine Supply, Inc., announced the appointment of **George D. Gray** to the newly created position of director-offshore marketing.

Mr. **Gray** is well known in the field of offshore safety and survival and has over 15 years' experience in sales and service of both marine and aviation lifesaving devices.

Simpson Timber Restructuring Its Panel Products Division

Simpson Timber Company recently announced a comprehensive plan for the company's western building products operations that includes a major investment in the panel products division and realignment of personnel. The $40-million capital restructuring involves a substantial dollar investment for new equipment and facilities for the manufacturing of overlaid panel products. The panel plant at McCleary, Wash. will be closed at the end of the year and all functions transferred to an improved plant facility at Shelton, Wash. Operations will continue at the overlay panel manufacturing plant in Albany, Oregon, and the Oregon Overlays Division in Portland, Oregon.

Thomas R. Ingham Jr., vice president of Northwest operations has named **Larry Fleming** to the newly created position of general manager-panel products. He will be responsible for all phases of the company's panel business. Reporting to him will be **Bob Hanson,** manager Northwest plywood operations; **John White,** marketing manager, panel products; **Frank Arnold,** division manager, Oregon Overlays, and Dr. **Reinhard Bohme** who recently replaced **John Gould** as product development manager.

Circle 320 on Reader Service Card

HydroTech Systems Install Hot-Tap Fitting In Gulf —Other Orders Pending

HydroTech Systems of Houston, Texas, recently announced that a 36-inch by 16-inch HydroTap was installed for Sea Robin Pipeline in the Gulf of Mexico. The HydroTap was installed in Vermilion Block 72 in 25 feet of water using the Aries Marine jackup barge Ram II. The HydroTap is a mechanical hot-tap fitting that allows subsea installation of an outlet flange without requiring underwater welding. The total bottom time required to lower the HydroTap to the pipeline, set and test the fitting and tap the 16-inch outlet was just over 30 hours.

HydroTech also announced that they received a supply order for an 8- by 6-inch HydroTap from Mark Producing. The HydroTap is planned for installation in South Marsh Island Block 161 in approximately 260 feet of water on an 8-inch Mesa Petroleum trunkline. The installation is planned for late June. HydroTech will also supply a 6-inch MisAligning Flange for the tie-in of Mark Producing's lateral line.

For further information on HydroTech Systems,

Circle 23 on Reader Service Card

Two New ROV Systems Purchased By Sonat

Sonat Subsea Services, Inc. of Houston recently purchased two new remotely operated vehicle (ROV) systems, one Scorpio and one Recon IVS. This brings to 19 the number of ROVs currently owned and operated by the company.

The Scorpio, procured from Ametek's Straza Division, was delivered in April this year. It will be assigned to and operated from the Sonat Subsea Asia-Pacific Operating Base located in Singapore.

The Recon IVS is the third in a series of enhanced Recon IV ROV systems manufactured by Perry Offshore for Sonat Subsea. It incorporates significant Sonat-specified improvements over the standard Recon IV, including high-resolution scanning sonar, gyrocompass, dual video cameras and monitors, and a four-function manipulator. This system will be operated by S&H Diving Corporation, the Americas operating subsidiary of Sonat Subsea. Delivery is scheduled for July this year.

Ingersoll-Rand Signs Sales Agreement With Kawasaki —Literature Available

Ingersoll-Rand, Charlotte, N.C., recently announced a major sales and technical agreement with Kawasaki Heavy Industries of Japan to market and sell X-FLO, a single-stage turbo compressor manufactured for Ingersoll-Rand by Kawasaki. Ingersoll-Rand will handle marketing and sales for the innovative compressor worldwide, while Kawasaki will concentrate its marketing efforts on the northern Asian countries.

"This agreement with Kawasaki marks Ingersoll-Rand's entry into new markets, and it adds an important new dimension to air compressor technology," said **Peter Baldwin**, vice president of Ingersoll-Rand's air compressor group. "By combining Ingersoll-Rand's marketing, sales and service expertise with Kawasaki's product, we will launch both X-FLO and our new division from the strongest possible position," Mr. **Baldwin** said.

Adaptable to air, gas and steam applications, X-FLO will serve major industries such as chemicals, utilities, wastewater treatment, pulp and paper, food, mineral processing and industrial pollution control. X-FLO has a unique impeller design that permits smaller package designs than traditional centrifugals, while achieving higher efficiencies and energy savings.

Ingersoll-Rand is a leading international manufacturer of air compressors providing support and service for its products on a worldwide basis.

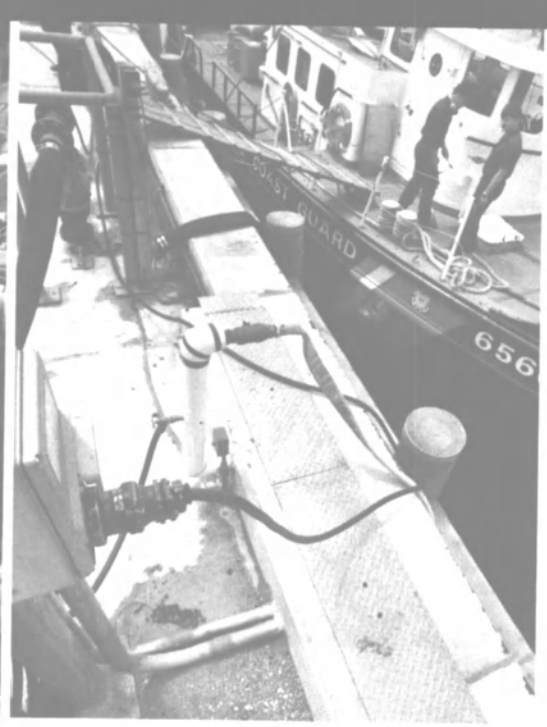
Kawasaki Heavy Industries of Japan is a major international manufacturer of heavy industrial products.

For more information on the Ingersoll-Rand/Kawasaki sales agreement and X-FLO,

Circle 28 on Reader Service Card

The Russellstoll Spectrum of Solutions.

FROM O.R. TO R.R., MAX-GARD® CONNEC



Russellstoll has the answer to any connection problem: the Max-Gard Plug, Receptacle, Connector and Interlock System. From hospitals to railroads, no other system can match it for safety, dependability and versatility.

The Max-Gard System excels in any environment. It includes plugs, receptacles and connectors, and general-purpose, explosion-proof and sheet steel interlocks. And because it is a system, one plug can be used in any mating receptacle, connector, or interlock.

Max-Gard plugs and receptacles are available in up to four-wire, five-pole configurations, 30 through 400 amp. Single-rated factory polarizations prevent interface of devices of different voltage, frequency, phase, or amperage. Optional control contacts allow for control, metering or electrical interlocking. "O" rings provide watertight wiring chambers. Specialized needs? Our engineering staff will help design a customized Max-Gard system for you.

For more information on the Max-Gard System and the Russellstoll Spectrum of Solutions, call or write.

ONS ARE THE ONLY ONES YOU'LL NEED.

Midland-Ross Corporation
Russellstoll Division
530 W. Mt. Pleasant Avenue
Livingston, NJ 07039
201/992-8400 (ext. 222)
Telex 13-8403

Circle 194 on Reader Service Card

MIDLAND ROSS

Murray Grainger Resumes Business Activities As Used Equipment Dealer

Murray Grainger, who for 25 years was president of Capital Equipment Enterprises, has announced that he is ending a short retirement and resuming his business activities as Murray Grainger & Co. The new firm will be engaged in buying and selling used equipment.

Mr. **Grainger** is well-known in shipyards in the United States and Canada. He specialized in cranes (whirley gantries, double-leg gantries, bridge and container cranes); plate bending rolls, brakes, shears, lathes and large boring mills; as well as power equipment (boilers, steam turbine generators, gas turbine generators, and large diesel generators).

The address for Murray Grainger & Co. is P.O. Box 591, Bloomfield, N.J. 07003. The new telephone number is (201) 762-0645, and the new telex number is 286772 MGCO (via RCA).

For further information on Murray Grainger & Co.,

Circle 53 on Reader Service Card

Derby Appointed Vice President Of Crowley's Caribbean Division

Dennis H. Derby

Dennis H. Derby has been named vice president, marketing and sales, of Crowley Maritime Corporation's Caribbean Division. The announcement was made by **Robert G. Homan**, senior vice president and general manager of the Division.

Mr. **Derby,** based in Jacksonville, Fla., has been with Crowley since 1980.

Crowley Maritime's Caribbean Division includes Trailer Marine Transport Corporation, which provides RO/RO cargo services between the U.S. mainland and Puerto Rico, with regular sailings between Puerto Rico and the U.S. Virgin Islands, the Dominican Republic, and Haiti. In addition, the Division provides contract towing, bulk petroleum transportation, and environmental protection services.

New Remote Control VHF Marine Radio Introduced By Uniden

Uniden Corporation of America, Marine Communications Division has introduced a new 90-channel remote control VHF marine radio, the Uniden MC 900. Its channel coverage includes all U.S. and international channels as well as all weather channels. Its two-piece design includes a compact control head and a power unit that can be stowed out of sight in any location up to 18-feet away.

The radio features automatic monitoring of channel 16. It is fully programmable, touch controlled via a flat, water-resistant keypad, and power is switchable from 1 to 25 watts.

To provide flexibility and convenience, a second control head is available as an option. This permits radio operation from a second location up to 25 feet from the main unit. With two control heads it can be used as a two-way intercom. The control head measures 5.7-inches by 6 inches by 4.4-inches; the main unit is 6⅛ by 8 by 1⅞ inches.

For more information on the Uniden VHF marine radio,

Circle 52 on Reader Service Card

Mitsubishi Introduces Latest Diesel Engine At New York Seminar

Mitsubishi Heavy Industries, Ltd. of Tokyo recently conducted a seminar and a reception at The Nippon Club in New York City to introduce to the American market its newly developed UE-LA Series of extra-long-stroke marine diesel engines. Attendees included management personnel from shipowning companies, shipyards, classification societies, and other firms.

Mitsubishi executives who addressed the seminar included: **F. Sasaki,** managing director; **H. Fujita,** general manager, Diesel Division, Power Systems Headquarters; **R. Tsuneya,** chief engineer, Diesel Engine Engineering Department; and **K. Tayama,** assistant chief engineer, Diesel Engine Engineering Department. Opening remarks were made by **S. Kitamura,** president of Nissho Iwai American Corporation.

With a specific fuel consumption in the economy rating of 119 grams per brake horsepower hour (116.5 for a derated engine) for the largest model in the Series, Mitsubishi claims that the new UE-LA offers the lowest sfc for engines of their type. In addition to the low fuel rate other main features of the UE-LA engine line include high propeller efficiency, high reliability, low-quality fuel compatibility, easy maintenance, and compact design. The UE engine is the only low-speed diesel developed in Japan.

The four models in the LA Series are each available in four- to eight-cylinder versions. The largest engine in the Series, the UEC60LA, has a bore of 600 mm and stroke of 1,900 mm, and has a maximum continuous output of 2,100 bhp per cylinder at 110 rpm. The UEC52LA has a 520-mm bore and 1,600-mm stroke, with an output of 1,600 bhp per cylinder at 133 rpm. The UEC45LA model has a bore of 450 mm and stroke of 1,350 mm; output is 1,200 bhp per cylinder at 158 rpm. The fuel consumption for these three models has been reduced 5 g/bhph compared with the former L Series.

The UEC 37LA is the smallest engine in the Series, with a bore of 370 mm and stroke of 880 mm. Its output is 700 g/bhph at 210 rpm. Fuel consumption for this model has been cut to 129 g/bhph at maximum rating and 126 g/bhph at economy rating.

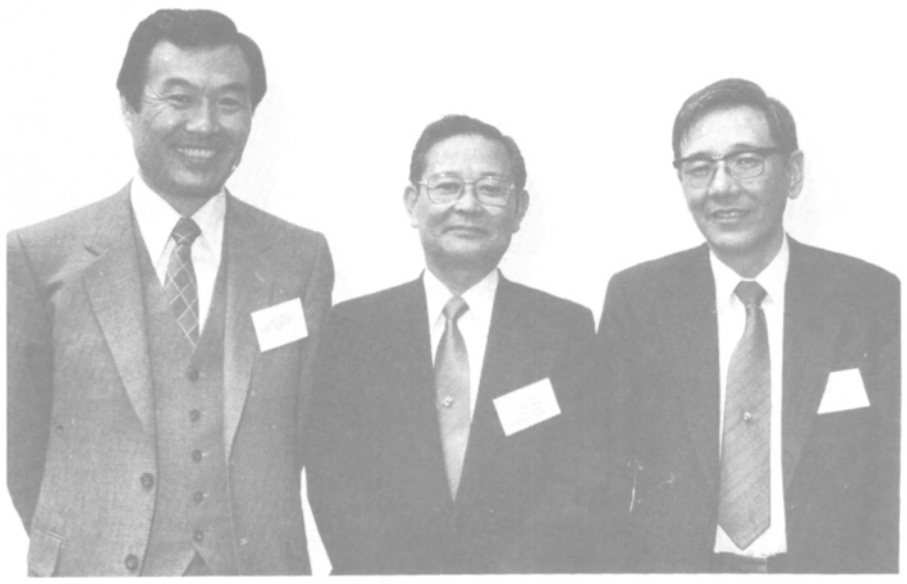
For all of the LA Series engines Mitsubishi quotes what it calls "capable minimum fuel consumption rates." These range from the above-mentioned 116.5 g/bhph for the 60LA model to 123.5 g/bhph for the 37LA.

The Mitsubishi UEC-LA diesel engines appear to have excellent performance capabilities, high reliability, and economy and should see widespread use as the main propulsion engines for bulk carriers, tankers, OBO carriers, containerships, multi-purpose ships, and many other types of vessels.

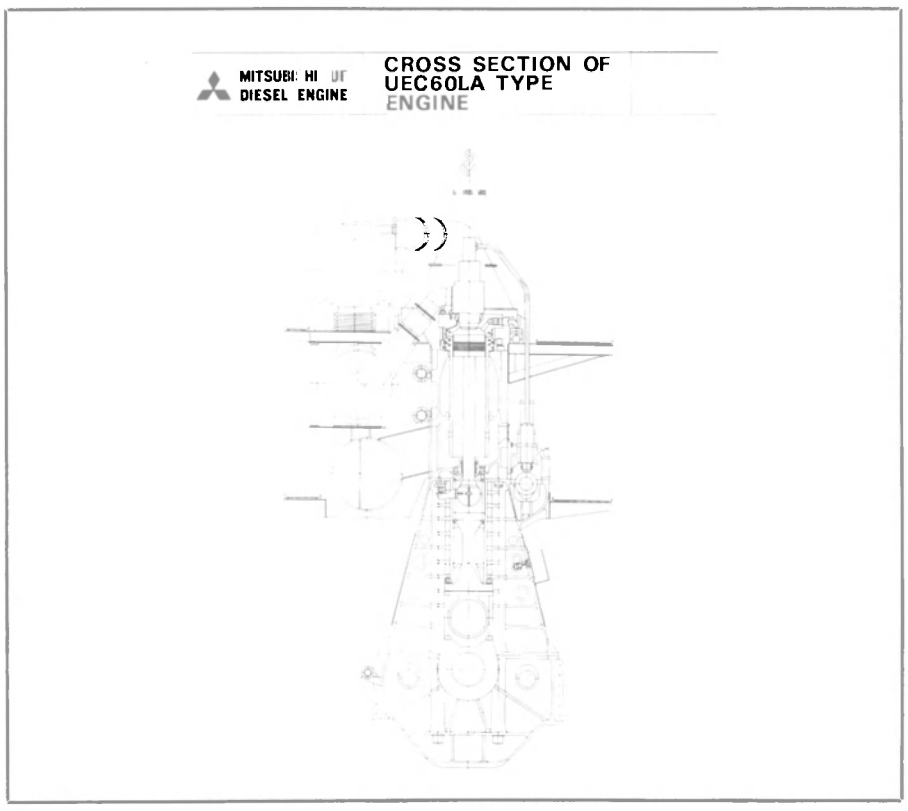
Mitsubishi now has available four full color brochures describing the UE-LA diesels in complete detail. One of these informative books contains 20 pages and includes photos, technical data, specifications tables plus several large fold-out pages with full color cut-away illustrations of an engine and a turbocharger.

For free copies of the UE-LA brochures,

Circle 337 on Reader Service Card



Left to right: **K. Tayama,** assistant chief engineer; **H. Fujita,** general manager, diesel engine division; and **R. Tsuneya,** manager-diesel engine R&D center, Mitsubishi Heavy Industries, Ltd.



Artist's conception of the oil rig service center.

Contract For Wharf At Cow Head Oil Rig Servicing Facility Awarded

A contract for $C6,685,054 has been awarded to Foundation-Lundrigans, a joint venture for the construction of a wharf at the oil rig facility at Cow Head on the Burin Peninsula.

The wharf, which was designed by Newfoundland Design Associates of St. John's, will measure 125 meters long with a 44 meter by 23 meter head block and will be capable of accommodating two oil rigs as well as supply vessels at the same time. The project is scheduled for completion early in 1986.

Foundation-Lundrigans is a joint venture company comprised of Foundation Company of Canada Ltd., of Toronto and the Lundrigans Group Ltd., of Corner Brook.

When completed, the Cow Head facility will consist of three main elements including the wharf structure together with a rock-filled causeway, a site storage area and a service building.

The estimated cost of the entire project is $C11 million which is cost shared on a 70:30 basis between the Federal and Provincial Governments under the Burin Peninsula Development Fund Agreement.

The Cow Head oil rig servicing facility is an expansion of Marystown Shipyard Limited and will be supported by the workforce as well as the fabricating and machining facilities at the yard. It is anticipated that the facility will provide a saving of up to 40 percent on rig servicing costs.

Anixter Relocates Evanston Facility

Anixter Bros., Inc., headquartered in Skokie, Ill., has moved its Evanston, Ill., facility to a larger service center located at 2201 Main Street, a 60,000-square-foot property recently purchased by the company. The announcement was made by **Larry Walsh**, regional vice president.

The Evanston facility was the original site of Anixter headquarters when the company was founded in 1957. Later, as the company expanded, the building on Brummel served as a major sales/distribution center for the Midwest. This arrangement continued until a further business expansion necessitated a move.

Anixter-Evanston will continue to serve the needs of business and industry in the states of Illinois, Iowa, and the greater metropolitan areas of Chicago and Northwestern Indiana with a full line of wire and cable, and business communications products. For customer convenience the telephone numbers have not been changed: (312) 869-8000 and 1-800-942-1664.

Circle 307 on Reader Service Card

Aluminum Boats Delivers Whale Watch Excursion Boat

The Portuguese Princess, a fast, sleek, new 94-foot passenger whale watch boat has entered service in Provincetown, Massachusetts.

Owner **Suzanne Carter** was looking for a shipyard that could build a high quality boat in a short time. Aluminum Boats, Inc., Crown Point, La., "had recently built and delivered two 85-foot crewboats in 12 weeks, so I knew they could deliver my 90-footer on time," Ms. **Carter** said.

Salvador J. Guarino, president of Aluminum Boats said Ms. **Carter** called as soon as the financing was completed and his design team began putting her ideas down on paper. The actual contract was signed 23 days later on January 5, 1985.

The keel was laid on January 7, and the boat was completed on April 10th. Sea trials followed the next day and the gleaming white Portuguese Princess sporting accent stripes of the Portuguese national colors, departed the Louisiana bayous on April 16th for the long trip to the East Coast.

The all-aluminum boat is 94 feet long, with a 24 foot beam, and 8 foot, 11 inch depth. Normal operating draft is 3 feet, 9 inches. The vessel is powered by three Detroit Diesel 12V71 TI diesel engines developing a total of 1530 hp. They turn three 33x29 inch diameter bronze propellers through Twin Disc 514 reverse/reduction gears with a ratio of 2:1. Auxiliary and ships service power is provided by a Kato, 30KW generator driven by a Detroit Diesel 371 diesel engine.

Suzanne Carter, left, shown with **Salvador Guarino,** president of Aluminum Boats.

The Portuguese Princess reached a speed of 26.9 mph during sea trials. Mr. **Guarino** said the high speed is necessary because a normal whale watching trip is about 3½ to 4 hours long and can cover cruising distances of 2 to 40 miles.

The salon on the main deck level can seat up to 92 persons on 23 Eacco padded seats. Forty-one people can line the gunwales on each side of the main deck, and the forepeak deck can accommodate up to 48 whale watchers. The bow area also includes additional handrails and features an 8-foot bowsprit which is used for whale spotting.

The galley with grill, microwave, oven and refrigerator is also located in the main salon.

The second level features an open observation deck which can serve 74 people, and seating for an additional 70 guests is provided.

The Portuguese Princess is equipped with an Al George, Inc. electro-hydraulic steering system. Some of the navigation and communications equipment aboard includes: a Furuno FR 360 radar; Sitex 787 C loran; Ritchie C453 compass; Standard 8635 VHF; Datamarine 3000 fathometer; Raytheon 400 loudhailer; and Aiphone intercom/PA system.

The new boat can carry 2300 gallons of fuel oil, 4637 gallons of ballast water, and 500 gallons of fresh water. Her displacement at full load is approximately 65 long tons. The vessel is U.S. Coast Guard certificated 20 miles coastwise.

For free information on Aluminum Boats facilities and capabilities,

Circle 339 on Reader Service Card

Portable Boring Machine Features Power Feed And Digital Readout —Literature Available

The Climax portable, modular boring/facing machine (moduLATHE) now has power feed for boring operations. The new digital control module allows positive, precise operator control from a remote position. It can be used where there is minimal clearance around the machine. The moduLATHE is also available without power feed.

With the power module and appropriate attachments you can reface pipe flanges, cut a variety of grooves, bore, linebore, re-machine bearing seats, cut weld preps and more. The moduLATHE will bore up to four inches deep. Line boring capability is available with various lengths of boring bars, mounting plates and outboard bearing plates.

For further information on the Climax moduLATHE,

Circle 319 on Reader Service Card

Marathon LeTourneau Exhibits Slo-Rol® Motion Suppression Technology During 1985 OTC

Marathon LeTourneau Offshore Company's Slo-Rol® motion suppression system significantly widens the operating window for jackup rigs by making major reductions in roll, pitch and heave motions. It allows jackups to change location during periods of high waves or swells, thus diminishing costly delays while "waiting on weather." Slo-Rol also reduces roll and pitch motions during wet tows in most sea states. This lessens dynamically induced structural loads on legs and supporting structures.

The Slo-Rol motion suppression system eliminates up to 90 percent of roll and pitch motions and up to 40 percent of heave motion. It also reduces leg moment loading by up to 90 percent at initial spud can impact with the sea floor.

Extensive wave tank tests of the Slo-Rol system on a model of a Marathon Gorilla jackup have confirmed the effectiveness of the system in both roll and pitch suppression.

This motion suppression system consists of open-bottom steel tanks installed adjacent to the corners of a jackup drilling rig's triangular hull. When filled with compressed air, the tanks radically alter roll performance by producing a stabilizing torque that counteracts the wave torque. Since Slo-Rol is a passive tank system, it requires only low power after activation.

Marathon's Slo-Rol system can be easily and economically installed on new-build rigs or retrofitted onto existing units.

For further information,

Circle 3 on Reader Service Card

Alco Inc. Promotes Wilmot To Manager-Sales Administration

John Wilmot

John Wilmot has been promoted to the position of manager, sales administration at Alco Power Inc. of Auburn, N.Y. The promotion was announced by **Gary E. Huneycutt,** Alco's director of marketing and sales.

In his new position, Mr. **Wilmot** will assume managerial responsibilities for all engine sales activities and engine contracts administration.

With Alco for over six years, Mr. **Wilmot**'s most recent position was engine contracts administrator. He is a graduate of Auburn Community College and attended SUNY in Buffalo, N.Y.

Alco is a subsidiary of Bombardier Inc., a diversified Canadian manufacturer of transportation, recreational and industrial products.

Consafe Signs Contract With Tammco To Build Offshore Living Quarters

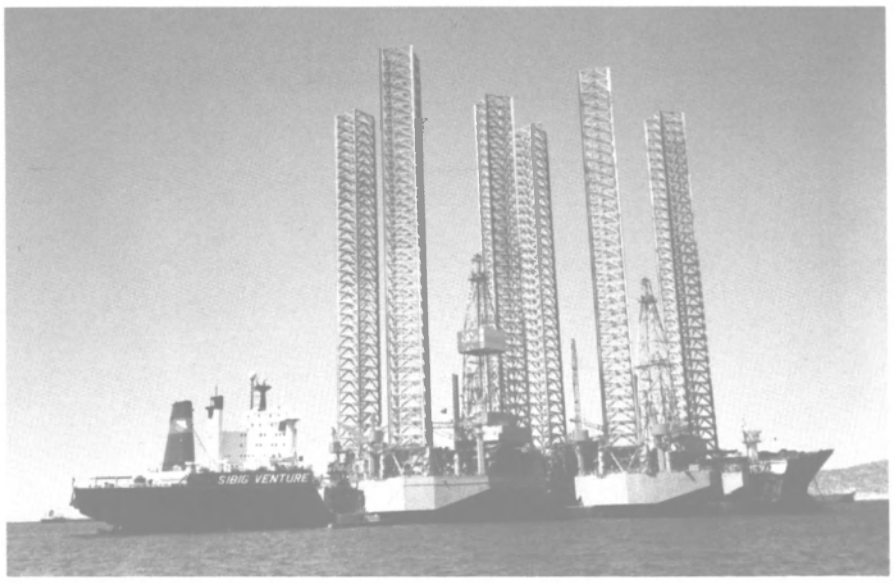
Consafe, Inc., Houston, Texas, has signed a license agreement with Tammco Unlimited, New Iberia, La., to manufacture the Consafe building system at Tammco's facility in Port Iberia.

Since 1982, Consafe has manufactured offshore living quarters and related utility buildings at their Houston plant. Projects have been delivered to most of the major operators in the Gulf of Mexico. Consafe will now expand its activities to also offer larger single-lift configurations.

Tammco, which has 400 employees, is offering offshore installation work in various disciplines to the US Gulf. They recently acquired a second waterfront facility in Port of Iberia where the modular building system will be manufactured under license from Consafe. Being able to offer the modular deliveries from both Houston and Tammco's waterfront facility will expand Consafe's possibilities to offer engineering, fabrication and offshore installation in turnkey packages to the US offshore market.

For further information and free literature on Consafe building systems,

Circle 19 on Reader Service Card



I.T.C. Holland Engineers Its Third Double Rig Dry Transport On The Sibig Venture

I.T.C. Holland B.V., Haarlem, Holland, the Netherlands, recently contracted the dry transport of two Rowan rigs from Seward, Alaska to Port of Spain, Trinidad.

The Rowan Middletown was loaded aboard the Sibig Venture in Seward, Alaska. The vessel then proceeded to Long Beach, California where the Rowan Alaska was floated onboard.

The 15,000 mile voyage via the Strait of Magellan is projected to take about 50 days. The rigs, as well as the ship, are too large to transit the Panama Canal, which has a width restriction of 106 feet.

The rigs are owned and operated by Rowan Companies Inc., Houston, Texas. The Rowan Middletown is a Marathon LeTourneau 116-C design having 410 feet of legs installed and a total weight of 9,587 tons. The Rowan Alaska is a Marathon LeTourneau ML-84-S design having 410 feet of legs installed and a total weight of 9,200 tons.

The Sibig Venture is owned and operated by Tschudi & Eitzen (Oslo, Norway). The vessel, one of the largest of its kind in the world, has an overall length of 728 feet, width of 138 feet, with a clear deck length of 423 and clear width of 138 feet. The deadweight capacity is 44,000 tons.

Axel C. Eitzen, of Tschudi & Eitzen, shipowner of the Sibig Venture, as well as a fleet of OBO carriers, was present during loadout-operations in Long Beach. (The Tschudi & Eitzen families marked the 100th anniversary of their partnership in 1984. Captain **Henry Tschudi** is the elder of the joint partnership.)

Tschudi & Eitzen (Oslo) and I.T.C. Holland have been associated for many years, combining their respective talents as shipowners, marine engineers and naval architects. Noble Denton & Associates of Houston, Texas, were the insurance surveyors assigned to the project.

I.T.C. (USA) Inc., is also located in Houston, and headed by **Edward Punch,** vice president.

For additional free information from I.T.C. Holland on their services,

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Left to right, during loadout operations of the Rowan Alaska at Long Beach, California are: **Richard Haas,** manager-compliance engineering and **Lonnie Boyd,** rig manager-Rowan Middletown, Rowan Companies; **Michel Gorman,** ocean engineer and surveyor, Noble, Denton & Associates; **Axel Eitzen,** shipowner, and Captain **I. Karlsen,** master-Sibig Venture, of Tschudi & Eitzen; **Andre Hoek,** naval architect and project coordinator, and **Edward A. Punch Sr.,** vice president, I.T.C. Holland.

Hitachi Zosen Completes Two Power Generating Barges For Philippines

Two power plant barges, NAPORCOR Power Barges 3 and 4, built for the National Power Corporation (NPC) of the Philippines, were completed recently at Hitachi Zosen's Osaka Works and subsequently towed to their destination. These barges, the same type as the two power barges built for NPC by Hitachi in 1981, will be installed in two locations—one at Iloilo on Panay Island and the other at Zamboanga on Mindanao Island.

Each barge will provide a total of 32 mw of electrical power at maximum from four diesel generators. Manufactured by Hitachi, Ltd., each of the 8,000-kw generators is driven by an Hitachi/Sulzer 16ZV40 diesel engine with an output of 11,600 bhp. The engines were manufactured at Hitachi's Sakurajima Works.

The barges have an overall length of 213 feet, beam of 100 feet, depth of 23 feet, and full-load draft of 8.86 feet. Displacement at full load is 5,398 metric tons.

One of two Hitachi-built power-generating barges under tow during trip from Japan to the Philippines. Each barge is fitted with four 8,000-kw diesel generators.

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Circle 191 on Reader Service Card

U.S. NAVY

FUTURE U.S. NAVY BUSINESS OPPORTUNITIES —A $230 billion #5 Year Market—

James R. McCaul
President, International Maritime Associates

This article deals with the potential for new business from the current U.S. Navy program.

However, as most readers are aware, since the mid-60's, all U.S. Navy new construction work must be conducted in private shipyards. In addition, aside from about 5,000 U.S. Navy and government ships, there are approximately 45,000 commercial vessels—ocean, coastal and inland—in the United States fleet.

Although this commercial sector still represents a strong and substantial market for overhaul, repair, equipment, electronics and consumables such as fuel, lube oils, paint, rope, etc., most firms involved in the U.S. marine industry—shipyards, equipment manufacturers, marine engineers, etc.—are developing a renewed interest in Navy business. *ed note*

U.S. Navy programs now dominate the marine business in the United States. Construction and maintenance of Navy ships provides jobs for nine out of ten workers in large U.S. shipyards.

This article provides an overview of future business to be generated by Navy programs. The first section addresses construction and major conversion plans. Ship maintenance and modernization is then addressed.

Ship Construction and Conversion

Over the next five years Navy plans to contract for 109 major new ships, 60 air cushion landing craft, and 24 conversions. A $75 billion budget is proposed for this procurement. Details are shown in Exhibit 1.

In addition to ship procurement Navy plans to spend about $125 billion over the next five years for weapons, electronics, ship support systems, and research and development.

This combined $200 billion—or $40 billion per year—program throws off many significant business opportunities, some of which are described below.

DDG 51—Bath Iron Works in early April won the lead ship contract for the new class of Arleigh Burke destroyers. Over the next decade Navy plans to buy 29 of these ships. Ingalls and Todd-L.A. will probably participate in this program as follow ship builders. The DDG 51 offers all types of subcontracting possibilities.

SSN-21—This new class of submarine is to replace the current SSN 688 submarine construction program. The lead ship contract is to be awarded in 1989. GD-Electric Boat and Newport News are competing for the lead builder contract. Each submarine is estimated to cost over $1 billion. Up to 100 of this class submarine are planned over a 20 year procurement period. There are many opportunities for prime and subcontract services—particularly for firms involved in high technology electronics and precision machining (especially those with experience in HY 100 steel).

LSD 49—Navy plans a cargo carrying varient of the LSD 41 amphibious landing ship. Funding of two ships is planned for FY 1988. This program will be of interest to yards such as Avondale, Lockheed, Bethlehem-Sparrows Point, GD-Quincy, Pennship and NASSCO. The first two yards have already been contracted to build LSD 41 ships.

LHD 2—A three ship multiyear procurement package is planned for LHD amphibious assault ships in FY 1986. Litton-Ingalls has the contract to build the lead ships in this class. Navy has decided to compete the follow ships. Beside Ingalls this provides an opportunity for yards like Avondale, NASSCO, GD-Quincy, Lockheed—perhaps Pennship, Bethlehem-Sparrows Point.

Support ships—several new support ship programs are planned over the next five years:

- a fast combat support ship (AOE 6) is scheduled for FY 1987, followed by one ship per year over the five year planning period
- The Hayes (TAGOR 16) will be converted to an acoustic research ship
- seven TACS crane ship conversions are planned
- more TAO fleet oilers will be built and the current AO 177 class oilers will be jumboized
- a new ammunition ship (AE) program is planned to start in FY 1988
- two floating drydocks are to be acquired
- a repair ship (AR) is scheduled for FY 1990

Many yards will pursue these contracts. Machinery manufacturers, engineering firms and a wide variety of equipment suppliers will find business targets in this area.

Landing/service craft—Navy plans to spend $242 million on landing craft and $480 million on service craft over the next five years. Exhibit 2 shows the type of craft now under construction and the current builders.

Electronic systems—Two of Navy's major electronics programs—Aegis and SUBACS—are being opened to second source competitions;

- RCA is now the prime contractor for Aegis, which is installed in CG 47 cruisers and (in modified version) is to be the principal systems in the DDG 51. Second source selection of the SPY 1 radar and related Aegis weapon system components will begin this year.
- IBM has been the prime contractor for the $1.7 billion program to develop an advanced submarine combat system. Navy has now decided to compete the more advanced phases (costing $8 billion +) of SUBACS development. Companies like Raytheon, GE and Rockwell are expected to be interested in this program.
- Other electronics business opportunities are available in the AN/SQS-53C sonar program, surveillance systems, electronic warfare, and tactical data system development. These programs throw off subcontract possibilities for test equipment, systems integration support, component manufacture, software . . .

Ordnance programs—Several very large programs are in progress which offer many subcontract opportunities. Lockheed is the prime contractor for the $8.5 billion Trident II missile. This program involves numerous subcontractors for system components and engineering services. Martin Marietta and FMC-Northern Ordnance are supplying the vertical launch system. Numerous subcontract manufacturing and machining opportunities are available. Boeing is scheduled to begin full scale development of the ASW stand-off weapon later this year. This is a multibillion dollar program which offers all types of subcontract possibilities.

Machinery—Future ship construction will provide opportunities for manufacturers of ship mechanical systems. These opportunities are not limited to U.S. firms. Foreign manufacturers can compete for contracts. Firms in countries with whom the U.S. has a memorandum of understanding or offset commitment have particular opportunity—as they compete on equal terms with U.S. manufacturers.

Ship Maintenance and Modernization

In addition to the $200 billion procurement program, Navy plans to spend another $30-$40 billion over the next 5 years on ship maintenance and modernization.

Navy plans to spend $6.1 billion on ship maintenance and moderni-

(continued on page 29)

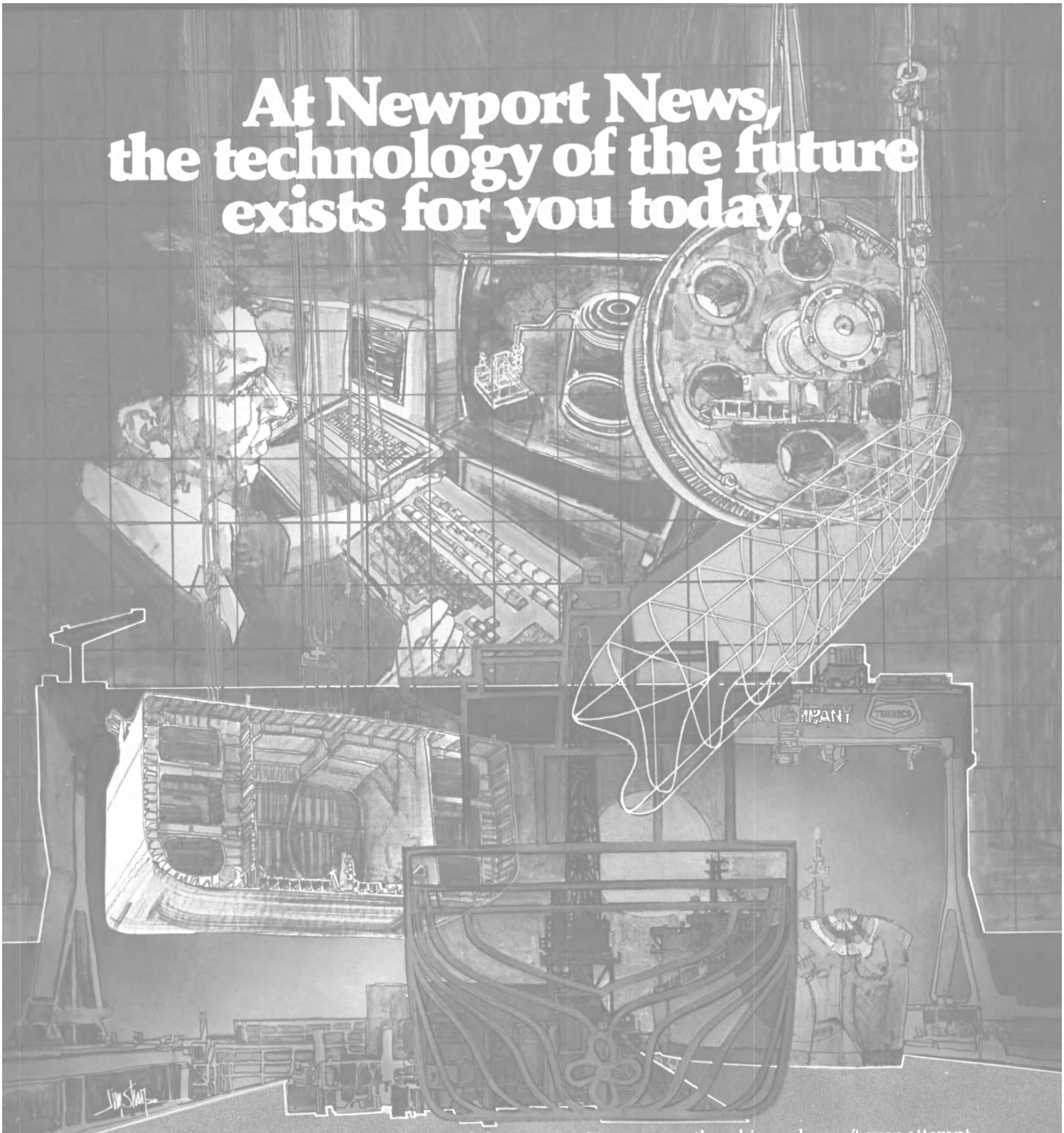

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Exhibit 1 Five Year Plan For Navy Shipbuilding And Conversion
FY 1986-1990
(dollars in millions)

	1986		1987		1988		1989		1990	
	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$
Trident	1	1531.8	1	1673.6	1	1751.8	1	1835.8	1	1923.0
SSN-688	4	2708.4	4	2543.5	4	2872.9	2	1677.0	4	2812.3
New Design SSN		—		456.1		132.5	1	1693.3		538.1
BB REACT		53.5	1	422.4		—		—		—
CV SLEP		133.4	1	491.8		111.2		115.8	1	651.6
CG-47	3	2766.2	3	2885.2	3	3139.0	2	2229.1		—
DDG-51		164.3	2	2239.5	5	4523.4	5	4512.3	5	4690.0
LSD-41	2	414.4		—		—		—		—
LHD-1	1	1507.2		379.2	1	915.5	1	701.4	1	1505.5
LPD-4 SLEP		—		80.5	1	279.3	3	457.3	3	360.8
LSD-41 (VAR)		—		23.6	2	512.5	2	544.4	2	536.5
MCM	4	334.1	1	102.2		—		—		—
MSH	4	184.5	4	195.7	4	219.0	4	212.1		—
PCM		—		—		—	—	95.1	6	95.1
TAO	2	328.5	2	356.4	2	385.8	2	391.7	2	403.7
AO (Jumbo)		—		—	1	70.3	2	145.6	2	135.6
TAGOS	2	115.1	2	117.3		—		—		—
AE		—		—	1	485.1	1	373.6	1	380.0
AFDM		—		—	1	126.2		—	1	103.0
AOE-6		—	1	756.6	1	572.5	1	593.7	1	608.3
AG (Conv)	1	68.9		—		—		—		—
AR		—		—		—		—	1	524.7
TACS (Conv)	3	82.5	2	66.6	2	70.2		—		—
TAVB (Conv)	1	26.9		—		—		—		—
MTS (Conv)		26.5		—		—		—		—
LCAC	12	307.0	12	310.3	12	315.4	12	327.6	12	340.8
Landing Craft		34.4		62.4		64.5		33.6		47.2
Service Craft		79.5		84.0		87.3		89.5		140.3
Strat Sealift		203.4		29.1		70.2		27.8		74.0
Outfitting		228.5		254.1		250.9		260.3		303.2
Post Delivery		112.6		204.3		146.7		209.8		150.1
Total Budget		**11,411.6**		**13,734.4**		**17,102.2**		**16,526.8**		**16,323.8**
No. of Ships:										
Major New Ships		**23**		**20**		**25**		**22**		**19**
Air Cushion LCAC's		**12**		**12**		**12**		**12**		**12**
Service/Conv. Landing Craft		**16**		**NA**		**NA**		**NA**		**NA**
Conversions		**5**		**4**		**4**		**5**		**6**

Note:

These numbers should naturally be treated with caution. Congress does not necessarily approve Navy budget requests and Navy's plans change:

- last year DOD requested $13.1 billion to build or convert 29 ships—Congress approved $11.7 billion for 26 ships
- two years ago Navy said 28 new ships were planned for FY 1986—Navy has now cut the figure to 23 ships
- two years ago Navy said it planned to spend $16.8 billion on shipbuilding and conversion in FY 1986—the budget figure has now been cut to $11.4 billion

Source: Department of Defense

Exhibit 2

Landing Craft, Workboats And Drydocks
Currently Under Construction
(as of January 1985)

Craft	Qty	Contractor	Contract Value (in thousands)
Seaspectre PB MK 4	3	Atlantic Marine, Inc.-Ft. Geo. Isl. FL	4,160
24′ EOD Boat	33	Monark Boat Co.-Monticello AK	1,670
24′ Boom Handling	4	Monark Boat Co.-Monticello AK	348
33′ Utility Boat	6	Monark Boat Co.-Monticello AK	656
36′ Lg. Personnel Landing Craft	98	Watercraft America-Edgewater, FL	11,500
56′ Target Boat	5	Watercraft America-Edgewater, FL	868
33′ Personnel Boat	13	Port Richmond-Richmond, CA	1,469
Med/Aux Repair Drydock (ARDM)	1	Todd-Seattle–Seattle, WA	32,700
Torpedo Weapon Retriever (TWR)	8	Marinette Marine-Marinette, WI	18,800
50′ Work Boat	52	Marinette Marine-Marinette, WI	12,845
Patrol Craft (YP)	19	Marinette Marine-Marinette, WI	68,000
Torpedo Weapon Retriever (TWR)	3	Marinette Marine-Marinette, WI	7,123
LCM-8	28	Marine Power & Equip.-Seattle, WA	13,348
Patrol Craft (YP)	7	Peterson Builders, Inc.-Sturgeon Bay, WI	25,800
40′ Utility Boat	23	Willard Company-Fountain Valley, CA	1,890
40′ Personnel Boat	22	Willard Company-Fountain Valley, CA	3,224
50′ Utility Boat	12	Willard Company-Fountain Valley, CA	2,024
33′ Personnel Boat	17	Willard Company-Fountain Valley, CA	3,407
26′ Motor Whale Boat	102	Uniflite-Bellingham, WA	3,796
22′ Utility Boat	15	Boston Whaler-Rockland, MA	400
18′ Utility Boat	64	Arcwel Corp.-San Diego, CA	731
18′ Target Boat	15	Arcwel Corp.-San Diego, CA	550
Med. Special Warfare Craft	1	RMI-National City, CA	7,000
110′ YC	28	Moss Point Marine-Escatawpa, MS	7,300
Total	**579**		**229,609**

Source: Department of Navy

(continued on page 30)

Exhibit 3

Navy Funding For Ship Maintenance And Alteration
FY 1982-1986
(in millions of dollars)

	FY 1982	FY 1983	FY 1984 (revised)	FY 1985 (revised)	FY 1986 (proposed)
Scheduled Overhauls	$2,156.5	$2,488.0	$2,360.9	$2,775.6	$2,273.2
Number of Overhauls	63	59	53	55	35
Restricted Availabilities	815.1	919.2	1,011.8	1,247.1	1,333.7
Number Selected Restricted Availabilities	57	71	88	96	104
Number of Phased Maintenance Availabilities	NA	7	10	14	30
Ship Alterations	932.8	896.6	1,088.3	1,409.1	1,544.9
Intermediate Maintenance	246.0	297.9	312.6	360.4	388.7
Technical Support	100.8	124.5	115.2	118.8	138.3
Fleet Outfitting	161.3	196.1	293.7	335.7	352.8
Inactivations	10.1	33.4	44.7	—	—
Berthing/Messing	NA	38.6	53.5	43.0	44.7
Total	**$4,422.6**	**$4,994.3**	**$5,280.7**	**$6,289.7**	**$6,076.3**

Note: Data do not include organization maintenance.
Source: OPNAV

(continued on page 29)

zation next year. The breakdown of this budget and comparison to previous years is shown in Exhibit 3.

The decline in the number of overhauls over the past five years is obvious. In FY 1982 Navy spent $2.2 billion to perform 63 overhauls. This was 49 percent of the ship maintenance budget. In FY 1986 Navy plans to spend $2.3 billion for 35 overhauls. This represents 37 percent of the maintenance budget. Offsetting reductions in overhaul funding, the budget for restricted availabilities has increased from $815 million (18 percent of budget) in 1982 to $1,334 million (22 percent of budget) in 1986.

The 35 overhauls scheduled in FY 1986 include one aircraft carrier, three ballistic missile submarines, eleven attack submarines, nine surface combatants, six amphibious ships, four auxiliaries and one minesweeper.

Navy projects that commercial shipyards will receive 34.1 percent (or $2,070 million) of the FY 1986 ship maintenance funding. In FY 1985 the figure is expected to be 35.8 percent (or $2,250 million).

An additional $163 million is proposed for maintenance and overhaul of Navy reserve fleet ships. This funding is to perform six overhauls, six phased maintenance availabilities, and three selected restricted availabilities.

MSC plans to spend $270 million on ship maintenance and alteration in FY 1986. This includes 42 ship overhauls. MSC received Congressional approval to spend about $320 million on ship maintenance and alteration in FY 1985. The most current estimate is that less than $250 million will actually be spent—and 35 rather than 50 overhauls originally approved will be performed. The breakdown of the MSC maintenance and alteration budget for 1984-1986 is provided in Exhibit 4.

Navy ship maintenance represents major business opportunity for ship repair yards and equipment manufacturers. Among the more interesting prospects and developments are the following.

Submarine overhaul—A substantial portion of the FY 1985 and 1986 overhaul budget is committed to nuclear submarine overhaul. Six of the eight naval shipyards (Philadelphia and Long Beach are not nuclear qualified) are booked solid with nuclear submarine work over the next few years. Newport News is the only commercial yard able to perform this work. At $100 million + per overhaul, this represents important business to Newport News.

Homeport policy—Navy's policy is to restrict short duration ship maintenance jobs to homeport area shipyards. This greatly affects the work distribution as 70 percent of the fleet is highly concentrated in five homeports:

Exhibit 4

FY 1984-1986 MSC Funding For Ship Maintenance and Repair/Alterations
(dollars in thousands)

	FY 1984			FY 1985						FY 1986		
	Estimate			Approved			Current Estimate			Estimate		
Category/Ship Type	**M&R**	**Alterations**	**Total**	**M&R**	**Alterations**	**Total**	**M&R**	**Alterations**	**Total**	**M&R**	**Alterations**	**Total**
Recovered through per diem rates												
CARSS	$19,813	$414	$20,227	$15,903	$847	$16,750	$8,186	$539	$8,725	$5,759	$639	$6,398
POL	37,210	3,915	41,125	49,043	11,865	60,908	20,834	5,484	26,318	25,303	3,343	28,646
Rapid Deployment Force	5,354	822	6,176	13,435	2,420	15,855	9,223	4,003	13,226	30,554	14,759	45,313
Scientific Support	35,191	5,374	40,565	47,625	13,291	60,916	36,809	9,519	46,328	37,375	12,591	49,966
Fleet Auxiliary	69,554	9,285	78,839	100,952	28,978	129,930	86,067	28,917	114,984	97,807	38,564	136,371
Subtotal	167,122	19,810	186,932	226,958	57,401	284,359	161,119	48,462	209,581	196,798	69,896	266,694
Reimbursable												
Scientific Support	316	14,822	15,138	0	0	0	0	0	0	0	0	0
Fleet Auxiliary	32,156	597	32,753	34,168	0	34,168	33,422	1,482	34,904	2,772	57	2,829
Subtotal	32,472	15,419	47,891	34,168	0	34,168	33,422	1,482	34,904	2,772	57	2,829
Grand Total	**$199,594**	**$35,229**	**$234,823**	**$261,126**	**$57,401**	**$318,527**	**$194,541**	**$49,944**	**$244,485**	**$199,570**	**$69,953**	**$269,523**
Number of Overhauls	**32**			**50**			**35**			**42**		

Sources: Military Sealift Command

Homeport	Percentage of Fleet as of Nov. 1983
Norfolk	24
San Diego	20
Charleston	13
Mayport	7
Los Angeles	6

Another Navy policy has been to lengthen the cycle between overhauls. To maintain ships between these extended overhauls more work is being performed during short selected restricted availabilities (SRA's). As a result yards in these five areas have a unique opportunity to capture most of the growing amount of short term maintenance jobs.

Navy yard/commercial yard work split--There is continuing pressure to increase the share of ship maintenance expenditures that commercial yards receive. Presently commercial yards get about 35 percent of the total ship maintenance funding. Congress (particularly the House) has been encouraging Navy to raise the commercial yard share to 40 percent. Additional work would be available for commercial bidding should the target percentage be raised.

A test program is planned this year to compare naval and commercial shipyard performance on Navy ship overhauls. Two LPD overhauls will be awarded on the West Coast—one each to a naval and commercial shipyard. Technical and cost performance will be compared. A similar test is planned using two FF 1052 overhauls on the East Coast.

IMA Detailed Assessment of Future Navy Market

Readers interested in knowing more about the future Navy market may wish to obtain two reports recently prepared by IMA:

- **U.S. Navy Procurement**--published in May 1985, this 220 page report is a professional, thorough assessment of the future $40 billion annual U.S. market for ships, ship systems and weapons.
- **U.S. Navy Ship Overhaul Market**—published in July 1984 (updated through June 1985) this 175 page report provides a comprehensive, professional assessment of the future $6-8 billion market for Navy ship maintenance and alteration.

Each of these reports (including four quarterly updates) is available for $480. If ordered together both are available for $750. To order please contact International Maritime Associates, Inc., 1800 K Street N.W., Washington D.C. 20006. Telephone (202) 296-4615; telex 64325; telecopier (202) 293-7508.

WORLD SHIPBUILDING

Table 3—Delivery Schedule of World Orderbook
(In million gross tonnage)

	1988 & after	Total	World Fleet at 6/30/84

Exhibit 4

FY 1984-1986 MSC Funding For Ship Maintenance and Repair/Alterations
(dollars in thousands)

	FY 1984			FY 1985						FY 1986		
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Scientific Support	35,191	5,374	40,565	47,625	13,291	60,916	36,809	9,519	46,328	37,375	12,591	49,966
Fleet Auxiliary	69,554	9,285	78,839	100,952	28,978	129,930	86,067	28,917	114,984	97,807	38,564	136,371
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IMA Detailed Assessment of Future Navy Market

Readers interested in knowing more about the future Navy market may wish to obtain two reports recently prepared by IMA:

- **U.S. Navy Procurement**—published in May 1985, this 220 page report is a professional, thorough assessment of the future $40 billion annual U.S. market for ships, ship systems and weapons.
- **U.S. Navy Ship Overhaul Market**—published in July 1984 (updated through June 1985) this 175 page report provides a comprehensive, professional assessment of the future $6-8 billion market for Navy ship maintenance and alteration.

Each of these reports (including four quarterly updates) is available for $480. If ordered together both are available for $750. To order please contact International Maritime Associates, Inc., 1800 K Street N.W., Washington D.C. 20006. Telephone (202) 296-4615; telex 64325; telecopier (202) 293-7508.

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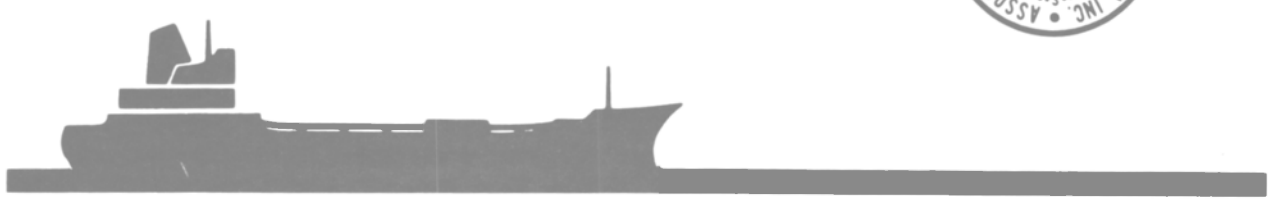

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WORLD SHIPBUILDING

The world fleet has continued to decrease, although new deliveries are keeping almost abreast of scrappings and casualties. It is interesting to note that the fleet increased by 100 million gross tons every five years from 1969 to 1979, but is now only 5.5 million gross tons higher than it was in 1979.

In the past year, the tonnage laid up has shown a continued decrease

(continued on page 34)

Table 1—Annual Orders and Completions
(In million gross tonnage)

Year	Orders Placed	Completions
1974	28.37	33.54
1975	13.79	34.20
1976	12.94	33.92
1977	11.09	27.53
1978	8.03	18.19
1979	16.84	14.29
1980	18.97	13.10
1981	17.23	16.93
1982	11.23	16.82
1983	19.48	15.91
1984 (est.)	**16.00**	**18.00**

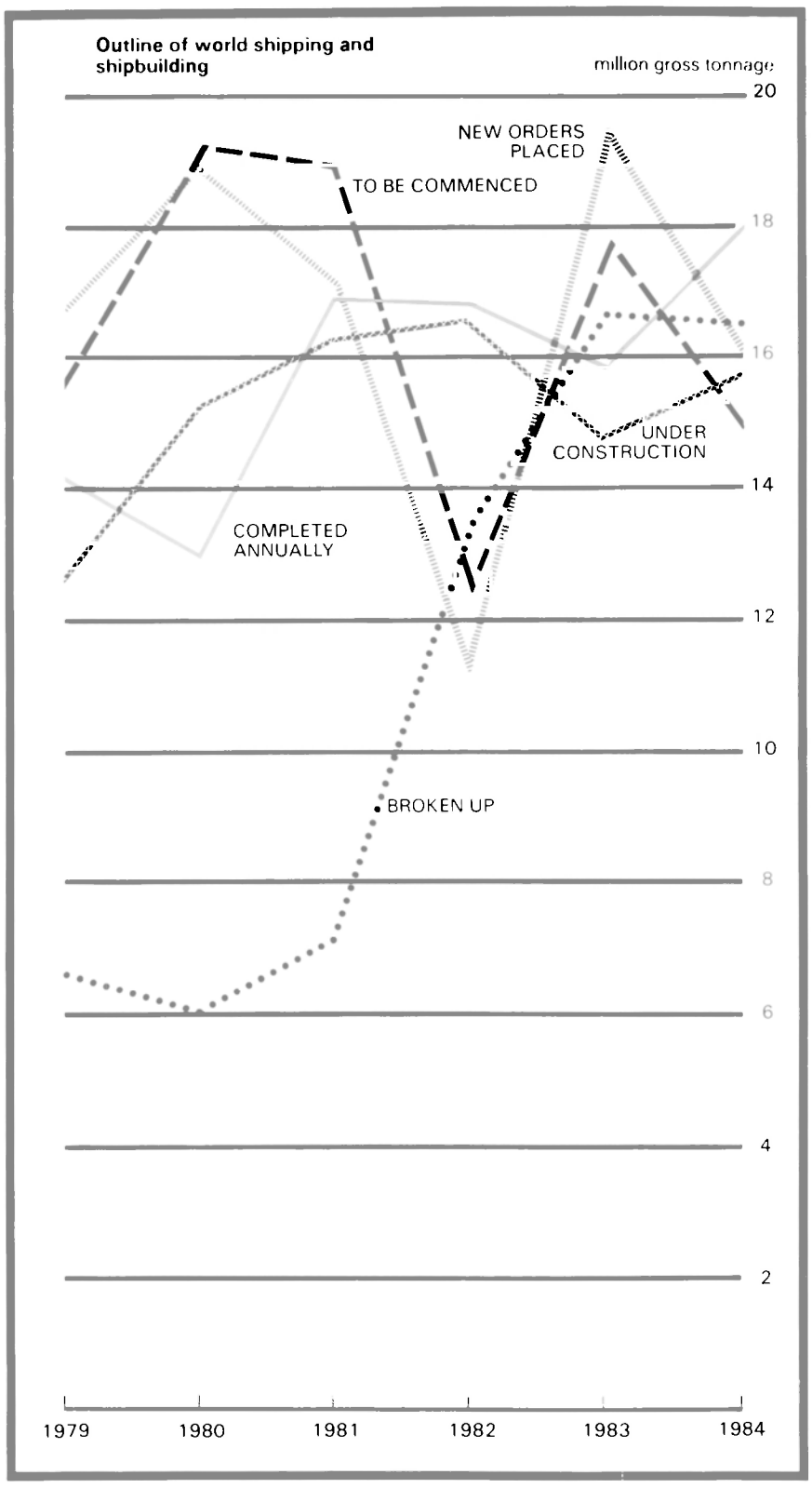


Table 2—Percentage of New Orders Placed

Year	Japan	South Korea	EEC	Comecon	Rest of World
1974	38.42%	2.82%	26.99%	2.87%	28.90%
1975	49.25	3.72	13.44	8.37	25.22
1976	56.01	2.47	10.56	10.00	20.96
1977	52.13	5.67	13.11	7.96	21.13
1978	43.25	3.71	14.89	11.49	26.66
1979	49.47	6.20	14.02	6.82	23.49
1980	52.66	8.96	12.11	4.22	22.05
1981	48.00	8.08	14.04*	6.06	23.82
1982	49.75	9.57	13.47*	9.44	17.77
1983	56.56	19.21	7.40*	5.14	11.69
1984 (est.)	**55.92**	**17.40**	**9.99***	**2.46**	**14.23**

*Including Greece

Table 4—Percentage of Orders Placed in Principal Shipbuilding Countries

Country of Build	1979	1980	1981	1982	1983	1984
Japan	49.5%	52.7%	48.0%	49.7%	56.6%	55.9%
South Korea	6.2	9.0	8.1	9.6	19.2	17.4
People's Republic of China (inc. Taiwan)	2.6	3.7	5.4	2.6	2.8	5.3
Federal Republic of Germany	4.4	2.2	4.4	4.4	2.4	3.1
Denmark	2.3	2.1	2.5	1.3	2.4	2.9
Brazil	2.7	0.3	3.3	2.7	1.7	2.3
Finland	1.6	1.5	1.8	1.0	0.4	2.0
United States	2.8	3.4	1.3	1.0	1.1	1.7
German Democratic Republic	0.9	1.2	1.9	4.0	2.4	1.0
Netherlands	0.7	1.2	1.2	1.2	0.6	1.0
United Kingdom	1.4	2.7	2.9	2.5	0.6	1.0
France	1.5	1.7	1.9	0.9	0.7	0.9
Poland	4.6	1.0	0.9	1.7	2.1	0.9
Norway	2.1	1.7	1.4	0.8	0.3	0.8
Belgium	2.7	0.6	0.4	0.5	0.5	0.7
Yugoslavia	2.8	1.7	0.7	2.4	1.2	0.6
Bulgaria	1.1	0.8	1.1	1.1	0.6	0.5
Rest of the World	10.1	12.5	12.8	12.6	4.4	2.0
Gross tonnage	**16,843,354**	**17,230,094**			**19,480,030**	
		18,969,044		**11,231,759**	**16,000,000** (estimated)	

Summary of Merchant Vessels, 100 Gross Tons and Over, Completed During 1977-1984 by Country Where Built

Country	1977	1978	1979	1980	1981	1982	1983	1984
Denmark	53	46	46	53	45	46	48	46
France	39	42	33	25	35	37	37	36
Germany (East)	51	55	56	50	54	52	55	58
Germany (West)	157	134	97	105	99	106	130	109
Italy	44	37	34	46	51	30	41	30
Japan	1,107	1,046	993	943	839	800	755	902
Netherlands	97	89	98	82	103	107	126	68
Norway	138	140	113	80	70	80	61	39
Poland	72	66	68	64	40	40	39	52
Spain	149	120	99	74	86	105	106	92
Sweden	40	36	32	27	33	25	24	13
United Kingdom	94	91	86	68	46	59	60	46
United States	129	151	182	205	223	204	159	73
Yugoslavia	19	19	29	23	17	23	15	21
World Totals	**2,796**	**2,618**	**2,466**	**2,412**	**2,269**	**2,312**	**2,276**	**2,210**

Source: Lloyd's Register Annual Summary of Merchant Ships Completed During 1984

Source (text, tables, and charts): Lloyd's Register of Shipping

WORLD SHIPBUILDING

(continued)

from the high figure of almost 53 million gross tons reported in May 1983. It now stands at just over 33 million gross tons. The biggest decrease has been in the tanker sector, which is down by 5 million gross tons, much of which has been sold for demolition. The 2 million gross ton increase in completions to a figure of 18 million gross tons has led to a decrease in the work in hand to approximately 30.7 million gross tons (Table 1).

As that table shows, new orders in 1984 were down by some 3.5 million gross tons compared with 1983. However, it should be noted that almost 2.5 million gross tons of the total for 1983 was an unprecedented order for bulk carriers. The rate of ordering, on a quarterly basis, has shown a steady increase throughout the year.

The world orderbook now stands at almost 2 million gross tons less than at the same time last year. For the second year running, demolitions have exceeded 16 million gross tons, more than 75 percent being sold to Far East shipbreakers.

Except for 1982, the amount of tonnage ordered annually has remained fairly static since 1979, though the fortunes of the tradition-

(continued on page 36)

Table 3—Delivery Schedule of World Orderbook
(In million gross tonnage)

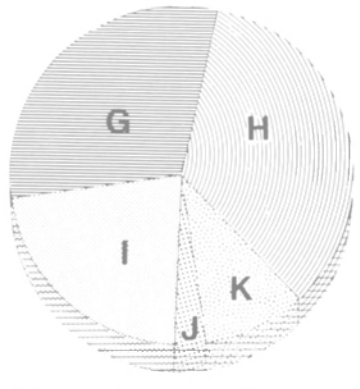
Type	1985	1986	1987	1988 & after	Total	World Fleet at 6/30/84
Oil tankers	3.11	2.17	0.33	—	5.62	147.463
Ore & bulk carriers	10.50	3.62	0.52	—	14.65	103.681
Bulk/oil carriers	0.73	0.55	0.46	—	1.74	24.653
Containerships	1.48	0.97	0.024	—	2.48	16.913
General cargo	1.42	0.27	0.036	0.045	1.77	77.174
Specialized carriers	0.86	0.17	0.001	—	1.03	13.280
Miscellaneous	2.45	0.69	0.16	0.045	3.39	35.519
Total orderbook as of 12/31/84	**20.56**	**8.45**	**1.54**	**0.137**	**30.69**	**418.682**

Merchant Vessels, 100 Gross Tons and Over, Completed During 1984 in Leading Shipbuilding Countries of the World

Country	No.	Total GT
Japan	902	9,711,381
South Korea	87	1,472,897
People's Republic of China (inc. Taiwan)	61	1,150,842
Federal Republic of Germany	109	516,590
Denmark	46	474,181
United Kingdom	46	444,743
USSR	210	395,584
German Democratic Republic	58	366,841
Romania	18	365,211
Spain	92	354,955
Finland	30	340,358

Source: Lloyd's Register Annual Summary of Merchant Ships Completed During 1984

Composition of world fleet as at June 30, 1984 (million gross tonnage)



G Bulk Ore 128 H Tankers 147 I Cargo Container 94
J Spec. Carriers 13 K Miscellaneous 37

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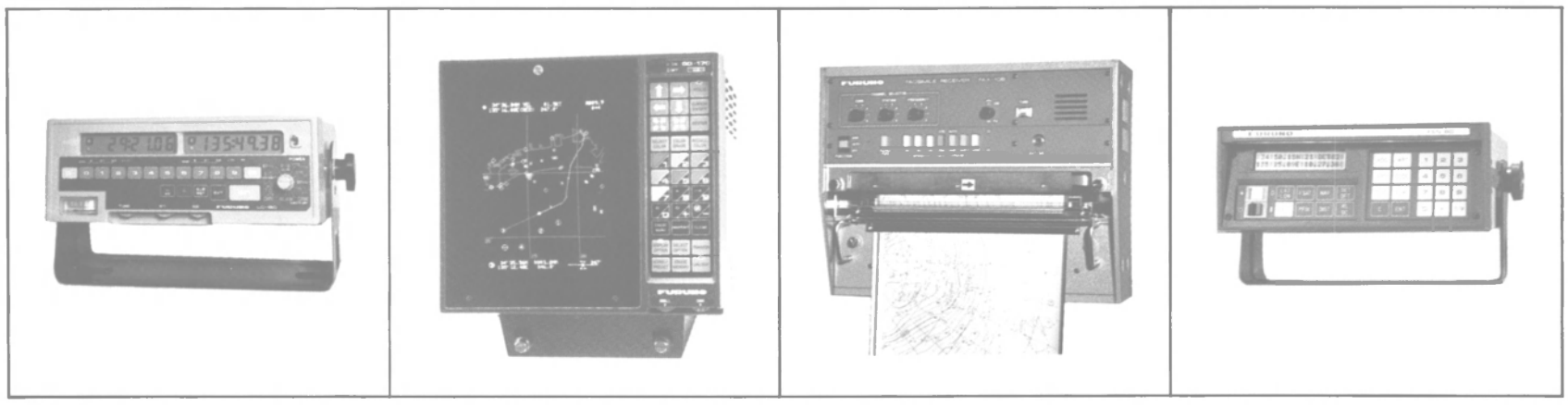


(continued)
al shipbuilding countries fluctuate from year to year.

Japan and South Korea continue their current domination of the market, taking 73 percent of the new orders placed; just under 10 percent went to EEC member countries. China (including Taiwan) has increased its share of orders for the second year running (Table 4).

A difficult situation in Finland was averted by the USSR bringing forward orders that would not normally have been placed until 1986 under the next five-year plan. This enabled Finnish shipbuilders to maintain their production schedules. A notable order was for the hulls of two 52,000-shp nuclear-powered icebreakers; the reactors and propulsion machinery are to be installed in Leningrad.

The decrease in Poland was mainly due to the absence of orders placed by Western countries. In addition, reports of orders recently placed by owners from the Communist bloc may not be completed.

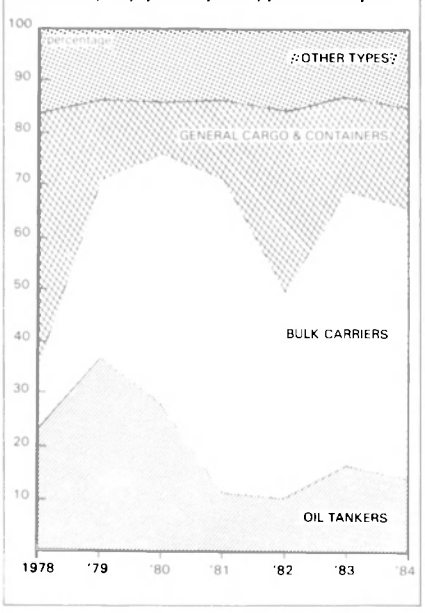
During the year, the first purpose-built tanker/processing/storage vessel was ordered in Japan by Norwegian owners for delivery in 1986.

Comparing the leading shipbuilding countries of five years ago with those of today, it can be seen that Japan and South Korea have greatly increased their orderbooks, while the U.S. and Brazil have shown a decrease of more than a million gross tons. Other countries showing a decrease include France, Poland, the United Kingdom, Spain, and Sweden, while Denmark and Finland are at about the same level. The current delivery schedule shows a contracting orderbook, with few contracts placed for delivery beyond 1986 (Table 3).

Principal countries of disposal for demolitions during 1984, which are estimated to be on the same 16.5 million gross ton level as the previous year, were: China (including Taiwan), 49 percent; South Korea, 24 percent; Pakistan, 7 percent; Japan, 5 percent; Spain, 4 percent; and other countries, 11 percent.

More than 50 percent of the world merchant fleet (100 gt and above) is now at least 10 years old. Only 11 percent of the tanker fleet, but almost 24 percent of the bulk carrier fleet, is less than five years of age.

Percentage of tonnage ordered annually by principal type of ship



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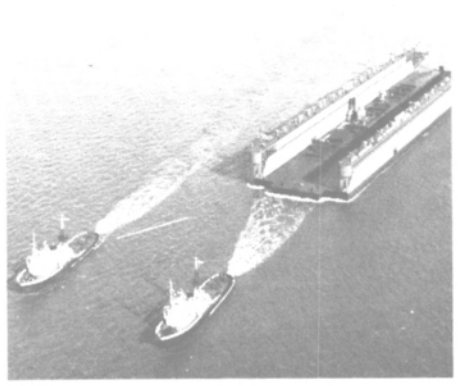

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Owner or Operator Name of Ship	Type	GT	DWT	HP T = Turbine D = Diesel	Year Built/ Rebuilt
AMERICAN HAWAII CRUISES					
550 Kearny Street, San Francisco, CA 94108					
Constitution	Cruise	20,251	7,100	T-55,000	51/84
Independence	Cruise	20,251	7,100	T-55,000	50/84
AMERICAN PRESIDENT LINES, LTD.					
1800 Harrison 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 Eisenhower	Container	36,900	45,900	D-43,200	80/84
President F.D. Roosevelt	Container	36,200	45,900	D-43,200	80/84
President Fillmore	Container	17,800	17,500	T-24,000	68/72
President Grant	Container	26,700	37,300	T-32,000	71/78/83
President Hoover	Container	26,700	37,300	T-32,000	71/78/83
President Jackson	Cargo	16,000	22,200	T-24,000	68
President Jefferson	Container	21,500	18,500	T-28,500	73
President Johnson	Container	21,500	18,500	T-28,500	74
President Kennedy	Container	16,500	19,300	T-22,000	64/72
President Lincoln	Container	40,600	29,800	D-43,200	82
President Madison	Container	21,500	18,500	T-28,500	73
President McKinley	Container	17,800	17,500	T-24,000	68/72
President Monroe	Container	40,600	29,800	D-43,200	83
President Pierce	Container	21,500	18,500	T-28,500	73
President Taft	Container	17,800	17,500	T-24,500	67/72
President Taylor	Cargo	16,000	22,200	T-24,000	69
President Truman	Container	16,500	19,000	T-22,000	62/71
President Tyler	Container	26,700	37,300	T-32,000	72/78/83
President Van Buren	Container	17,800	17,500	T-24,000	67/72
President Washington	Container	40,600	29,800	T-43,200	82
President Wilson	Cargo	16,000	22,200	T-24,000	69
AMERICAN TRADING TRANSPORTATION COMPANY, INC.					
555 Fifth Avenue, New York, NY 10017					
American Trader	Tanker	15,053	27,615	T- 9,350	43/67
Baltimore Trader	Tanker	31,228	57,884	T-15,000	55/71
Chesapeake Trader	Tanker	24,669	50,116	D-11,400	82
Delaware Trader	Tanker	24,669	50,057	D-11,400	82
Pennsylvania Trader	Tanker	20,046	34,124	T-13,750	62
Potomac Trader	Tanker	24,669	50,057	D-11,400	83
Texas Trader	Tanker	15,129	27,500	T- 7,240	44/69
Washington Trader	Tanker	24,938	39,368	T-22,000	59
AMOCO SHIPPING COMPANY, INC.					
P.O. Box 8368, Chicago, IL 60680					
Amoco Delaware	Tanker	15,000	27,770	TE-7,240	44/71
APEX MARINE CORPORATION					
2001 Marcus Avenue, Lake Success, NY 11042					
Adonis	Tanker	38,297	80,422	D-20,700	56/82
American Heritage	Tanker	44,000	91,849	T-24,500	78
Apollo One	Incin.	2,073	7,317	D- 2,250	85
Archon	Bulk	33,784	63,463	D-12,300	84
Atlantic Spirit	RO/RO	17,525	16,144	T-30,000	76/84
Aurora	Bulk	33,784	63,739	D-12,300	84
Baltimore	ITB	23,913	47,247	D-18,200	83
Beaver State	Tanker	44,900	91,849	T-24,500	78
Brooklyn	Tanker	103,907	225,000	T-50,000	73
Charleston	Tanker	21,649	39,366	T-12,000	56/80
Golden Endeavor	OBO	44,900	91,849	T-24,500	74
Golden Monarch	Tanker	44,900	91,388	T-24,500	75
Groton	ITB	23,913	47,247	D-18,200	82
Jacksonville	ITB	23,913	47,247	D-18,200	82
Mobile	ITB	23,913	47,247	D-18,200	84
New York	ITB	23,913	47,247	D-18,200	83
Philadelphia	ITB	23,913	47,247	D-18,200	84
Scorpio	Tanker	14,156	24,513	T- 7,000	44/80
Ultramar	OBO	39,800	82,199	T-24,000	73
Ultrasea	OBO	39,800	82,120	T-24,000	74
Williamsburg	Tanker	103,812	225,000	T-50,000	74
ARCO MARINE, INC. (ATLANTIC RICHFIELD COMPANY)					
515 S. Flower Street, Los Angeles, CA 90071					
Arco Alaska	Tanker	83,675	188,436	T-28,000	79
Arco Anchorage	Tanker	57,691	120,319	T-26,000	73
Arco California	Tanker	83,675	188,436	T-28,000	80
Arco Endeavor	Tanker	18,347	31,816	T-14,850	58
Arco Fairbanks	Tanker	57,700	120,585	T-26,000	74
Arco Heritage	Tanker	28,381	53,288	T-20,680	63
Arco Independence	Tanker	117,515	262,376	T-32,000	77
Arco Juneau	Tanker	57,691	120,585	T-26,000	74
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 Spirit	Tanker	117,515	262,376	T-32,000	77
BAY TANKERS INCORPORATED					
1 Chase Manhattan Plaza, New York, NY 10005					
Bay Ridge	VLCC Tanker	103,812	224,428	T-50,000	79
Maryland	VLCC Tanker	117,285	264,073	T-35,000	76
Massachusetts	VLCC Tanker	117,285	264,073	T-35,000	75
New York	VLCC Tanker	117,285	264,073	T-35,000	76
Stuyvesant	VLCC Tanker	103,812	224,670	T-50,000	77
CENTRAL GULF LINES, INC.					
650 Poydras Street, New Orleans, LA 70130					
Dawn	Cargo	11,309	12,939	T-18,150	63
Green Harbour	LASH	28,487	46,152	T-32,000	74
Green Island	LASH	28,487	46,152	T-32,000	74
Green Valley	LASH	28,487	46,152	T-32,000	74
Green Wave	Cargo/Cont.	9,521	9,928	D-10,000	80
Rapid	RO/RO	11,757	15,694	T-30,000	69
Rover	RO/RO	11,757	15,694	T-30,000	69
CHEVRON SHIPPING COMPANY					
555 Market Street, San Francisco, CA 94105					
Alaska Standard	Tanker	1,947	2,698	D- 1,700	59
Chevron Arizona	Tanker	16,941	39,207	GT/E-12,500	77
Chevron California	Tanker	35,588	70,213	T-20,000	72
Chevron Colorado	Tanker	16,941	39,203	GT/E-12,500	76
Chevron Louisiana	Tanker	16,941	39,258	GT/E-12,500	77
Chevron Mississippi	Tanker	35,589	70,213	T-20,000	72
Chevron Oregon	Tanker	16,941	39,274	GT/E-12,500	75
Chevron Washington	Tanker	16,941	39,167	GT/E-12,500	76
COASTWISE TRADING COMPANY, INC.					
2501 Palmer Highway, Suite 110, Texas City, TX 77590					
Amoco Tallahassee	Tug	273	412	D- 5,800	81
Amoco Atlanta	Tug	273	412	D- 5,800	82
Amoco Richmond	Tug	273	412	D- 5,800	82
Amoco Columbia	Tug	273	412	D- 5,800	82
Amoco Florida	Tank Barge	11,296	27,747	—	81
Amoco Georgia	Tank Barge	9,759	21,366	—	82
Amoco Virginia	Tank Barge	11,296	24,630	—	82
Amoco South Carolina	Tank Barge	11,321	24,654	—	82
COSCOL MARINE CORPORATION					
9 Greenway Plaza, Houston, TX 77046					
Coastal Manatee	Tanker	19,030	30,806	T-13,600	61



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For years, Baldt LWT and Moor-Fast anchors have kept offshore drilling rigs firmly in place. Now Baldt engineers have incorporated many new design features into an anchor with an even stronger grip.

Baldt's new Moor-Plus anchor* also offers you holding power superior to other critical-design anchors. Moor-Plus, made from rugged cast steel, is the new brute of the deep for offshore applications.

Unique design features contribute to the higher holding power: Larger fluke area and streamlined-tripping palm assembly maximize penetration. Smooth fluke surfaces ease embedment. Fluke angles adjust for firm and soft bottom conditions. Shortened shank eliminates "the bends" Flared shackle end affords trouble-free operation with Baldt retrieval systems.

Advanced engineering design. Demanding quality control. Together, they result in a new high in holding efficiency in the new Baldt Moor-Plus anchor.

Moving ahead to keep you standing fast.

BALDT®

Baldt Incorporated
Corporate Headquarters
P.O. Box 350
Chester, PA 19016 U.S.A.
215-447-5200/Telex: 834367

Baldt Inc.
European Sales Division
9 Bon-Accord Crescent
Aberdeen, Scotland
AB1 2DN
(0224) 572562. Telex: 739385

Dreyfus Supply
and Machinery Corp.
P.O. Box 3116
New Orleans, LA 70117
(504) 944-3366. Telex: 584237

Washington Chain and Supply Co.
P.O. Box 3645
Seattle, WA 98124
(206) 623-8500. Telex: 320052

Tri-Tex Marine, Inc.
P.O. Box 18253
Houston, TX 77023
(713) 923-6653. Telex: 293561

*Patents Pending

Circle 16 on Reader Service Card

U.S.-FLAG OCEANGOING FLEET

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
COVE SHIPPING INC.					
Wall Street Plaza, Suite 1630, New York, NY 10005					
Cove Leader	Tanker	40,511	71,054	T-25,000	59
Cove Liberty	Tanker	33,596	69,306	T-22,000	54/74/81
Cove Navigator	Tanker	19,498	31,991	T-18,000	51
Cove Sailor	Tanker	20,557	34,865	T-15,000	59
Cove Trader	Tanker	28,310	49,339	T-15,000	59
ENERGY TRANSPORTATION CORPORATION					
540 Madison Avenue, New York, NY 10022					
Energy Altair	Tug	262.6	—	D- 4,800	82
Energy Ammonia	Barge	11,438	7,150	—	82
LNG Aquarius	LNG	95,084	71,475	T-43,000	77
LNG Aries	LNG	95,084	71,466	T-43,000	77
LNG Capricorn	LNG	95,084	71,409	T-43,000	78
LNG Gemini	LNG	95,084	71,327	T-43,000	78
LNG Leo	LNG	95,084	71,409	T-43,000	78
LNG Libra	LNG	95,084	71,503	T-43,000	79
LNG Taurus	LNG	95,084	71,495	T-43,000	79
LNG Virgo	LNG	95,084	71,482	T-43,000	79
EXXON SHIPPING COMPANY					
P.O. Box 1512, Houston, TX 77251-1512					
Exxon Baltimore	Tanker	26,198	51,015	T-19,000	60
Exxon Baton Rouge	Tanker	34,266	75,600	T-19,000	69
Exxon Baytown	Tanker	32,136	57,720	D-16,800	84
Exxon Benicia	Tanker	75,272	172,775	T-26,700	79
Exxon Boston	Tanker	23,299	51,314	T-19,000	60
Exxon Charleston	Products Tanker	27,798	48,075	D-16,800	83
Exxon Galveston	Tanker	12,769	26,923	D- 7,000	70/78
Exxon Gettysburg	Tanker	23,655	39,029	T-26,500	57
Exxon Houston	Tanker	31,697	72,056	T-19,000	64
Exxon Jamestown	Tanker	19,734	40,631	T-26,500	57
Exxon Lexington	Tanker	19,734	40,631	T-26,500	58
Exxon New Orleans	Tanker	32,035	72,056	T-19,000	65
Exxon North Slope	Tanker	75,272	172,775	T-26,700	79
Exxon Philadelphia	Tanker	38,144	76,160	T-19,000	70
Exxon Princeton*	Tanker	21,446	42,595	D-11,200	82
Exxon San Francisco	Tanker	34,266	75,600	T-19,000	69
Exxon Washington	Tanker	19,734	40,631	T-26,500	57
Exxon Wilmington	Products Tanker	27,508	48,011	D-16,800	84
Exxon Yorktown*	Tanker	21,446	42,954	D-11,200	83

*Bareboat chartered from Connecticut National Bank

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
FALCON SHIPPING GROUP					
1000 Louisiana Street, Suite 2900, Houston, TX 77002					
Eclipse	Tanker	20,751	37,276	D-15,000	71
Falcon Champion	Tanker	17,735	33,542	D-14,500	84
Falcon Countess	Tanker	20,751	37,276	D-15,000	72
Falcon Lady	Tanker	20,751	37,276	D-15,000	71
Falcon Leader	Tanker	17,735	33,542	D-14,500	83
Falcon Princess	Tanker	20,751	37,276	D-15,000	72
Golden Phoenix	OBO	78,164	128,000	T-17,600	83
Jade Phoenix	OBO	78,164	128,000	T-17,600	83
Pride of Texas	Bulk	24,384	36,500	D-15,600	81
Spirit of Texas	Bulk	24,384	36,500	D-15,600	82
Star of Texas	Bulk	24,384	36,500	D-15,600	82
FARRELL LINES INCORPORATED					
One Whitewall Street, New York, NY 10004					
Argonaut	Container	17,904	16,205	T-17,500	79
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 Freedom	Container	17,904	16,230	T-17,500	72
Export Patriot	Containership	17,904	16,345	T-17,500	73
Austral Rainbow	LASH	26,456	29,749	T-32,000	72
HESS SHIPPING CORPORATION					
1 Hess Plaza, Woodbridge, NJ 07095					
Chesapeake	Tanker	27,000	50,000	T-15,000	64
HUDSON WATERWAYS CORPORATION					
1 Chase Manhattan Plaza, New York, NY 10005					
Manhattan	Tanker	63,681	113,800	T-43,000	62
Transcolorado	Heavy Lift	10,014	11,475	T- 9,000	45/68
Transcolumbia	Heavy Lift	10,014	11,475	T- 9,000	45/68
HVIDE SHIPPING INCORPORATED					
1900 S.E. 17th Street Causeway, Fort Lauderdale, FL 33316					
Frances Hammer/Oxy 4103	ITB	17,126	45,313	D-18,200	81
Julius Hammer/Oxy 4101	ITB	17,126	45,313	D-18,200	81
Seabulk Challenger/STL 3901	ITB	20,982	39,345	D-14,000	75
Seabulk Magnachem/ SCC 3902	ITB	18,671	45,617	D-14,000	77
INTEROCEAN MANAGEMENT CORPORATION					
Three Parkway, Philadelphia, PA 19102					
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
KEYSTONE SHIPPING COMPANY					
313 Chestnut Street, Philadelphia, PA 19106					
Atigun Pass	Crude/Products	74,251	173,380	T-26,700	77
Bennington	Crude/Products	27,325	53,150	T-20,700	63
Chelsea	Crude/Products	22,358	39,235	T-15,000	75
Cherry Valley	Crude/Products	22,358	39,230	T-15,000	74
Chestnut Hill	Crude Tanker	44,875	91,295	T-24,500	76
Chilbar	Chemical Tanker	21,937	39,363	T-20,460	59/81
Coronado	Crude/Products	22,358	39,237	T-15,000	73
Edgar M. Queeny	Chemical Tanker	19,047	37,106	T-15,000	70
Energy Independence	Collier	24,901	38,234	T-12,000	83
Fredericksburg	Crude/Products	21,557	39,374	T-20,460	58/80
Golden Gate	Crude/Products	27,899	61,952	T-20,000	70
Kenai	Crude/Products	60,385	123,113	T-30,000	79
Keystone Canyon	Crude/Products	74,251	173,380	T-26,700	78
Keystoner	Chemical Tanker	11,369	18,384	T- 7,700	53
Kittanning	Crude Tanker	44,875	91,344	T-24,500	77
Meton	Chemical Tanker	18,273	33,881	T-20,460	59
Monmouth	Chemical Tanker	16,376	29,780	TE-7,240	42/70
Petersburg	Crude/Products	27,470	50,063	T-15,000	63
Spirit of Liberty	Products Tanker	20,948	38,238	T-15,000	68
Tonsina	Crude Products	60,385	122,781	T-30,000	78
Valley Forge	Chemical Tanker	20,572	37,753	T-15,000	66
LACHMAR SHIPPING					
Gastrans, Inc., P.O. Box 5759, Lake Charles, LA 70606					
Lake Charles	LNG	87,000	68,000	T-43,000	80
Louisiana	LNG	87,000	68,000	T-43,000	80
LYKES BROS. STEAMSHIP COMPANY					
300 Poydras Street, New Orleans, LA 70130					
Adabelle Lykes	Container	16,800	15,200	D-15,750	68/73
Almeria Lykes	Seabee	21,700	38,400	T-36,000	72
Ashley Lykes	Cargo/Cont.	11,900	14,300	T-11,000	63/73
Brinton Lykes	Cargo/Cont.	11,900	14,300	T-11,000	62/72
Charles Lykes	RO/RO	23,400	20,300	T-37,000	76
Charlotte Lykes	Container	16,800	15,200	D-15,750	68/73
Cygnus	RO/RO	13,100	14,500	D-19,000	77
Doctor Lykes	Seabee	21,700	38,400	T-36,000	72
Elizabeth Lykes	Cargo	11,000	14,700	T-15,500	65
Genevieve Lykes	Cargo	10,700	14,700	T-15,500	68
James Lykes	Cargo/Cont.	11,900	14,300	T- 9,900	60/72
Jean Lykes	Cargo/Cont.	11,900	14,300	T- 9,900	61/72
John Lykes	Cargo/Cont.	11,900	14,300	T- 9,900	60/72
Joseph Lykes	Cargo/Cont.	11,900	14,300	T- 9,900	60/71
Jupiter	RO/RO	13,200	19,100	T-37,000	76
Leslie Lykes	Cargo/Cont.	11,900	14,300	T- 9,900	62/72
Letitia Lykes	Cargo	10,700	14,700	T-15,500	68
Louise Lykes	Cargo	11,000	14,700	T-15,500	65
Lyra	RO/RO	12,200	14,900	D-19,000	77
Mallory Lykes	Cargo	10,700	14,700	T-15,500	66
Margaret Lykes	Container	16,225	15,200	T-15,750	68/73
Marjorie Lykes	Cargo/Cont.	11,900	14,300	T-11,000	62/73
Nancy Lykes	Cargo/Cont.	11,900	14,300	T- 9,900	61/71
Ruth Lykes	Cargo	11,000	14,700	T-15,500	66
Sheldon Lykes	Container	16,375	15,200	D-15,750	69/73
Shirley Lykes	Cargo/Cont.	11,900	14,300	T-11,000	62/72
Stella Lykes	Cargo	10,700	14,700	T-15,500	66
Solon Turman	Cargo/Cont.	11,900	14,300	T- 9,900	61/71
Thompson Lykes	Cargo/Cont.	11,900	14,300	T- 9,900	60/71
Tillie Lykes	Seabee	21,700	38,400	T-36,000	73
Tyson Lykes	RO/RO	23,400	20,300	T-37,000	76
Velma Lykes	Cargo	10,700	14,700	T-15,500	67
Zoella Lykes	Cargo/Cont.	11,900	14,300	T- 9,900	60/71
MARINE TRANSPORT LINES, INC.					
P.O. Box 1550, Secaucus, NJ 07094					
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
Chemical Pioneer	Chemical tanker	18,500	35,000	T-15,000	83
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 Floridian	Sulfur tanker	11,150	24,838	TE-7,000	44/67
Marine Princess	Bulk carrier	26,060	51,355	D-13,800	79

There's a WESTFALIA system for every oil purification need

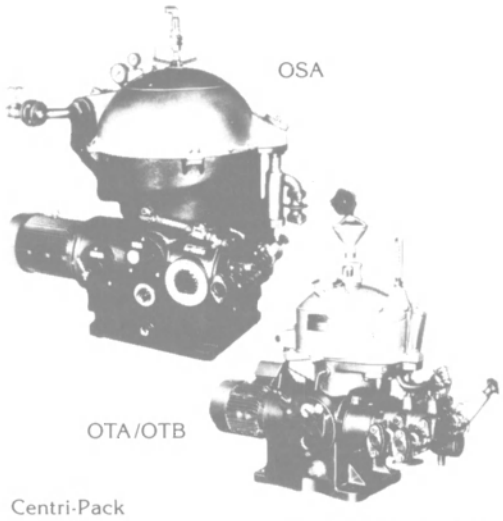
Highest oil purity.
Westfalia Oil Purifiers remove water and sediment from heavy fuel oils at top efficiency. . . at densities up to *1010 kg/m³* and cat fines down to 1 ppm. Our *exclusive* two-stage *UNITROL/SECUTROL* system gives unmatched purity even under *widely varying feed conditions.*

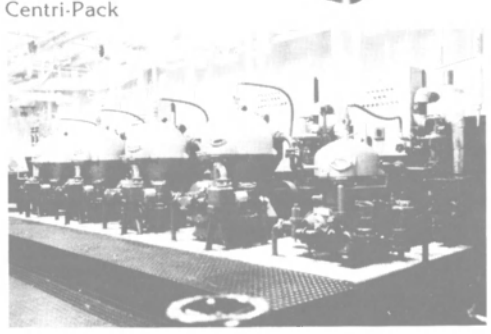
UNITROL performs the basic oil/water/solids separation on oils both lighter and heavier than water. SECUTROL assures maximum solids and water removal. . . while monitoring de-sludging intervals. Together, they provide the *highest HFO quality now obtainable.*

Complete monitoring.
Westfalia systems allow monitoring of such vital functions as oil flow, oil temperature, increased water discharge, oil break-over, failure to shoot, motor temperature, vibration, and excessive number of second-stage solids or water discharges. Control stations, with audible and visual alarms, can be located remotely and/or at the equipment site.

Whether your engines are powering a huge ocean-going cargo vessel or a small service boat, there's a Westfalia Oil Purification System that suits them best.

Westfalia Oil Purifiers — self-cleaning OSA/OSB models and take-down OTA/OTB models — are available for all oil purification needs in any shipboard application.





Top reliability.
Built-in ruggedness and sturdy design give Westfalia Oil Purifiers a record of reliability unmatched by any competitive system. . . perfect for tough marine service conditions.

Preassembled modules.
Westfalia Oil Purifiers are available as single machines or as preassembled "Centri-Pack" modules, with heaters, pumps, strainers, controls, wiring, etc. installed and ready to go.

Rapid, expert service.
With every Westfalia Oil Purification System you get Centrico expertise, to help design, install, and service your equipment. At any port — Atlantic, Pacific, Gulf — skilled engineering advice and assistance, as well as parts, are usually available overnight — or sooner.

Westfalia systems and Centrico service. . . in any engine room, they're the best answer for your oil purification requirements.

WESTFALIA SEPARATOR CENTRICO

Centrico, Inc.
100 Fairway Court / Northvale, N.J. 07647
(201) 767-3900

Circle 162 on Reader Service Card

U.S.-FLAG OCEANGOING FLEET

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
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
MATSON NAVIGATION COMPANY					
333 Market Street, San Francisco, CA 94105					
Haleakala	Container barge	3,562	4,500	—	84
Islander	Barge	3,403	4,834	—	63
Kauai	Container	23,800	22,539	T-32,000	80
Lurline	Container-RO/RO	23,477	21,321	T-30,000	73/82
Manukai	Container	23,800	27,100	T-32,000	70
Manulani	Container	23,800	27,100	T-32,000	70
Matsonia	RO/RO	15,300	13,900	T-30,000	73
Maui	Container	23,800	27,100	T-32,000	78
Mauna Kea	Cargo	3,900	4,400	D- 1,530	67
Maunalei	Container	17,500	17,900	T- 9,900	44/65
Mauna Loa	Container barge	3,562	4,500	—	84
Maunawili	Container	17,800	17,900	T- 9,900	45/65
MOBIL OIL CORPORATION					
150 East 42nd Street, New York, NY 10017					
Eclipse	Tanker	20,751	37,276	D-15,000	71
Mobil Aero	Tanker	18,600	32,900	T-17,600	59
Mobil Arctic	Tanker	57,800	124,499	T-30,000	72
Mobil Meridian	Tanker	28,200	49,200	T-15,000	61
Syosset	Tanker	18,348	31,816	T-13,500	58
MOORE McCORMACK BULK TRANSPORT, INC.					
One Landmark Square, Stamford, CT 06901					
Mormacsky	Tanker	22,354	39,232	T-15,000	77
Mormacstar	Tanker	22,354	39,232	T-15,000	75
Mormacsun	Tanker	22,354	39,232	T-15,000	76
OCEAN CARRIERS, INC.					
13105 Northwest Freeway, Suite 700, Houston, TX 77040					
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
OMI CORPORATION					
280 Park Avenue, New York, NY 10017					
OMI Champion	Product tanker	20,858	37,874	T-15,000	69
OMI Charger	Product tanker	20,877	37,807	T-15,000	69
OMI Columbia	Crude tanker	75,549	136,507	D-27,300	74/83
OMI Dynachem	Chemical tanker	32,328	50,852	D-14,100	81
OMI Hudson	Chemical tanker	32,328	50,852	D-14,100	81
OMI Leader	Product tanker	20,877	37,807	T-15,000	69
OMI Missouri	Bulk carrier	26,800	48,890	D-11,100	83
OMI Sacramento	Bulk carrier	26,800	48,890	D-11,100	83
OMI Wabash	Product tanker	20,884	37,853	T-15,000	69
OMI Willamette	Product tanker	20,884	37,853	T-15,000	69
OMI Yukon	Crude tanker	37,784	81,116	T-24,000	73
OSG BULK SHIPS					
511 Fifth Avenue, New York, NY 10017					
Overseas Alaska	Tanker	28,250	62,000	T-20,000	70
Overseas Alice	Tanker	20,900	37,800	T-15,000	68
Overseas Arctic	Tanker	28,250	62,000	T-20,000	71
Overseas Boston	Tanker	61,200	121,150	D-26,000	74
Overseas Chicago	Tanker	44,850	90,600	T-24,500	77
Overseas Harriette	Bulk	14,300	25,550	D-11,200	78
Overseas Juneau	Tanker	57,700	120,500	T-25,000	73
Overseas Marilyn	Bulk	14,300	25,550	D-11,200	78
Overseas Natalie	Tanker	35,596	68,900	T-23,000	61
Overseas New York	Tanker	44,850	90,400	T-24,500	77
Overseas Ohio	Tanker	44,850	90,550	T-24,500	77
Overseas Valdez	Tanker	20,900	37,800	T-15,000	68
Overseas Vivian	Tanker	20,900	37,800	T-15,000	69
Overseas Washington	Tanker	44,900	90,500	T-24,500	78
POINT SHIPPING CORPORATION					
1211 Avenue of the Americas, New York, NY 10036					
Point Manatee	Bulk Carrier	13,487	21,222	T-12,668	44/70
Point Vail	Tanker	34,594	87,506	D-19,500	64
PRUDENTIAL LINES, INC.					
One World Trade Center, Suite 3701, New York, NY 10048					
Lash Atlantico	LASH	26,406	29,820	T-32,000	74
Lash Italia	LASH	26,406	29,820	T-32,000	74
Lash Pacifico	LASH	26,406	29,820	T-32,000	74
Santa Adela	Cargo	11,039	13,695	T-18,750	65
Santa Juana	Cargo	11,039	13,695	T-18,750	65
PUERTO RICO MARINE MANAGEMENT, INC.					
P.O. Box 1910, Elizabeth, NJ 07207					
Arecibo	Container	17,977	18,172	T- 9,000	44/69
Bayamon	RO/RO	15,131	14,180	T-32,000	70
Borinquen	Container	17,189	17,032	T- 9,000	45/66
Caguas	RO/RO	17,513	16,943	T-30,000	74
Fortaleza	RO/RO	15,135	13,969	T-32,000	72
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
SABINE TOWING & TRANSPORTATION COMPANY					
P.O. Box 1528, Groves, TX 77619					
Colorado	Tanker	16,822	30,590	T- 7,240	44/72
Concho	Tanker	18,682	32,741	T- 7,000	45
Guadalupe	Tanker	17,985	30,369	T- 7,240	45/78
Neches	Tanker	20,066	34,930	T- 7,240	43
Pecos	Tanker	17,291	28,749	T-13,750	50
SEA-LAND SERVICE, INC.					
P.O. Box 1050, Elizabeth, NJ 07207					
Adventurer	Container	17,376	15,270	D-17,400	78
Aleutian Developer	Container	4,631	2,331	D- 4,200	76/80
Boston	Container	11,389	9,317	T- 9,900	44/68
Charleston	Container	11,389	10,002	T- 9,900	45/68
Consumer	Container	23,763	26,600	T-32,500	73
Defender	Container	25,225	23,308	D-30,150	80
Developer	Container	25,225	23,308	D-30,150	80
Economy	Container	24,774	25,513	T-32,000	71
Endurance	Container	25,225	23,308	D-30,150	80
Explorer	Container	25,225	23,308	D-30,150	80
Express	Container	25,225	23,308	D-30,150	80
Freedom	Container	25,225	23,308	D-30,150	80
Galveston	Container	11,558	9,401	T- 9,900	45/68
Independence	Container	25,225	23,308	D-30,150	80
Innovator	Container	25,225	23,308	D-30,150	80
Leader	Container	17,376	15,174	D-17,400	78
Liberator	Container	25,225	23,308	D-30,150	80
Long Beach	Container	17,184	16,977	T- 9,900	45/66
Mariner	Container	25,225	23,308	D-30,150	80
Newark	Container	11,389	9,344	T- 9,900	45/68
Oakland	Container	17,184	17,091	T- 9,900	45/65
Pacer	Container	17,376	15,212	D-17,400	78
Panama	Container	17,184	17,014	T- 9,900	45/66
Patriot	Container	25,225	23,308	D-30,150	80
Philadelphia	Container	11,389	9,357	T- 9,900	45/69
Pioneer	Container	17,376	15,289	D-17,400	78
Pittsburgh	Container	18,024	17,568	T- 9,900	45/69
Portland	Container	11,389	9,708	T- 9,900	45/68
Producer	Container	23,763	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
Venture	Container	24,774	25,513	T-32,000	71
Voyager	Container	25,225	23,308	D-30,150	80
SUN REFINING & MARKETING INC., MARINE OPERATIONS					
P.O. Box 2224, Aston, PA 19014					
America Sun	Tanker	37,300	80,700	T-24,000	69
Eastern Sun	Tanker	1,579	3,525	D- 5,800	85
New York Sun	Tanker	19,500	34,400	D-14,200	80
Northern Sun	Tanker	1,533	2,654	D- 1,900	80
Northern Sun II	Tanker	1,579	3,524	D- 2,050	84
Pennsylvania Sun	Tanker	26,300	53,463	T-18,500	59
Philadelphia Sun	Tanker	19,500	34,400	D-14,200	81
Prince Wm. Sound	Tanker	60,084	123,936	T-30,000	75
Texas Sun	Tanker	26,300	53,453	T-18,500	60
Tropic Sun	Tanker	20,177	34,700	T-13,600	57
Western Sun	Tanker	18,800	31,828	T-13,500	54
TANKER MANAGEMENT, INC.					
3820 One Shell Square, New Orleans, LA 70139					
Carole G. Ingram	ITB Tanker	24,500	37,106	D-11,128	72
Martha R. Ingram	ITB Tanker	24,500	36,958	D-11,128	72
TEXACO MARINE SERVICES INC.					
P.O. Box 1028, Port Arthur, TX 77641					
Texaco California	Tanker	23,460	39,249	T-15,000	54/73
Texaco Connecticut	Tanker	23,459	39,366	T-15,000	53/71
Texaco Florida	Tanker	23,459	41,948	T-15,000	56/72
Texaco Georgia	Tanker	16,514	26,333	T-15,000	64
Texaco Maryland	Tanker	16,514	26,550	T-15,000	63
Texaco Massachusetts	Tanker	16,515	26,547	T-15,000	63

U.S.-FLAG OCEANGOING FLEET

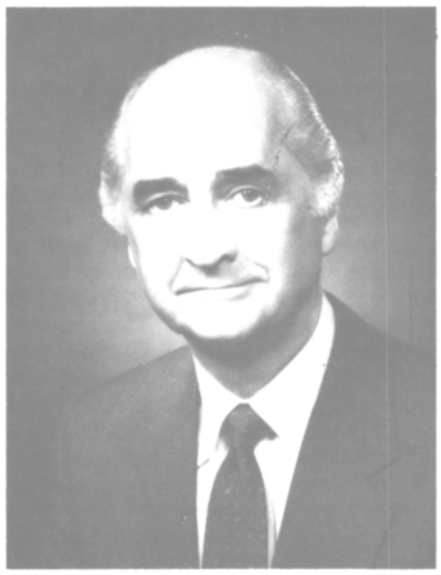
Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
Texaco Minnesota	Tanker	12,171	19,683	TE-7,000	43/64
Texaco Mississippi	Tanker	15,688	26,588	TE-7,000	44/64
Texaco Montana	Tanker	16,584	26,547	T-15,000	65
Texaco New York	Tanker	23,461	39,363	T-15,000	53/72
Texaco Rhode Island	Tanker	16,584	26,547	T-15,000	64
TOTEM OCEAN TRAILER EXPRESS, INC.					
1100 Olive Way, Seattle, WA 98101					
Great Land	RO/RO	17,527	18,115	T-30,000	75
Westward Venture	RO/RO	17,527	18,411	T-30,000	77
TRINIDAD CORPORATION					
7930 Clayton Road, St. Louis, MO 63117					
Admiralty Bay	Tanker	37,800	80,800	T-24,000	71
Glacier Bay	Tanker	38,400	81,000	T-24,000	70
Sohio Resolute	Tanker	37,800	80,600	T-24,000	71
UNION OIL COMPANY OF CALIFORNIA					
911 Wilshire Boulevard, Los Angeles, CA 90017					
Blue Ridge	Tanker	21,359	42,268	T-13,000	81
David D. Irwin	Tanker	15,400	25,700	T-12,800	42
UNITED STATES LINES, INC.					
27 Commerce Drive, Cranford, NJ 07016					
American Alabama	Container	42,720	58,907	D-28,000	84
American Altair	Cargo/container	14,001	16,183	T-19,000	65/76
American Apollo	Container	19,127	20,000	T-26,000	70
American Aquarius	Container	19,127	20,100	T-26,000	71
American Argo	Cargo/container	10,500	12,800	T-19,000	64/76
American Astronaut	Container	18,877	20,600	T-26,000	69
American Banker	Cargo/container	16,518	19,272	T-22,000	62/72
American Builder	Cargo/container	16,518	19,871	T-22,000	61/71
American California	Container	42,720	58,907	D-28,000	85
American Draco	Cargo/container	14,001	16,183	T-19,000	65/76
American Entente	Container	28,087	16,634	T-28,500	73/77
American Envoy	Container	28,087	16,982	T-28,500	72/77
American Hawaii	RO-RO/container	34,318	34,075	D-23,000	85
American Illinois	Container	42,720	58,907	D-28,000	85
American Kentucky	Container	42,720	58,907	D-28,000	85
American Lancer	Container	18,765	22,200	T-26,000	68
American Lark	Container	18,887	20,600	T-26,000	69
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 Maine	Container	42,720	58,907	D-28,000	84
American Marketer	Container	21,150	19,529	T-28,500	73
American Merchant	Container	21,500	19,529	T-28,500	73
American Michigan	Container	34,318	34,075	D-23,000	85
American Monarch	Cargo	13,053	9,493	T-21,000	69
American Nebraska	Container	42,720	58,907	D-28,000	85
American New Jersey	Container	42,720	58,907	D-28,000	84
American New York	Container	42,720	58,907	D-28,000	84
American North Carolina	RO/RO-container	34,318	34,075	D-23,000	84
American Oklahoma	Container	42,720	58,907	D-28,000	85
American Pioneer	Container	28,095	17,124	T-28,500	80
American Puritan	Container	28,095	16,918	T-28,500	80
American Reservist	Cargo	10,500	12,800	T-19,000	64
American Resolute	Container	17,902	16,205	T-17,500	80
American Rigal	Cargo	10,500	12,800	T-19,000	65
American Spitfire	Cargo	13,053	9,493	T-21,000	69
American Titan	Cargo	13,053	9,493	T-21,000	68
American Trader	Container	26,989	29,749	T-32,000	71/77
American Trojan	Cargo	13,053	9,493	T-21,000	69
American Utah	Container	42,720	58,907	T-28,000	85
American Vega	Cargo	10,500	12,800	T-19,000	64
American Veteran	LASH/container	26,456	29,729	T-32,000	73
American Virginia	Container	42,720	58,907	D-28,000	85
American Washington	Container	42,720	58,907	D-28,000	85
VICTORY CARRIERS					
645 Fifth Avenue, New York, NY 10022					
Montpelier Victory	Tanker	28,005	50,136	T-21,500	62
Mount Vernon Victory	Tanker	27,496	49,430	T-15,000	61
Mount Washington	Tanker	27,797	49,395	T-21,500	63
WATERMAN STEAMSHIP CORPORATION					
120 Wall Street, New York, NY 10005					
Major Stephen W. Pless	RO/RO-container	29,091	25,073	T-30,000	83/85
Pfc. Eugene A. Obregon	RO/RO-container	29,091	25,073	T-30,000	83/84
Robert E. Lee	LASH	32,269	40,921	T-32,000	74
Sam Houston	LASH	32,269	40,921	T-32,000	74
Sgt. Matej Kocak	RO/RO-container	29,091	25,073	T-30,000	83/84
Stonewall Jackson	LASH	32,269	40,921	T-32,000	74
WEST COAST SHIPPING COMPANY					
P.O. Box 4258, Los Angeles, CA 90051					
Coast Range	Tanker	21,357	39,990	T-13,000	81
Cornucopia	LPG/Tanker	21,688	21,717	T-13,600	58/78
Lompoc	Tanker	10,448	16,673	TE-7,000	45
Sansinena II	Tanker	35,634	71,459	T-18,200	71
Sierra Madre	Tanker	21,357	39,990	T-13,600	81
WESTERN HEMISPHERE CORPORATION					
P.O. Box 2401, Santa Monica, CA 90406-2401					
Lion of California	Tanker	10,473	16,692	T- 7,000	54
Mission Santa Clara	Tanker	20,020	35,079	T-13,000	57

Oceangoing Merchant Fleet of the United States as of January 1, 1985
(Tonnage in Thousands)

	Total			Privately Owned			Maritime Administration Owned		
	Number Ships	Gross Tons	Deadweight Tons	Number Ships	Gross Tons	Deadweight Tons	Number Ships	Gross Tons	Deadweight Tons
Active Fleet:									
Passenger/Pass. Cargo	8	108	65	3	52	24	5	56	41
General Cargo	44	506	622	40	487	594	4	19	28
Intermodal	119	2,566	2,789	119	2,566	2,789	—	—	—
Bulk Carriers (Incl. TB)	19	552	960	19	552	960	—	—	—
Tankers (Incl. TKB & LNG)	204	6,668	12,265	202	6,654	12,244	2	14	21
Total	394	10,400	16,701	383	10,311	16,611	11[1]	89	90
Inactive Fleet:									
Passenger/Pass. Cargo	27	356	209	3	37	25	24	319	184
General Cargo	222	1,957	2,553	27	305	363	195	1,652	2,190
Intermodal	36	616	650	30	517	550	6	99	100
Bulk Carriers (Incl. TB)	4	78	122	4	78	122	—	—	—
Tankers (Incl. TKB & LNG)	61	2,037	3,612	45	1,827	3,268	16	210	344
Total	350	5,044	7,146	109	2,764	4,328	241	2,280	2,818
Passenger/Pass. Cargo	35	464	274	6	89	49	29	375	225
General Cargo	266	2,463	3,175	67	792	957	199	1,671	2,218
Intermodal	155	3,182	3,439	149	3,083	3,339	6	99	100
Bulk Carriers (Incl. TB)	23	630	1,082	23	630	1,082	—	—	—
Tankers (Incl. TKB & LNG)	265	8,705	15,877	247	8,481	15,512	18	224	365
Total American Flag	744	15,444	23,847	492	13,075	20,939	252[2]	2,369	2,908

[1]Includes 5 Vessels in Custody of Other Agencies. [2]Includes National Defense Reserve Fleet that consists of 234 ships, of which 10 are scrap candidates.
Source: Maritime Administration.

U.S. MERCHANT SHIPBUILDING



M. Lee Rice

Major Merchant Vessels, 2,000 DWT and Over, Delivered by U.S. Shipyards During 1984

Name of Ship	Type	Owner	GT	DWT	HP
		AVONDALE SHIPYARDS			
Exxon Baytown*	Tanker	Exxon Shipping Company	32,136	57,720	D-16,800
Exxon Wilmington	Products	Exxon Shipping Company	27,508	48,011	D-16,800
		BATH IRON WORKS			

US SHIPBUILDING OUTLOOK

Markets & Cost Saving

By M. Lee Rice, President, Shipbuilders Council of America

Editor's note: The following report is reprinted from the 1984 Annual Report of the Shipbuilders Council of America that was released in April, 1985.

For the shipbuilding and shiprepair industries, 1984 was a year in which "holding ground" was a primary operative phrase. The present policy of the Administration is that our industry must fend for itself as best it can, and survive as best it can despite the projected deficiencies in our ability to meet military requirements.

Indeed, even steps that could have been taken without direct cost to the government and which would have been supportive of the shipbuilding industry were not implemented. Among these are withdrawal of the proposed rule that would allow the repayment of construction differential subsidy (CDS) by operators to qualify affected vessels for Jones Act trading privileges. The threat of rule promulgation continues to disrupt the Jones Act market for operators and thwarts shipbuilding potential.

A tolling of the litany of failures in policy planning and the execution of maritime policy does not need to be repeated. My message in the 1983 Shipbuilders Council Annual Report can be redated, as current, without fear that important gains have been neglected.

It is, of course, a fact that the Congress enacted the Shipping Act of 1984 following seven long years of Congressional debate. That Act, which is intended to give regulatory relief and broadened operating flexibility to the liner industry, when signed by the President was hailed as the *new beginning of a healthy merchant marine.* It is also true that two major contracts for Jones

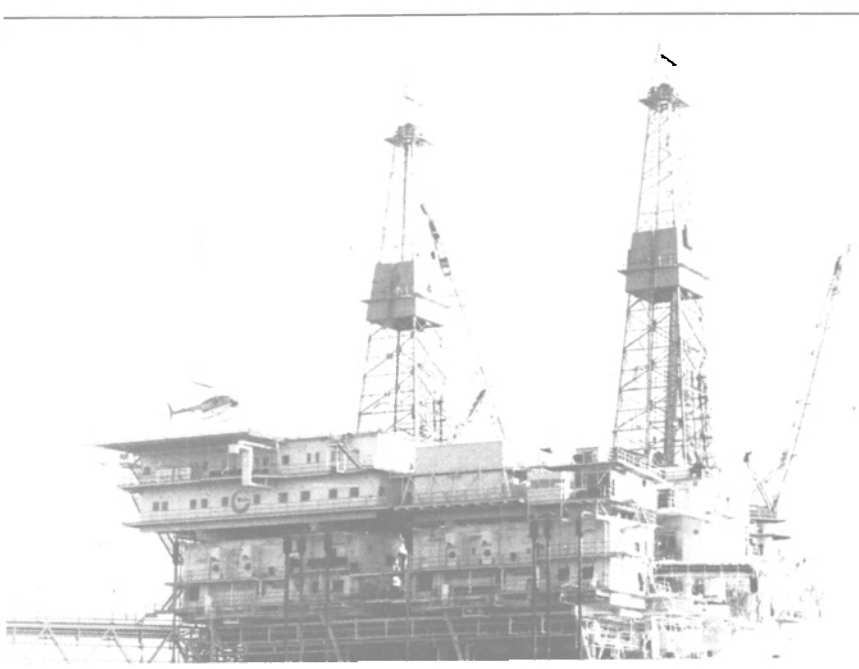
(continued on page 46)

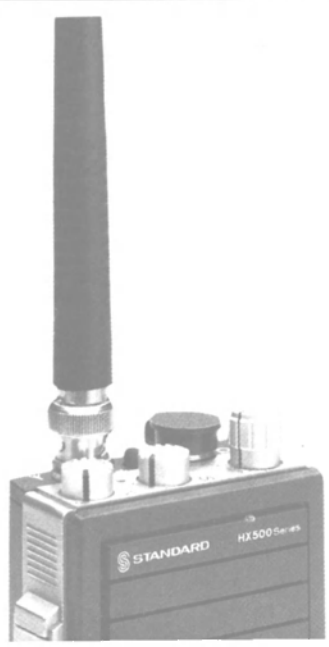
U.S. MERCHANT SHIPBUILDING

(continued)

Act vessels with a value of about $400 million were placed in U.S. shipyards during the past year. These contracts, although highly welcomed by the industry, compare poorly with the value of the commercial shipbuilding contracts under way at the end of 1980—contracts with a total value above $3.3 billion.

Furthermore, more than one-half of the 1984 contracts, by value, would not have been executed at all had the CDS repayment rule been promulgated before August 15, 1984. At that point Exxon Shipping Company elected to purchase two large crude carriers that are intended to transport Alaskan oil from Exxon's producing fields. If the rule had been promulgated by that date, two existing vessels would have been purchased and a shipbuilding contract, which will provide employment for one year for about eight percent of the previously defined shipyard production worker mobilization base, would not have become a shipbuilding order.





Our industry recognizes that it must depend upon the naval shipbuilding and shiprepair programs for almost its entire business base. Actions taken by the Congress, the Executive Branch, and its departments affecting procurement law and regulations are of great importance to the future welfare of the industry. Unfortunately, there are a number of actions that have been taken and many more that are under consideration that can have major negative impacts on the manner in which business is transacted, the required form, the terms and conditions of shipbuilding contracts, and the profitability of the industry.

An important misconception of a significant part of the Congress and

U.S.-FLAG OCEANGOING FLEET

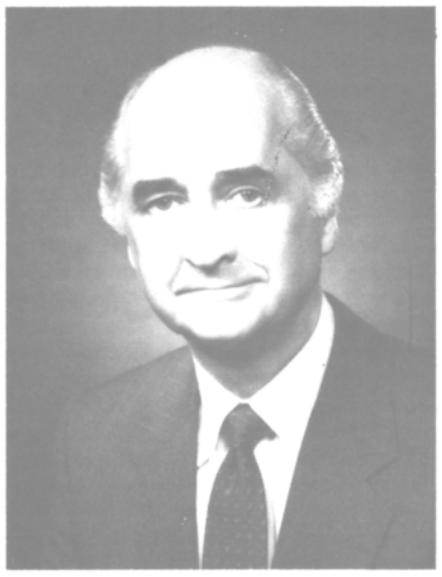
Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
Texaco Minnesota	Tanker	12,171	19,683	TE-7,000	43/64
Texaco Mississippi	Tanker	15,688	26,588	TE-7,000	44/64
Texaco Montana	Tanker	16,584	26,547	T-15,000	65
Texaco New York	Tanker	23,461	39,363	T-15,000	53/72
Texaco Rhode Island	Tanker	16,584	26,547	T-15,000	64
TOTEM OCEAN TRAILER EXPRESS, INC.					
1100 Olive Way, Seattle, WA 98101					
Great Land	RO/RO	17,527	18,115	T-30,000	75
Westward Venture	RO/RO	17,527	18,411	T-30,000	77
TRINIDAD CORPORATION					
7930 Clayton Road, St. Louis, MO 63117					
Admiralty Bay	Tanker	37,800	80,800	T-24,000	71
Glacier Bay	Tanker	38,400	81,000	T-24,000	70
Sohio Resolute	Tanker	37,800	80,600	T-24,000	71
UNION OIL COMPANY OF CALIFORNIA					
911 Wilshire Boulevard, Los Angeles, CA 90017					
Blue Ridge	Tanker	21,359	42,268	T-13,000	81
David D. Irwin	Tanker	15,400	25,700	T-12,800	42
UNITED STATES LINES, INC.					
27 Commerce Drive, Cranford, NJ 07016					
American Alabama	Container	42,720	58,907	D-28,000	84
American Altair	Cargo/container	14,001	16,183	T-19,000	65/76
American Apollo	Container	19,127	20,000	T-26,000	70
American Aquarius	Container	19,127	20,100	T-26,000	71
American Argo	Cargo/container	10,500	12,800	T-19,000	64/76
American Astronaut	Container	18,877	20,600	T-26,000	69
American Banker	Cargo/container	16,518	19,272	T-22,000	62/72
American Builder	Cargo/container	16,518	19,871	T-22,000	61/71
American California	Container	42,720	58,907	D-28,000	85
American Draco	Cargo/container	14,001	16,183	T-19,000	65/76
American Entente	Container	28,087	16,634	T-28,500	73/77
American Envoy	Container	28,087	16,982	T-28,500	72/77
American Hawaii	RO-RO/container	34,318	34,075	D-23,000	85
American Illinois	Container	42,720	58,907	D-28,000	85
American Kentucky	Container	42,720	58,907	D-28,000	85
American Lancer	Container	18,765	22,200	T-26,000	68
American Lark	Container	18,887	20,600	T-26,000	69
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 Maine	Container	42,720	58,907	D-28,000	84
American Marketer	Container	21,150	19,529	T-28,500	73
American Merchant	Container	21,500	19,529	T-28,500	73
American Michigan	Container	34,318	34,075	D-23,000	85
American Monarch	Cargo	13,053	9,493	T-21,000	69
American Nebraska	Container	42,720	58,907	D-28,000	85
American New Jersey	Container	42,720	58,907	D-28,000	84
American New York	Container	42,720	58,907	D-28,000	84
American North Carolina	RO/RO-container	34,318	34,075	D-23,000	84
American Oklahoma	Container	42,720	58,907	D-28,000	85
American Pioneer	Container	28,095	17,124	T-28,500	80
American Puritan	Container	28,095	16,918	T-28,500	80
American Reservist	Cargo	10,500	12,800	T-19,000	64
American Resolute	Container	17,902	16,205	T-17,500	80
American Rigal	Cargo	10,500	12,800	T-19,000	65
American Spitfire	Cargo	13,053	9,493	T-21,000	69
American Titan	Cargo	13,053	9,493	T-21,000	68
American Trader	Container	26,989	29,749	T-32,000	71/77
American Trojan	Cargo	13,053	9,493	T-21,000	69
American Utah	Container	42,720	58,907	T-28,000	85
American Vega	Cargo	10,500	12,800	T-19,000	64
American Veteran	LASH/container	26,456	29,729	T-32,000	73
American Virginia	Container	42,720	58,907	D-28,000	85
American Washington	Container	42,720	58,907	D-28,000	85
VICTORY CARRIERS					
645 Fifth Avenue, New York, NY 10022					
Montpelier Victory	Tanker	28,005	50,136	T-21,500	62
Mount Vernon Victory	Tanker	27,496	49,430	T-15,000	61
Mount Washington	Tanker	27,797	49,395	T-21,500	63
WATERMAN STEAMSHIP CORPORATION					
120 Wall Street, New York, NY 10005					
Major Stephen W. Pless	RO/RO-container	29,091	25,073	T-30,000	83/85
Pfc. Eugene A. Obregon	RO/RO-container	29,091	25,073	T-30,000	83/84
Robert E. Lee	LASH	32,269	40,921	T-32,000	74
Sam Houston	LASH	32,269	40,921	T-32,000	74
Sgt. Matej Kocak	RO/RO-container	29,091	25,073	T-30,000	83/84
Stonewall Jackson	LASH	32,269	40,921	T-32,000	74
WEST COAST SHIPPING COMPANY					
P.O. Box 4258, Los Angeles, CA 90051					
Coast Range	Tanker	21,357	39,990	T-13,000	81
Cornucopia	LPG/Tanker	21,688	21,717	T-13,600	58/78
Lompoc	Tanker	10,448	16,673	TE-7,000	45
Sansinena II	Tanker	35,634	71,459	T-18,200	71
Sierra Madre	Tanker	21,357	39,990	T-13,600	81
WESTERN HEMISPHERE CORPORATION					
P.O. Box 2401, Santa Monica, CA 90406-2401					
Lion of California	Tanker	10,473	16,692	T- 7,000	54
Mission Santa Clara	Tanker	20,020	35,079	T-13,000	57

Oceangoing Merchant Fleet of the United States as of January 1, 1985
(Tonnage in Thousands)

	Total			Privately Owned			Maritime Administration Owned		
	Number Ships	Gross Tons	Deadweight Tons	Number Ships	Gross Tons	Deadweight Tons	Number Ships	Gross Tons	Deadweight Tons
Active Fleet:									
Passenger/Pass. Cargo	8	108	65	3	52	24	5	56	41
General Cargo	44	506	622	40	487	594	4	19	28
Intermodal	119	2,566	2,789	119	2,566	2,789	—	—	—
Bulk Carriers (Incl. TB)	19	552	960	19	552	960	—	—	—
Tankers (Incl. TKB & LNG)	204	6,668	12,265	202	6,654	12,244	2	14	21
Total	394	10,400	16,701	383	10,311	16,611	11[1]	89	90
Inactive Fleet:									
Passenger/Pass. Cargo	27	356	209	3	37	25	24	319	184
General Cargo	222	1,957	2,553	27	305	363	195	1,652	2,190
Intermodal	36	616	650	30	517	550	6	99	100
Bulk Carriers (Incl. TB)	4	78	122	4	78	122	—	—	—
Tankers (Incl. TKB & LNG)	61	2,037	3,612	45	1,827	3,268	16	210	344
Total	350	5,044	7,146	109	2,764	4,328	241	2,280	2,818
Passenger/Pass. Cargo	35	464	274	6	89	49	29	375	225
General Cargo	266	2,463	3,175	67	792	957	199	1,671	2,218
Intermodal	155	3,182	3,439	149	3,083	3,339	6	99	100
Bulk Carriers (Incl. TB)	23	630	1,082	23	630	1,082	—	—	—
Tankers (Incl. TKB & LNG)	265	8,705	15,877	247	8,481	15,512	18	224	365
Total American Flag	744	15,444	23,847	492	13,075	20,939	252[2]	2,369	2,908

[1]Includes 5 Vessels in Custody of Other Agencies. [2]Includes National Defense Reserve Fleet that consists of 234 ships, of which 10 are scrap candidates.
Source: Maritime Administration.

U.S. MERCHANT SHIPBUILDING



M. Lee Rice

Major Merchant Vessels, 2,000 DWT and Over, Delivered by U.S. Shipyards During 1984

Name of Ship	Type	Owner	GT	DWT	HP
		AVONDALE SHIPYARDS			
Exxon Baytown*	Tanker	Exxon Shipping Company	32,136	57,720	D-16,800
Exxon Wilmington	Products	Exxon Shipping Company	27,508	48,011	D-16,800
		BATH IRON WORKS			
Falcon Champion	Tanker	Falcon II Sea Transport	28,200	33,500	D-12,200
		BAY SHIPBUILDING			
Thoroughbred Topper*	Tug/barge	Norfolk Southern	20,500	33,500	D- 7,200
		TACOMA BOATBUILDING			
Apollo One*	Incinerator	At-Sea Incineration	2,073	7,317	D- 2,250

*Selected by MR/En as an "Outstanding Oceangoing Ship" of 1984 (12/1/84 issue).

Major Merchant Type Vessels, 2,000 DWT and Over, Under Construction or on Order in Shipyards of the United States as of May 1, 1985

SHIPYARD Owner	Ship Type	No. of Ships	Hull Nos.	Total DWT	Total HP	Est. Del'y
BAY SHIPBUILDING						
Sea-Land Service	Cont.	3	735-7	48,000	D-NA	86-7
GENERAL DYNAMICS-QUINCY						
General Dynamics	MPS	4*	87-90	90,800	D-105-600	85-6
TACOMA BOATBUILDING						
At-Sea Incineration	Incin.	1	434	7,317	D-2,250	85
TWIN CITY SHIPYARD						
Gulf Coast Trailing	Dredge	1	885	4,800	D-6,800	85
TAMPA SHIPYARDS						
Ocean Products Carriers	Tanker	5*	1121-5	150,000	D-76,500	85-6
	TOTALS	**14**		**300,917**	**191,150**	

*For charter to the Military Sealift Command

US SHIPBUILDING OUTLOOK

Markets & Cost Saving

By M. Lee Rice, President, Shipbuilders Council of America

Editor's note: The following report is reprinted from the 1984 Annual Report of the Shipbuilders Council of America that was released in April, 1985.

For the shipbuilding and ship-repair industries, 1984 was a year in which "holding ground" was a primary operative phrase. The present policy of the Administration is that our industry must fend for itself as best it can, and survive as best it can despite the projected deficiencies in our ability to meet military requirements.

Indeed, even steps that could have been taken without direct cost to the government and which would have been supportive of the shipbuilding industry were not implemented. Among these are withdrawal of the proposed rule that would allow the repayment of construction differential subsidy (CDS) by operators to qualify affected vessels for Jones Act trading privileges. The threat of rule promulgation continues to disrupt the Jones Act market for operators and thwarts shipbuilding potential.

A tolling of the litany of failures in policy planning and the execution of maritime policy does not need to be repeated. My message in the 1983 Shipbuilders Council Annual Report can be redated, as current, without fear that important gains have been neglected.

It is, of course, a fact that the Congress enacted the Shipping Act of 1984 following seven long years of Congressional debate. That Act, which is intended to give regulatory relief and broadened operating flexibility to the liner industry, when signed by the President was hailed as the *new beginning of a healthy merchant marine.* It is also true that two major contracts for Jones

(continued on page 46)

Secretary Dole Promulgates CDS Repayment Rule

Subsequent to Mr. **Rice's** writing of this article, just as we went to press with this issue, Secretary of Transportation **Elizabeth Dole** promulgated a rule permitting the owners of U.S.-flag tankers built with the assistance of construction differential subsidy (CDS) for the foreign trades to repay to the government the subsidy on the vessels, thus allowing these tankers to operate in the domestic trades.

The Department of Transportation, in a press release, stated that the CDS repayment rule will "introduce newer, more efficient tankers" into the Alaskan North Slope crude oil trade, increase competition, and "minimize government obstacles to marketplace decisions." DoT analysis predicts that seven VLCCs will take advantage of the one-year window, and the CDS repayment on these ships could provide the treasury with $277 million including interest.

The refunding rule is scheduled to take effect June 6 this year. Accompanying documents are devoid of any in-depth analysis of the rule's effect on national security or the shipbuilding industry. This action by Secretary **Dole** was not unexpected; protracted litigation should follow.

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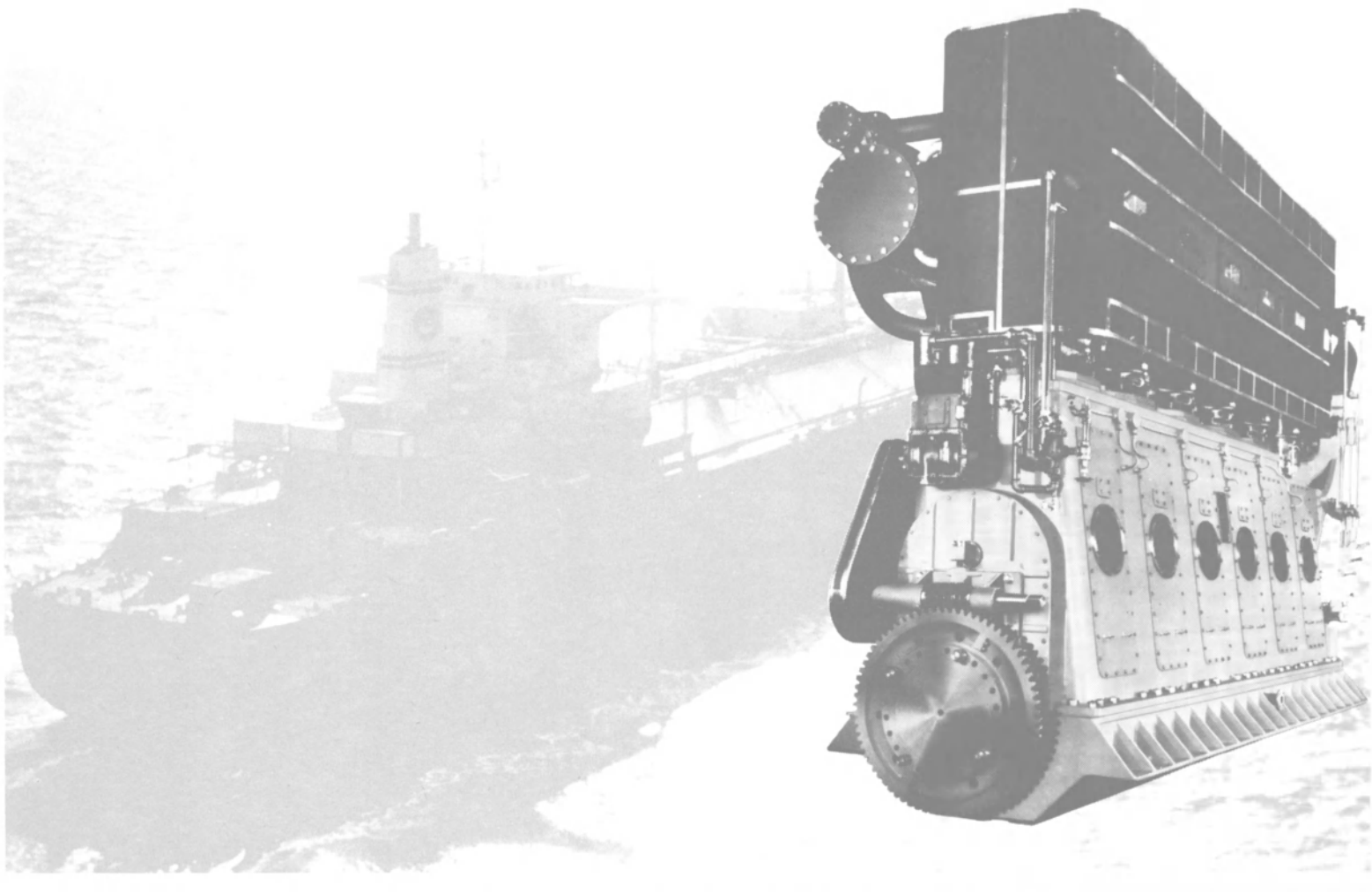

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U.S. MERCHANT SHIPBUILDING

(continued)

Act vessels with a value of about $400 million were placed in U.S. shipyards during the past year. These contracts, although highly welcomed by the industry, compare poorly with the value of the commercial shipbuilding contracts under way at the end of 1980—contracts with a total value above $3.3 billion.

Furthermore, more than one-half of the 1984 contracts, by value, would not have been executed at all had the CDS repayment rule been promulgated before August 15, 1984. At that point Exxon Shipping Company elected to purchase two large crude carriers that are intended to transport Alaskan oil from Exxon's producing fields. If the rule had been promulgated by that date, two existing vessels would have been purchased and a shipbuilding contract, which will provide employment for one year for about eight percent of the previously defined shipyard production worker mobilization base, would not have become a shipbuilding order.

Our industry recognizes that it must depend upon the naval shipbuilding and shiprepair programs for almost its entire business base. Actions taken by the Congress, the Executive Branch, and its departments affecting procurement law and regulations are of great importance to the future welfare of the industry. Unfortunately, there are a number of actions that have been taken and many more that are under consideration that can have major negative impacts on the manner in which business is transacted, the required form, the terms and conditions of shipbuilding contracts, and the profitability of the industry.

An important misconception of a significant part of the Congress and congressional staff members, as well as executives who administer defense procurement, is that government contracting should be done under ever more restrictive rules, contract terms, and procurement procedures. We can understand the desire of the Congress and administrators to achieve reduction in the costs of defense procurement and to increase the efficiency of the process. A point exists, however, when efforts to control contractors' costs by additional audit and reporting requirements, changes in the definition of allowable costs, and required contract terms and conditions becomes counterproductive.

There have been significant changes to federal procurement law in the past two years. At this time, it is impossible to determine their ultimate impact on overall costs. However, without waiting to measure the effect of recent "reforms," additional changes are being suggested in the form of legislation or are being implemented through administrative edict.

The government contracting process is a complex system. We fear that we have entered an operating environment when two dollars will be spent in administrative costs or final contract costs in the hope that one will be saved. This, at best, is false economy. The government gains tremendously when contractors can earn competitive profits from government work and are stimulated to invest earnings to acquire improved plant and productivity gains. Profits and cash flow resulting from government contracts are an essential requirement if the entire government contracting process is to function efficiently and

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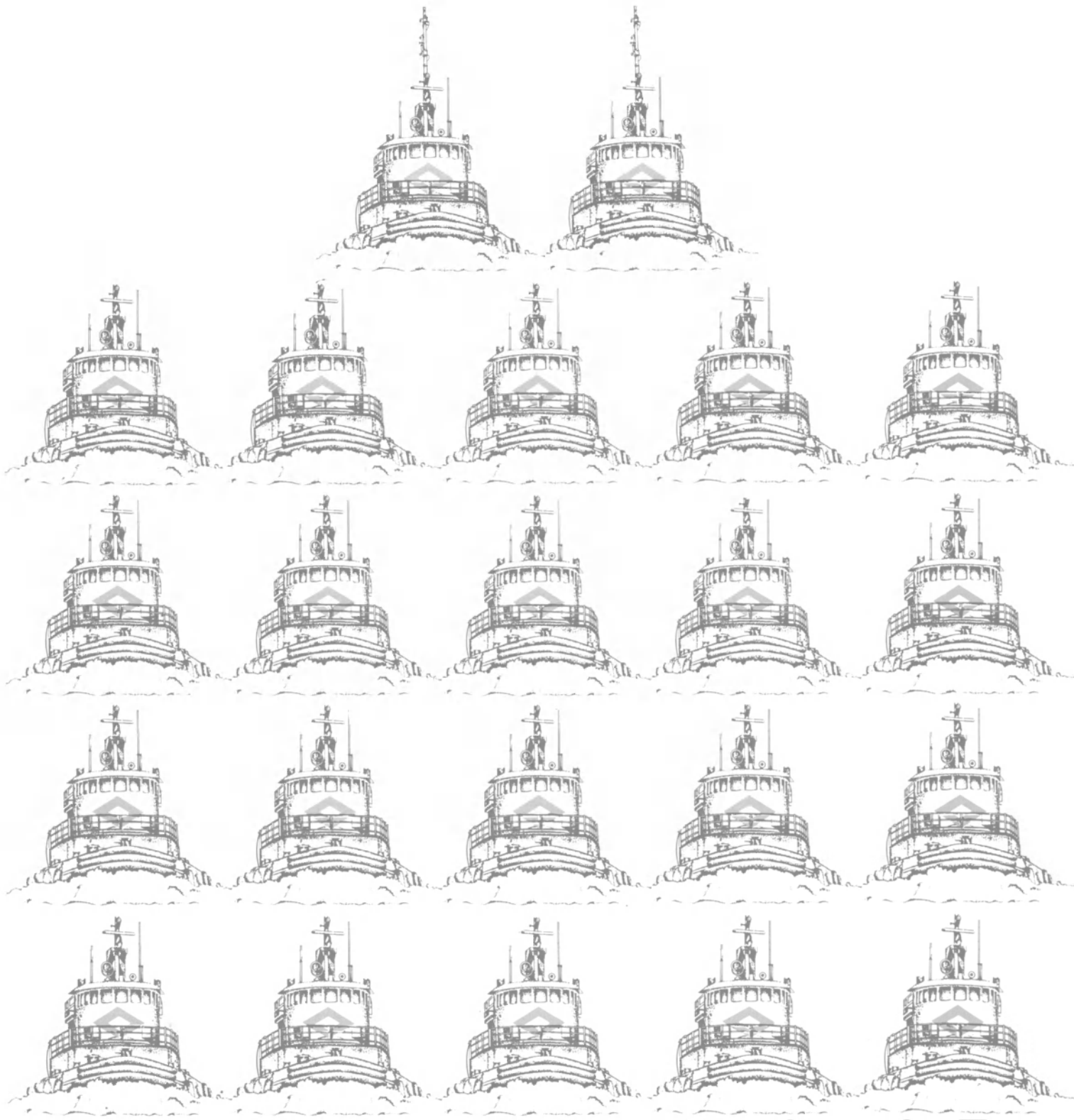

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(continued)

private investment in new and renewed capability is to occur.

Profits earned should be regarded by the government as an important tool through which efficiencies and lower future costs can be achieved. Profits must not become a "dirty word." The government should recognize, and act, in accord with its dual role of operating partner who gains in its tax collector role from profits earned and in its customer role from efficiency and cost gains that result from private investment.

Within the naval shipbuilding budget (SCN) there are three primary elements of cost. These are: (1) costs incurred by the Navy in management of the procurement system; (2) costs incurred by the Navy in the procurement of government-furnished equipments and materials that, in turn, are delivered to the shipyards; and (3) contracts with the shipyards for the construction of vessels. Of the total SCN expenditure, only about 40 percent is the value of shipyard contracts. Of this amount, roughly one-half purchases the services and skills of the shipbuilder. The other half of the contract cost is expended by the shipbuilder to purchase materials, equipments, and services supplied by others and required to build the ship.

Productivity and efficiency gains achieved by shipyards reduce costs controlled directly by the yards. These are the cost of shipyard labor and overhead. To a much lesser degree shipyards, through good procurement practices, can cause reductions in the cost of purchased materials, equipments, and services. To repeat: shipyards directly control, on the average, about one-half of the contract cost but only about 20 percent of the total SCN expenditure. Thus, major gains in shipyard productivity translate into relatively small reductions in the *total* shipbuilding account. The Navy, on the other hand, can through its direct actions influence and affect the cost of the non-shipyard-controlled components of the budget, roughly 80 percent of the total expenditure, an amount that includes shipyard-purchased materials that are purchased to meet military specifications.

We have recommended, for a number of years, that the Navy aggressively pursue reductions in the cost of that part of the SCN budget that is under its control and beyond the control of the shipyards. To "get at" these potential cost reductions, we recommend that the Navy undertake a meaningful self-appraisal of its procurement practices and the cost of administration of shipbuilding programs.

We have often asserted that there are major cost savings to be gained from survey, review, and revision of (1) the General Specifications that define ship design criteria and characteristics, and (2) the Military Specifications that fix definitional standards for all purchased equipments and materials. Achievement of adequate system performance at lowest cost has never been a primary objective in development of this fundamental documentation. We believe that cost must be considered as a primary objective in the development and/or modification of these controlling specifications.

Materials and equipments procured each year under the Military Specifications alone cost the Navy, its weapons systems suppliers, and the shipbuilders billions of dollars. It is recognized that a balance between performance requirements and cost reductions must be realized. To not pursue cost gains through specification change is an abrogation of responsibility.

The potential for cost saving is large. What is required is that the Navy fund and carry out study and revision of these specifications, with engineering, test, and evaluation as necessary. This approach has been proposed on an almost annual basis for a number of years. Unfortunately, because the payoff is in the out years, the program is annually among the first to be "axed" to gain shorter-term objectives in the funding of ship construction projects.

We continually are asked to reduce shipbuilding and shiprepair costs. The record shows that the shipbuilding industry has made major cost reduction advances. We now believe that we are justified in asking that the Navy make similar reductions in their controlled costs, and that the Congress gain full understanding of who and what actually controls each of the primary elements of shipbuilding costs.

The potential for achieving ever lower shipbuilding costs is approaching a limit. Shipbuilding productivity and engineering advances, coupled with the intense competition that characterizes our industry, has resulted in lower selling prices. The fact that shipbuilding and shiprepair has become an oligopsony, affects selling price and will cause major change in the industry.

In our view, it is time to turn attention to other cost drivers in the procurement process, and to begin consideration of diverse national security requirements in the development of a shipbuilding policy.

U.S. MARITIME ASSETS AND NATIONAL SECURITY

A MESSAGE FROM THE CHAIRMAN OF THE SHIPBUILDERS COUNCIL OF AMERICA

David H. Klinges, Vice President
Marine Construction, Bethlehem Steel Corporation

In my message in the 1983 Annual Report of the Shipbuilders Council, I discussed as a major problem the growing divergence between available maritime assets and those required to meet national security demands. The discussion included consideration of both the number and types of commercial vessels and shipbuilding capacity and capability. No solution of the problem was identified or implemented during 1984.

The government's most significant action during the year in relation to the issue was the conclusion that a military deployment under Defense Guidance now requires that the size of the Ready Reserve Force must be sharply increased. A year earlier it had been planned to increase the fleet to 77 vessels by 1988. The revised plan envisions that well over 100 vessels will be required to be on 5 to 10 day readiness basis to meet surge deployment demands for dry cargo. The fact that the plan was required to be changed so soon after the original plan was developed indicates that the count and capacity of useful vessels in the privately owned U.S.-flag merchant fleet is changing very rapidly. And, this change is not in a positive direction. This is in agreement with our predictions and analyses.

A further major increase in the number of product tankers that must be added to the 16 tanker vessels planned to be in the reserve force is predictable when the shortfall in tanker tonnage required to meet wartime demands is factored into strategic planning. In the development of strategic plans, it is readily apparent that the focus of concern has been directed only toward the availability of shipping capacity. The loss of shipyard capacity has not yet been dealt with, in our judgment.

In spite of assertions and promises given to the Congress in the summer of 1984, that shipbuilding programs would be proposed by early November, the Administration remained silent about the matter throughout the presidential political campaign.

Recently, a maritime spokesman stated that the previous general policy would continue without a shipbuilding program. The policy is paraphrased as follows:

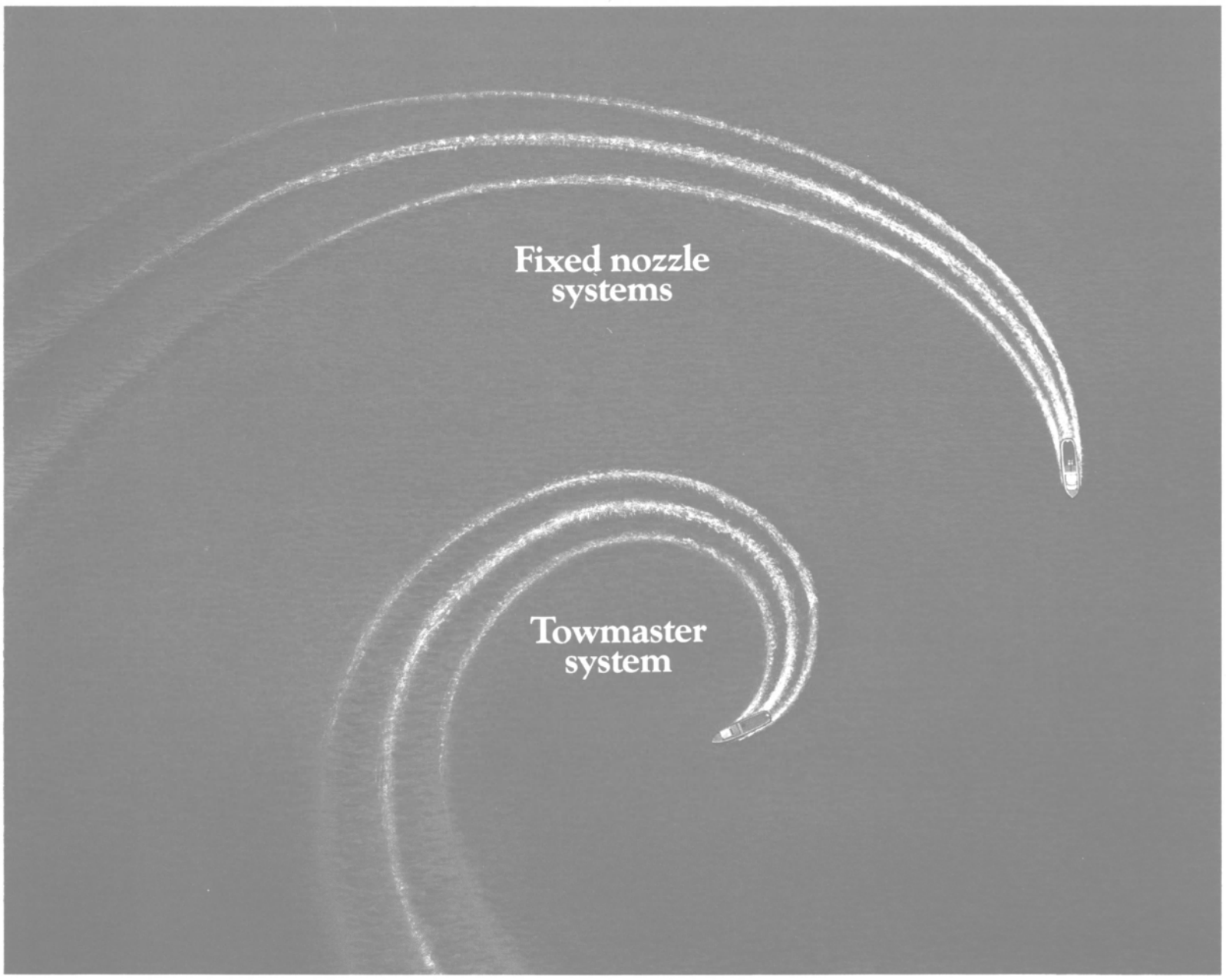
- Naval shipbuilding and shiprepair programs provide ample support to the private industry;
- The Jones Act, held sacrosanct, will provide some work for the industry;
- Present cargo reservations programs will be continued but not extended;
- No programs that involve spending beyond the defense programs will be considered; and
- Other than Jones Act vessels, U.S.-flag ships must be acquired abroad.

Thus, the shipbuilding industry must be content with being essentially a captive supplier to the Navy, dependent on only the naval and the predicted small Jones Act markets. The assertions of our industry that a balanced maritime program, providing support for shipbuilding consistent with the demands of the national security, has again been rejected without adequate consideration of the consequences.

A tenet of present maritime policy is that offshore procurement of all foreign-trading vessels is essential to the national welfare. It follows, therefore, that shipbuilders are expected to desist in arguments for a balanced maritime program, drop opposition to foreign building for ship operators, and accept the fate that results as a consequence.

The owners of the nation's shipbuilding and repair companies expect more from the managers to whom they have entrusted their investments than this policy would provide. Surely, the nation's citizens expect more than silent acceptance of national policy that we sincerely hold as incorrect. Our international allies should, and do, expect more, as their own security depends upon our nation's ability to perform in accord with our claims of military capability.

The shipyards of the nation have made great strides in the past few years to increase capability and efficiency. The government has been the principal beneficiary of these improvements. Major cost reduction in the procurement of naval ships has occurred. However, we cannot perform miracles. We cannot become internationally competitive in the commercial shipbuilding arena for a number of reasons, of which not the least is the magnitude of government support our competitors receive. The U.S. government by its choice has become our principal customer. Its decisions as to the extent it will support our industry will determine the reality of our defense capabilities.



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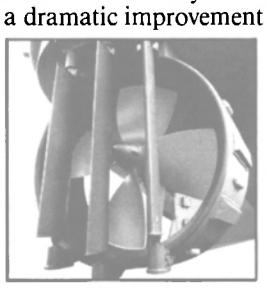

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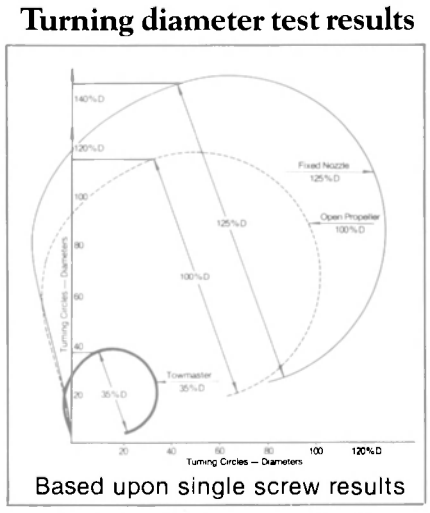

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U.S. MERCHANT SHIPBUILDING

THE CIRCLE OF RELIANCE
"In Time of War, Land, Sea, and Air Forces and All Logistic Support Functions Must Work as a Team"

A conclusion stated in the 1983 Annual Report as to the prospects that commercial merchant marines will not, in the future, meet national security requirements and a statement of the maritime problem that must be solved both remain valid. They are:

"**CONCLUSION**—Due to dramatic shifts both in commercial markets and government policies, here and abroad, commercial markets that have previously been relied upon to provide sealift, shipbuilding, and shiprepair assets required to fulfill national security objectives can no longer be relied upon to provide these assets."

"**PROBLEM STATEMENT**—Faced with the above conclusion, how should the nation provide (1) sealift assets in sufficient quantity and possessing operational characteristics as determined by national security demand, and (2) shipbuilding and shiprepair capability and capacity defined as essential to meet national security needs—both at lowest cost in toto?"

A solution to the problem is demonstrably required.

In time of war, land, sea, and air forces and all logistic support functions must work as a team. Military commanders must be able to assess with accuracy their commands' abilities and insure that these capabilities work in concert with companion forces and support functions to achieve defined objectives.

It is assumed that both the ability to work jointly and required support capabilities exist. Unfortunately, these fundamental requirements are not tested by analyzing the ability of all interlocked components to support each other. Civilian leaders are not expert in such determinations, while military leaders are neither empowered nor expected to judge the capabilities of companion force and support functions. Indeed, beyond military capability, we assume that very substantial support elements are and will remain available from non-military sources, both government and commercial in our nation and those of our Allies.

The U.S. does not have a system that provides overall coordination of military needs with industrial capacity. Our principal adversary does. Instead, the U.S. has a "Circle of Reliance" where each service assumes that "If I'm okay, you're okay" and that all required non-military support functions, including those of our Allies, are also okay.

Consider the maritime element of the Circle. The Army, Air Force, and Marines rely on the Navy to provide military sealift. The Navy relies on its controlled assets and on the Department of Transportation (DoT) to fulfill responsibilities under the Merchant Marine Acts to provide ships, men, and shipyards needed to meet sealift needs. The DoT relies on the White House direction—both to insure the availability of our Allies' large shipping and shipbuilding resources and to set policy under which DoT can perform its statutory duty to maintain required U.S.-controlled shipping and shipbuilding assets—and the Administration relies on the Navy, Army, Air Force, and Marines to maintain forces necessary to defend the nation. The circle goes around and around. Is the untested reliance justified?

The Administration has adopted a maritime policy that severely limits its support of commercial shipping and shipbuilding. It is assumed without analysis and test that Navy and commercial support will, under existing ground rules, provide sufficient assets to meet wartime demands. The Navy has become highly concerned that these policies will not provide the required U.S. sealift needs. However the Navy, in seeking to build its combatant fleet, logically rejects the diversion of its limited fund resources to provide national assets that heretofore have been provided without significant cost to the Navy. The Army, Air Force, and Marines assume that deployment and logistic support needs will be met, but have no means to insure that this is so.

It is assumed that the entire dry cargo sealift to support a NATO crisis will be provided from the fleets of NATO Allies. These Allies rely almost exclusively upon commercial forces to provide the ships and shipyards needed to support their sealift commitments. The shipping and shipbuilding assets of the principal NATO Allies are in rapid decline. Specifically, the adoption of the UNCTAD Code of Conduct for Liner Conferences by most of the world's trading nations, and its rejection by the U.S., have consequences upon our NATO Allies that have never been factored into forward defense planning and the development of international defense strategies.

If the Circle of Reliance is analyzed, logic compels the conclusion that the ability of our military to effectively use force capabilities being provided may fail for want of sealift and shipyard resources *only assumed* to be available.

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In the event of a national emergency, even at top speed this frigate would take at least eight days to travel from the U.S. Gulf to San Francisco, via the Panama Canal. Consider the alternative if the Canal were impassable or not open to U.S. ships.

The logical solution to this possible dilemma is to provide for the construction of our future surface combatants, such as the new Arleigh Burke class (DDG 51) destroyer, in equal amounts on either side of the Panama Canal. Geographical dispersion of U.S. shipyards, capable of building surface combatants, is essential to the nation's military preparedness and national defense.

A West Coast shipbuilding mobilization base utilizing our private shipyards, is in the best interest of our nation and the defense of the Pacific Basin, an area occupying in excess of 50% of the globe.

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U.S. BARGE AND TOWING OPERATIONS

THE GOVERNMENT AS PARENT TO INDUSTRY: PARTICIPATION OR BENIGN NEGLECT?

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

Joseph A. Farrell III

There is an element in our political tradition which holds that government is, and appropriately ought to be, the parent of industry. All protestation to the contrary government, like a parent, has the capacity to nuture, encourage, build up, level, discourage or ruin industry—its child. One may like to believe that such a relationship is not proper, that it is antithetical to free enterprise, or that it is simply not the case that such a familial pact exists between business and government, but any objective examination of the facts, of our history, emphatically proves otherwise.

That said, what is the proper relationship of parent to child, of government to industry? Certainly not to abuse, likewise not to pamper. Certainly not to ignore, likewise not to regulate intrusively.

Speaking specifically to the transportation industry in its various modes, what is the proper role of government in assuring not only the smooth functioning of the total system, but likewise the equitable treatment of its component parts and the safeguarding of the public good? The answer simply: the absolute *minimum* role possible to achieve those very laudable aims. It was Thomas Jefferson who remarked that "the government which governs best governs least." But, what does this mean in the practical, hard knocks world of modern business? I will address this question specifically as it regards the American waterway system.

Unfettered competition is the centerpiece of the waterways industry, providing a choice for shippers of the bulk products which fuel our economy. Lower prices resulting from this competitive choice ultimately benefit the individual American consumer. We carry 13 percent of the nation's freight for 2 percent of the national transportation cost. We are the most efficient, safest and least expensive mode of transport.

Our industry has also been a vital adjunct to our armed forces in times of war.

These benefits to the nation not withstanding, we are a deeply troubled industry. The barge and towing industry has not come back with the general economy. We are in a depression, not a recession, and we are not recovering.

Witness a study conducted by the renowned accounting firm of Arthur Anderson & Co. That firm gathered financial data from 15 of the largest inland barge companies. In 1980, these companies earned an aggregate profit of $130 million on $1.1 billion in revenue. In 1982, these same companies *lost* $30 million. In 1983, they lost over $40 million. Mind you, these are among the largest companies. You can imagine how the little fellows have fared. Bankruptcies abound. The downward spiral is unmistakably clear.

What happened?

Our industry is dependent upon bulk products, largely petroleum, coal and grain. All three commodities are depressed.

President **Carter's** disastrous grain embargo savaged our industry. We carried 46 percent of all U.S. grain for export. In 1980, before the embargo was imposed, the U.S. shipped 20 million metric tons of grain to the USSR. That went to zero until 1982 when the Reagan Administration signed a new agreement with the Soviets to ship 8-12 million metric tons. It will be very difficult to recapture the market share we once had. The Soviet's, to protect their own interests, have diversified their purchases to include Australia, Canada and Argentina.

Energy demand is slack. Conservation worked ... a good thing. And, the economies of the western nations and Japan have lagged behind our own, in growth.

Furthermore, there is a vast surfeit of equipment in the industry. New tax laws brought hordes of investors into barge owning partnerships in order to shelter their income. We are now over 15 percent overbuilt.

What then is the proper role of the federal government in the affairs of the waterways industry? That depends on who you talk to.

Ideally, our transportation network should exist today as a balanced system. No single mode should reign supreme. All forms—rail, water, motor, pipeline, air—have integral roles to play. Each is a vital link in the chain.

Historically, the uniting force provided by transportation has been stimulated, encouraged and supported by the federal government. As far back as 1787, the Northwest Ordinance stated, "the waterways shall forever remain free," thus recognizing the public benefits flowing from this national treasure. So, too, our government nursed the infant railroad industry through federal land grants beginning in 1850.

The operation of the modes born in the 20th century; trucking and the airlines, also stimulated the material instincts of the federal government. Under one of the programs begun by President **Franklin Roosevelt** in 1934, called the Civilian Works Administration, 500,000 miles of railways were built or improved as part of his program to cure the devastating unemployment of the Depression. President **Eisenhower** followed that with the mammoth interstate highway network, begun in the 50's.

Later, the government subsidized the regional airport program, building 500 new airports as well as the upgrading of an equal number.

It is the possible weakening and eventual collapse of the waterways link, the oldest and most venerable of the links in the transport chain, that concerns me. It is the singular ability of the water mode to provide a shipping option for such crucial commodities as petroleum (and its byproducts), coal, chemicals and fertilizers, grain, sand, ore, gravel and lumber, that makes barge carriage so attractive. If this most efficient form of transport—the barge industry—were removed from the overall traffic system, there would be a marked and immediate increase in the cost of some of the necessities of life—electricity, cereal, gasoline, automobiles and housing.

Unfortunately, the future ability of the barge and towing industry to continue to offer bargain transportation for these vital commodities is presently being threatened by misguided legislative and executive branch initiatives. Mindless attempts to impose higher levels of user taxes on the navigation industry, the loosening of the protections now afforded shippers and our industry by the Panama Canal Act are the two looming threats to the foundations of this industry.

For three quarters of a century, the Panama Canal Act was unchallenged. Then, in June of 1983, the CSX rail corporation announced its intention to purchase Texas Gas Resources with its huge barge subsidiary: American Commercial Barge Lines. The case was argued for six months before the Interstate Commerce Commission. On July 24, the Commission voted 4-0 to permit the merger, thereby standing the law on its head. The final disposition of this landmark matter is before the courts and its efficacy will-ultimately be decided by the judicial branch.

Other marauders on the loose threatening the barge industry, and therefore, the American consumers' pocketbook, are some government officials who, blind to all reason,

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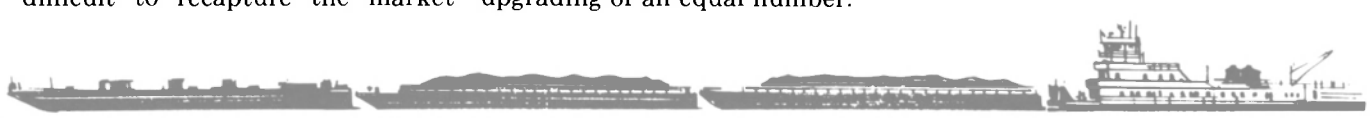


(continued from page 52)

pursue the imposition of even higher user taxes on this industry. We are awash in studies which show high user taxes will surely harm U.S. exports by decreasing their competitiveness even further, hurt the already bleeding American farmer who must bear the brunt of increased costs and cause a net drain on the U.S. Treasury due to lost export related jobs. For example, witness the case of coal. Today, we are the beneficiaries of electric generating plants that provide us with some of the cheapest utility rates in the world. However, this bargain electricity may be in jeopardy. A user charge "impact" assessment conducted by **Walter J. Wills**, economics professor emeritus at Southern Illinois University's School of Agriculture, warns that increasing user taxes on waterway transportation could damage the coal industry in the "eastern interior basin" and increase electricity rates. "A 34-cents per-gallon tax would increase electricity rates 6 percent, a 70-cents per-gallon tax would increase electricity costs 14 percent and a $1.30 per gallon tax would increase electricity costs 33 percent," he says.

Look also at export coal. In 1982, the U.S. exported 105 million tons of coal. During 1983, total U.S. coal exports equalled only 76.9 million tons at a value of $4.07 billion. According to the Department of Commerce, through May of 1984, coal exports had exceeded the 30 million ton mark and were running ahead of the previous year, but only slightly. The international coal market is very tough, very cutthroat. Here, the barge industry can have a positive impact in reducing the total price of this important commodity. *If* we are permitted to freely compete.

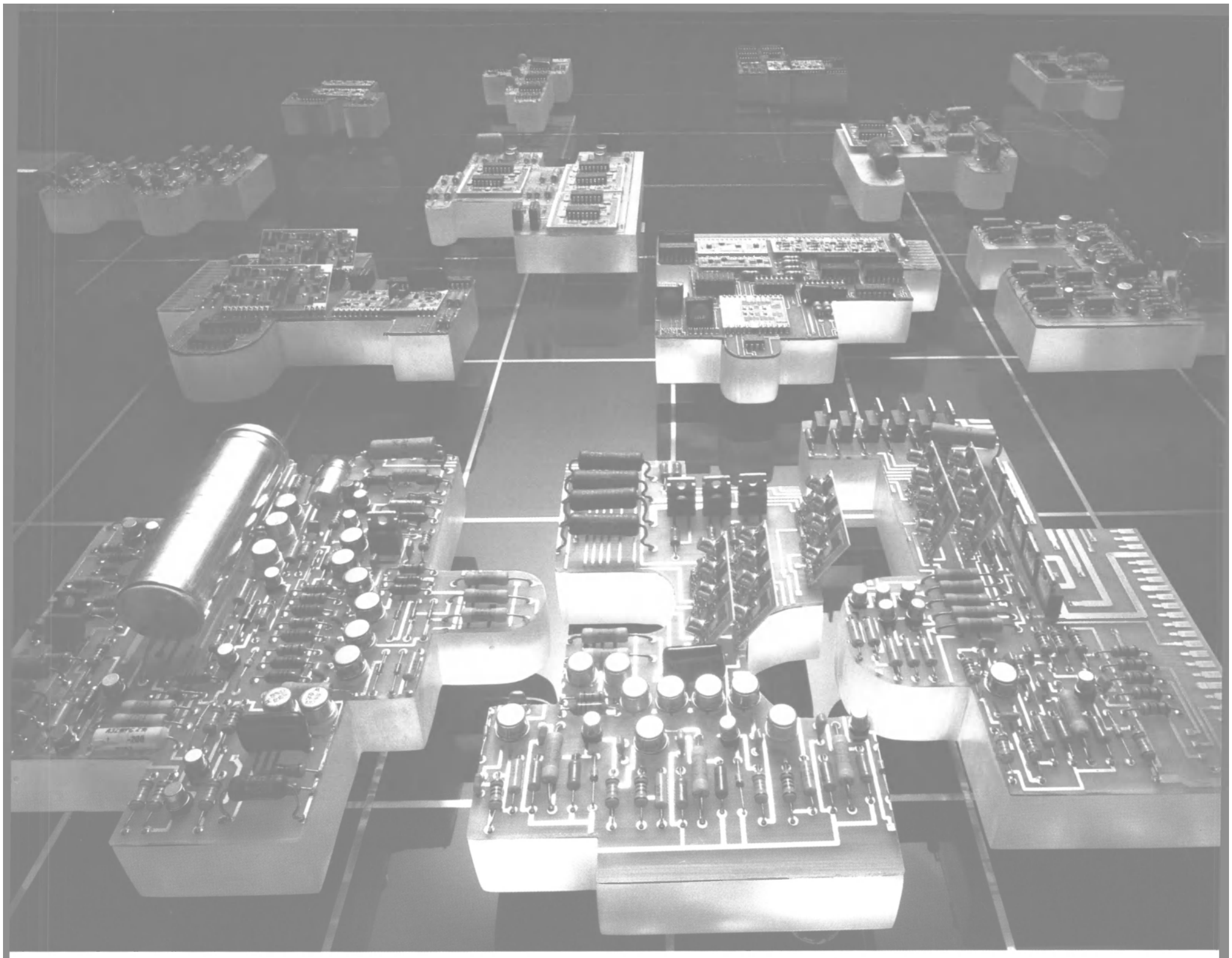
History reveals that where railroads have to compete directly with barge lines to haul coal traffic, miraculously, the rail rates are reduced to meet the barge competition.

According to published Tennessee Valley Authority statistics, the rate for shipping coal by rail from Coalmont, Tennessee to Birmingham, Alabama, is $20.10 per net ton where the railroads face no competition from the waterways. The identical shipment costs $15.14 per net ton where waterborne competition comes into play, a difference of $4.96 per net ton. Such water-compelled rail rate reductions range from 40-110 percent, and using the rail industry's own estimate, force the railroads to charge almost $1 billion less per year—industry wide—for shipment by rail.

Despite these figures, government seems bound and determined to increase barge taxes. The barge and towing industry can perhaps be forgiven for feeling as though the government, in exercising its role as the parent of industry has demonstrably, and rather blatantly, favored one of its children over the other. This is, categorically, *not* the proper role of government in the commercial sphere. Where government involves itself in the affairs of its children in industry—once they are grown and on their feet—that involvement must be one of almost pristine impartiality.

Let us leave the realm of user taxes on our industry and the realm of the "Johnny can do no wrong" policy of the government as far as

(continued on page 56)



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(continued from page 54)

the rails are concerned regarding the gobbling up of competing barge lines—in direct contravention of the law and polite custom—and have a look at government tax policy as it relates to the rails. Bear in mind that the government proposes higher taxes for the barge operators who are struggling to stay afloat and draw your own conclusions regarding the equity of the government's tax policy regarding the rail carriers—most of the largest of which find themselves in the financial pink since the passage of the Staggers Rail Act of 1980, despite being found to be *not* "revenue adequate" by the government. Briefly, this determination means that the rail carrier is, in the view of the government, unable to make basic costs and a reasonable profit on capital outlay.

Witness the financial condition of CSX Corp. In taxable years 1981-1983, CSX Corp. not only paid no federal tax whatsoever, on profits of 1.75 billion dollars, but received rebates of taxes paid in earlier years or sold "excess" tax benefits to the extent that the corporation actually got money back from the federal government.

Then there is the Santa Fe Southern Pacific Corp., another railroad judged to be revenue inadequate by the government, despite profits in taxable years 1981-1983 of 1.5 billion dollars, on which the company paid absolutely no federal income tax and was sent a very substantial rebate check by that same government.

Witness also Norfolk Southern Corp. Needless to belabor the point—Norfolk Southern is, of course, revenue inadequate. This despite profits in taxable years 1981-1983 of a respectable 574 million dollars.

Where is the fairness in all this? In a fair system, a company can't be revenue inadequate and flush with cash at the same time. In a fair system, a company should not be on the ropes financially and yet be asked to pay still higher user taxes at the same time. It's just not defensible.

Our national leadership must recognize the severity of our waterway industry's plight, and consider the crucial role we play in the transportation system and the overall economy. Laws and regulations must be directed at protecting the public and nurturing the industry, and not at inhibiting it any further. How can reasonable people possibly advocate still higher user fees in light of the disastrous data on the financial condition of the water carrier industry borne out in the **Arthur Anderson** study and other independent surveys concerning the economic health of our industry?

If, as I contend, the proper role of government in our mixed economy is to promote a healthy, balanced system of transportation, and do so with only the minimum intrusion necessary, then something is rotten in Denmark regarding the relationship of the water carriers to the government.

How we fell from dad's grace is anyone's guess, but if a reconciliation is not forthcoming fast, one son of government, once a master of the water, is going to die of drowning. And it will not be an accidental death.

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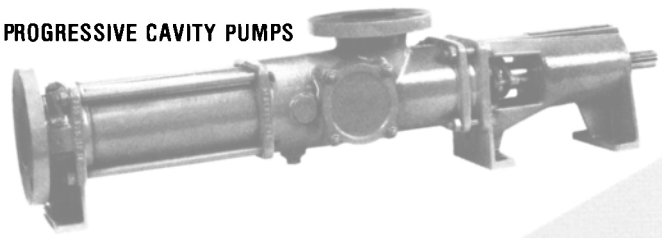

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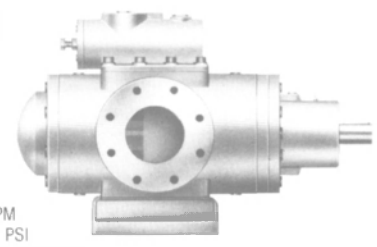

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Application: As transfer, booster, fuel oil injection and supply pumps or lube oil pumps in the engine room. For ship hydraulics i.e., in anchor winches and cranes, steering gear control, propeller steering devices, etc...

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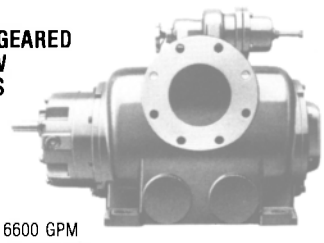

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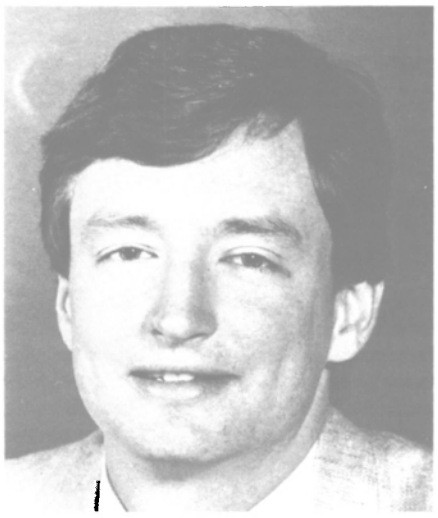
INLAND/COASTAL-
SMALLER/MEDIUM YARDS

A SUCCESSFUL MARITIME POLICY UNDER ATTACK

By Neal S. Platzer

President, Platzer Shipyard, Inc. and
Chairman, American Waterways Shipyard Conference



Neal S. Platzer

The following quote was taken directly from a draft report on shipping, shipbuilding, and sealift and is in reference to the Merchant Marine Act of 1936, which constitutes our current domestic maritime policy. This report was developed by a Presidentially-appointed federal advisory committee whose responsibility is to advise the President and the Congress on issues concerning the entire maritime and marine environment.

"It is increasingly clear . . . that this national policy and the package of protections derived from it—tax credits, loan guarantees, limited cargo preference, cabotage and build-U.S. requirements—have been fairly ineffective" in producing an efficient domestic Jones Act fleet.

As these observations illustrate, attention continues to be focused on the various elements of the Merchant Marine Act of 1936 and its impact and benefits to this country. Time and time again, legislators, regulators and outside parties have asserted that these protections, which have fostered the continued growth of the U.S. shipbuilding industry, should be dismantled.

This project was conceived in 1983, and its original focus was to review the status of the shipbuilding industry, which was then and still is in a severe depression. The purpose of the study was to develop recommendations to ensure that an adequate domestic shipbuilding base was preserved. Over the past two years, the study has been broadened to include shipping and sealift issues. The draft report now centers on how the U.S. can enhance its sealift capabilities. The study has drastically changed its thrust from one of seeking solutions to bolster the ailing shipbuilding industry to establishing a sealift capacity with little regard for the well being of the shipbuilding industry. This represents a profound change in the mission of the project as initially conceived.

The draft report considers many options for enhancing our transoceanic sealift fleet. As the quoted passage indicates, the authors feel that the current programs have not been effective in carrying out the mandate of the Merchant Marine Act of 1936. The report erroneously concludes that the Jones Act fleet is a major contributor to the transoceanic fleet, and that by tampering with the Act, the nation's transoceanic sealift capabilities will be increased.

Marine transportation takes place in three basic areas: 1) on the internal waters of the nation, i.e., the rivers, lakes, bays, and sounds; 2) along the coasts; and 3) on the open oceans. Specialized vessels have been developed over the years to navigate in these three distinct areas. The first two areas are the basic concerns of the Jones Act. The vessels engaged in the domestic fleet are not designed for transoceanic use. It is a false and erroneous conclusion that by tampering with the Jones Act, transoceanic sealift capacity will be greatly enhanced.

From the founding of the nation, we have adopted a policy reserving our domestic trade for our own ships. The Jones Act, which embodies the U.S.-build requirement and other cabotage laws relating to the transportation of merchandise, has fostered the development of the entire domestic maritime industry, including the small and medium sized or second tier commercial shipyards. This Act, is the only successful portion of the U.S. maritime policy. Because of the Jones Act, this country has developed a domestic water transportation system, unrivaled in the rest of the world.

The report based many of its assumptions and recommendations on the statement that the programs embodied in the Merchant Marine Act of 1936 have been ineffective in producing technologically efficient vessels. This is not supported by the facts. These programs have created and fostered the growth of a necessary component of this nation's overall transportation system. The second tier shipyards, and the industries they service, provide many major benefits to this nation's economy and national defense needs.

The draft report suggests just the opposite conclusion. The authors state that "... no economic need for Federal protection (i.e., the Jones Act) of these (smaller) yards (exists) since rail and highway modes allow foreign construction of capital equipment, and no national defense need (exists) to protect the small yards because their role in a mobilization effort would be minimal."

The second tier shipyards do provide an essential economic service to this country. This segment of the industry builds and repairs the tugboats, towboats, and barges necessary for the inland and coastal barge and towing industries. This industry sector serves 87 percent of the major cities, carries two-thirds of all domestic marine traffic, and carries 13 percent of the nation's commerce at 2 percent of the cost.

In 1982, the inland and coastal towing industries delivered 15 percent of the nation's export coal to ports and 46 percent of the grain. All this has been and continues to be accomplished with U.S.-built vessels which compete with foreign-built vehicles and the other domestic transportation modes for freight. We are a competitive factor in this nation's overall transportation system.

This industry also provides the vessels for the offshore service industry such as the supply boats, crew boats, utility vessels and barges necessary to support and maintain drilling activities. We have led the world in producing technologically advanced and efficient vessels which are vitally important to the continuance of this industry sector.

The second tier shipyards have played and continue to play a major role in the national defense requirement of this country. During World War II, many inland and coastal yards built sub-chasers, landing craft, mine sweepers, escort ships and other smaller vessels for the war effort. Today, we continue to supply the Navy, U.S. Coast Guard and other military branches with the smaller auxilliary craft necessary to maintain our military forces.

The authors of the report to the President feel that the current system of domestic maritime laws, including the Jones Act, is not working and are not justifed.

Yet, there is no doubt that the Jones Act is successful and should be maintained. There is a real danger that those unfamiliar with the maritime industry will attempt to correct the sealift problem by reversing an absolutely sound policy. There are many others who wish to dilute, or even abolish, the Jones Act and all U.S.-build requirements. This would mean an end to shipbuilding in this country as we know it today.

There are ongoing attempts to weaken this important maritime legislation. The report to the President may spark hearings on the entire Jones Act issue. Hearings to discuss the merits of the Jones Act and the continuance of its programs have been suggested by several Senators on the Merchant Marine Subcommittee. There are moves afoot to introduce a generic passenger vessel bill which would allow all foreign flag passenger vessels to operate in our coastwise trades. The second tier shipyards do build passenger vessels, and that remains one of the few new construction markets available.

The Jones Act and the provisions it embodies have allowed the second tier industry to grow into an integral part of the entire domestic maritime transportation industry. Our industry provides important economic and national defense services to our country which would be lost if the Jones Act were seriously undermined.

As an industry, we cannot stand by and watch while others unjustly attack the laws which form the foundation of our business. Many of us have invested a lifetime in our businesses, and have been working towards the betterment and the future of the industry and, more important, the nation.

The American Waterways Shipyard Conference (AWSC), first organized in 1976, provides the second tier shipyards with the only protection against further erosion of the Jones Act. AWSC has and will continue to monitor the developments of the draft report which could prove so detrimental. AWSC urged the advisory committee to delete all references to the Jones Act from the report since it is erroneous and off-base with respect to the basic premise on the transoceanic sealift issue.

All who have a stake in this segment of the shipbuilding industry should support the position of the American Waterways Shipyard Conference. Only through a unified position can we safeguard the imperatives of the Jones Act. Supporting the position of the American Waterways Shipyard Conference today is the first step towards ensuring a future for tomorrow.

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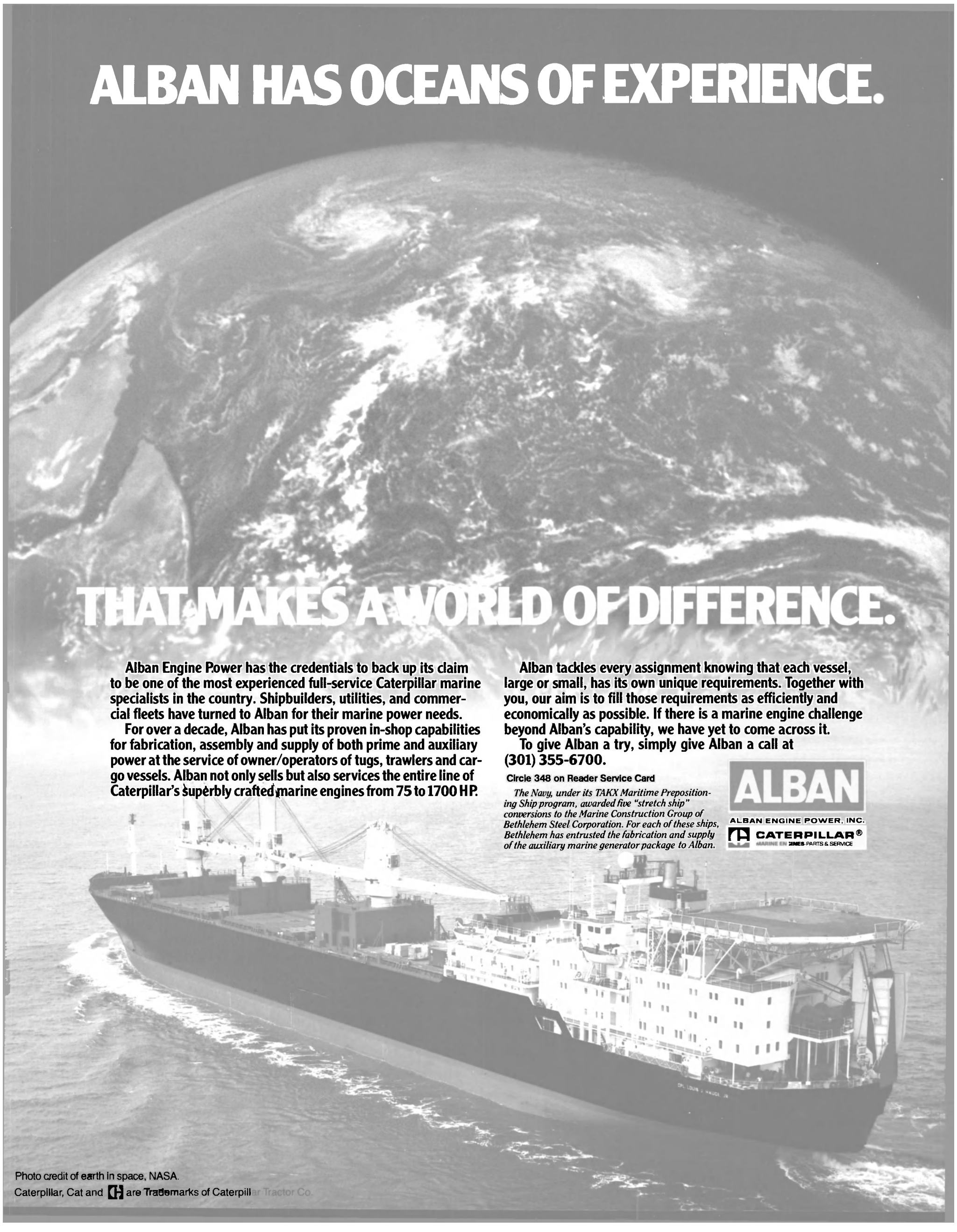

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Offshore Service Vessels, Tugboat And Inland Towboat Fleets

It is estimated there are approximately 10,000 self propelled tugs, towboats and offshore service vessels in the U.S. fleet.

Add to the above 10,000 tugs, towboats, and offshore support vessels, the balance of the United States shallow draft self propelled fleet consisting of 11,000 ferries, patrol boats, dredges, pilot boats, fire boats, small harbor tankers, etc. and the number of documented small vessels in the U.S. self-propelled fleet (5-1000 gross tons) totals approximately 21,000 shallow-draft vessels.

NOTE: These tables do not include all shallow-draft vessels, i.e. ferries, patrol boats, fire boats, dredges, commercial fishing boats, etc. are not included.

The figures in these shallow draft tables are conservative as it is not possible to obtain data on every tug, towboat and offshore support vessel in the United States fleet (a limited number of smaller and/or individually owned boats may not be included).

Source: Statistics courtesy of Fleet Data Service, P. O. Box 2576, Nacogdoches, TX 75963. Telephone (409) 569-0375.

Similar tables can be generated on specific segments of the fleet on a custom basis. Contact **James O. Covington,** Fleet Data Service, P. O. Box 2576, Nacogdoches TX 75963. Telephone (409) 569-0375 for further details of information available.

Statistical Summary

The following statistical tables summarize the 1310 tugs in the active American fleet at the end of 1984.

Three specific vessel types have been identified and tabulated separately. These are anchor-handling tugs (AT), tugs used with dedicated tug/barge units (IT), and tugs in ship-handling or harbor service (HBR). The remaining 776 tugs are not equipped with deck gear for anchor-handling service, fendering for ship-handling service, or special barge connectors for ITB service. These 776 tugs are in general towing service.

The inventory has been tabulated by year built and horsepower ranges. It should be noted that these HP ranges are based upon manufacturer's ratings for continuous duty.

[Tables continue on page 62]

Statistical Summary

The following table summarizes the American-owned fleet as it existed at the end of calendar year 1984. It shows the breakdown of the fleet by type of vessel by year built. This represents the available fleet at year end and includes the known operational fleet plus vessels temporarily laid up, vessels in unknown fleets, and completed but unsold shipyard stock. Vessels removed from the fleet during 1984 are not included.

AMERICAN OFFSHORE SERVICE VESSEL INVENTORY
Year-end 1984

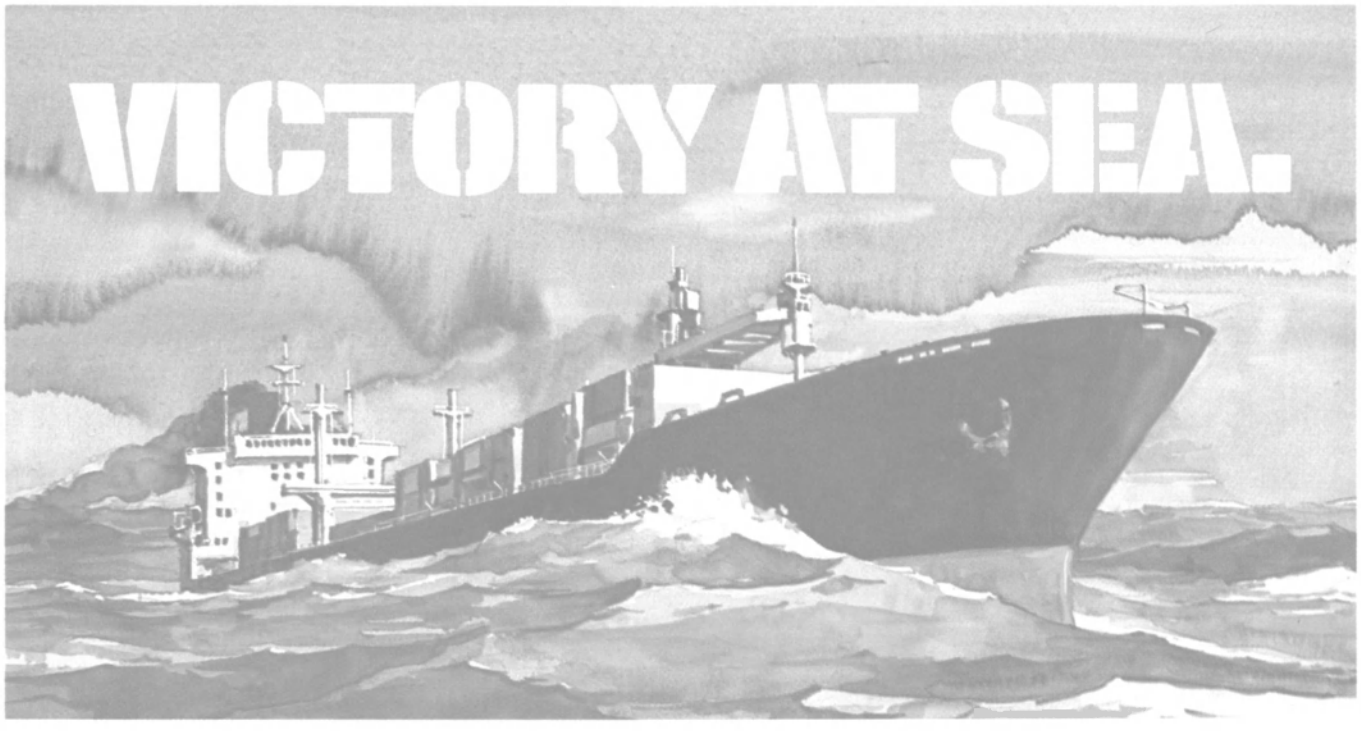
	VESSEL TYPES											
	150-ft LOA and Larger						60- to 149-ft LOA					
YEAR BUILT	SU	AS	TS	GE	MISC	Total	CREW	UTIL	LB	MISC	Total	GRAND TOTAL
Unknown	0	0	0	2	0	2	0	5	0	4	9	11
Pre-60	0	0	0	2	0	2	7	37	0	13	57	59
1960	0	0	0	0	0	0	2	0	0	0	2	2
1961	0	0	0	0	1	1	2	0	0	1	3	4
1962	1	0	0	0	0	1	4	4	0	1	9	10
1963	0	1	0	0	0	1	6	9	0	1	16	17
1964	1	0	0	3	0	4	3	17	0	5	25	29
1965	11	0	0	2	1	14	12	21	0	10	43	57
1966	17	3	0	6	3	29	13	25	0	9	47	76
1967	12	1	0	4	3	20	9	10	0	0	19	39
1968	18	4	0	2	2	26	16	4	0	3	23	49
1969	19	6	1	2	0	28	28	3	0	1	32	60
1970	8	10	3	2	5	28	29	9	1	1	40	68
1971	12	9	4	0	3	28	14	5	0	0	19	47
1972	21	3	7	2	0	33	17	18	0	1	36	69
1973	23	3	22	4	5	57	22	17	1	0	40	97
1974	21	2	46	4	1	74	23	17	2	2	44	118
1975	15	5	37	1	2	60	15	14	2	1	32	92
1976	15	9	31	4	5	64	28	24	6	1	59	123
1977	32	5	16	4	4	61	29	35	3	1	68	129
1978	48	2	24	4	4	82	47	59	11	3	120	202
1979	51	8	18	2	5	84	49	78	13	3	143	227
1980	45	5	10	6	6	72	87	80	12	6	185	257
1981	56	12	9	10	5	92	83	122	14	3	222	314
1982	74	18	44	12	1	149	36	39	9	3	87	236
1983	22	13	32	3	5	75	12	11	2	2	27	102
1984	11	0	8	2	1	22	2	6	5	0	13	35
1985	4	1	10	4	0	19	0	4	2	0	6	25
Total	537	120	322	87	62	1128	595	673	83	75	1426	2554

AMERICAN-OWNED OFFSHORE, COASTAL & HARBOR TUGS
Year-end 1984

	Vessel Types				
YEAR BUILT	MISC TUGS	AH TUGS	HBR TUGS	ITB TUGS	TOTAL
UNK	6	8	3	0	17
Pre-60	262	1	130	2	395
1960	4	0	8	0	12
1961	9	0	6	0	15
1962	7	1	3	0	11
1963	8	1	4	0	13
1964	17	1	2	0	20
1965	27	2	8	0	37
1966	29	13	6	0	48
1967	39	8	4	2	53
1968	28	5	5	0	38
1969	16	11	7	1	35
1970	30	11	6	1	48
1971	11	7	3	1	22
1972	13	7	1	1	22
1973	16	5	3	2	26
1974	16	17	2	1	36
1975	35	30	7	5	77
1976	40	22	5	4	71
1977	39	9	2	4	54
1978	24	10	3	2	39
1979	19	6	3	4	32
1980	15	3	16	2	36
1981	27	19	12	6	64
1982	30	12	9	12	63
1983	8	7	6	0	21
1984	1	0	3	1	5
Totals	776	216	267	51	1310

HARBOR TUGS
Year-end 1984

	Total Continuous Horsepower															
YEAR BUILT	UNK	Under 500	500 999	1000 1499	1500 1999	2000 2499	2500 2999	3000 3499	3500 3999	4000 4499	4500 4999	5000 5499	5500 5999	6000 6499	6500 6999	TOTAL
UNK	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	3
Pre-60	1	9	9	50	34	20	3	2	1	0	0	0	0	0	1	130
1960	0	0	0	0	7	1	0	0	0	0	0	0	0	0	0	8
1961	0	0	0	1	1	4	0	0	0	0	0	0	0	0	0	6
1962	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	3
1963	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	4
1964	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
1965	0	2	1	1	3	0	0	1	0	0	0	0	0	0	0	8
1966	0	0	2	2	2	0	0	0	0	0	0	0	0	0	0	6
1967	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	4
1968	0	0	0	2	1	0	0	1	0	1	0	0	0	0	0	5
1969	0	0	0	1	2	2	2	0	0	0	0	0	0	0	0	7
1970	0	0	1	1	0	1	0	2	0	1	0	0	0	0	0	6
1971	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	3
1972	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
1973	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	3
1974	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2
1975	0	0	0	1	0	1	0	2	2	1	0	0	0	0	0	7
1976	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	5
1977	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
1978	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	3
1979	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	3
1980	0	0	1	0	8	1	2	3	0	1	0	0	0	0	0	16
1981	0	0	0	0	1	0	1	5	3	1	1	0	0	0	0	12
1982	0	1	0	0	0	0	0	4	4	0	0	0	0	0	0	9
1983	0	0	0	0	1	0	0	1	4	0	0	0	0	0	0	6
1984	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3
Totals	1	13	16	65	71	35	12	27	19	6	1	0	0	0	1	267



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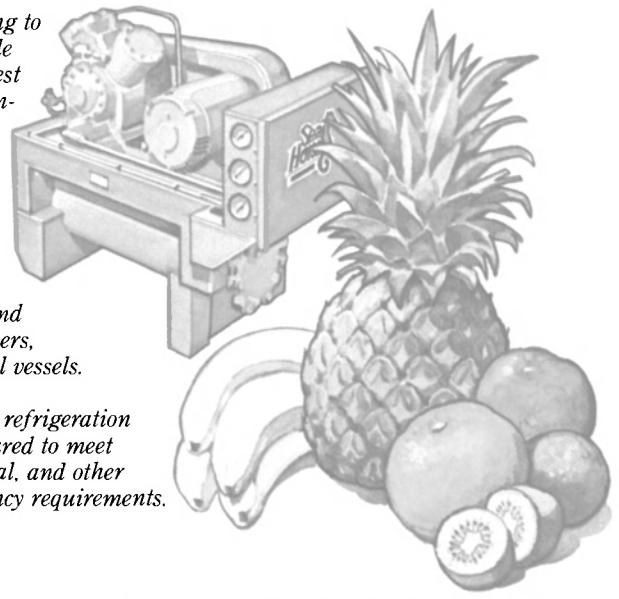
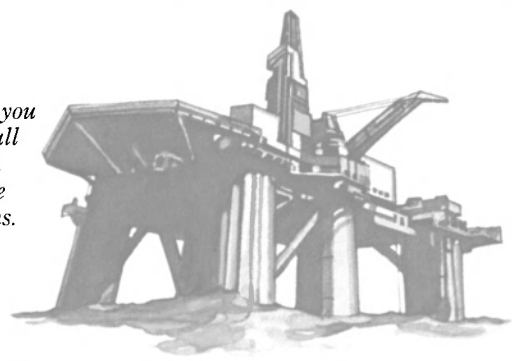
Expect our air conditioning to keep your crew comfortable on board—and at their best on the job. We offer a complete line of water-cooled condensing units, air- and water-cooled liquid chillers, central station air handlers, and single-package cooling units. And we install them on offshore rigs, platforms and their support vessels, tankers, container ships, and naval vessels.

Our air-conditioning and refrigeration systems can be manufactured to meet ABS, USCG, special naval, and other worldwide governing agency requirements.



You can spec the features, capacities, and performance you need in any system in our full line. We build in sea-proven reliability, to ensure long life under the toughest conditions.



Contact Walter Berg, Manager of Marine Systems, 315/432-6417. Carrier Transicold Division, Carrier Corporation, P.O. Box 4805, Syracuse, NY 13221. Telex: 937 306.

UNITED TECHNOLOGIES CARRIER TRANSICOLD

THE MARINE AIR CONDITIONING AND REFRIGERATION PEOPLE

GO CARRIER TRANSICOLD

Offshore Service Vessels, Tugboat And Inland Towboat Fleets

INTEGRATED TUG/BARGE TUGS
Year-end 1984

Total Continuous Horsepower

YEAR BUILT	2000 2499	2500 2999	3000 3499	3500 3999	4000 4499	4500 4999	5000 5499	5500 5999	6000 6499	6500 6999	7000 7499	7500 7999	— 11000 — 11499	— 14000 — 14499	14500 14999	15000 15499	— 18000 — 18499	TOTAL
Pre-60	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
1970	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
1971	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
1972	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
1973	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
1974	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1975	0	0	1	1	0	0	0	2	0	0	0	0	0	1	0	0	0	5
1976	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4
1977	0	0	1	0	0	0	0	1	0	0	1	0	0	1	0	0	0	4
1978	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2
1979	0	0	0	0	0	0	0	3	0	0	1	0	0	0	0	0	0	4
1980	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
1981	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	1	2	6
1982	0	0	0	1	0	3	0	0	1	0	1	0	0	1	0	0	5	12
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Totals	0	1	2	4	1	4	1	12	1	0	8	2	2	3	1	1	8	51

ANCHOR-HANDLING TUGS
Year-end 1984

Total Continuous Horsepower

YEAR BUILT	500 999	1000 1499	1500 1999	2000 2499	2500 2999	3000 3499	3500 3999	4000 4499	4500 4999	5000 5499	5500 5999	6000 6499	6500 6999	7000 7499	7500 7999	8000 8499	TOTAL
UNK	0	2	5	1	0	0	0	0	0	0	0	0	0	0	0	0	8
Pre-60	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
1963	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
1964	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1965	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1966	0	3	1	1	2	5	0	1	0	0	0	0	0	0	0	0	13
1967	0	1	3	0	1	0	1	1	0	0	1	0	0	0	0	0	8
1968	0	0	1	3	0	1	0	0	0	0	0	0	0	0	0	0	5
1969	0	0	0	4	5	1	0	1	0	0	0	0	0	0	0	0	11
1970	0	0	5	2	0	1	0	0	1	0	2	0	0	0	0	0	11
1971	0	0	1	0	0	2	2	0	2	0	0	0	0	0	0	0	7
1972	0	0	0	1	0	2	2	2	0	0	0	0	0	0	0	0	7
1973	0	0	2	0	0	1	0	1	0	0	1	0	0	0	0	0	5
1974	0	0	2	2	0	0	0	3	2	0	7	0	0	1	0	0	17
1975	0	0	2	3	2	3	1	3	1	0	9	0	0	6	0	0	30
1976	0	0	0	1	0	1	5	0	6	0	3	2	0	3	0	1	22
1977	0	0	0	4	0	2	0	0	0	0	2	0	0	1	0	0	9
1978	0	3	1	4	0	2	0	0	0	0	0	0	0	0	0	0	10
1979	0	0	1	0	0	1	2	2	0	0	0	0	0	0	0	0	6
1980	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3
1981	0	5	3	1	0	8	1	0	0	0	1	0	0	0	0	0	19
1982	0	3	2	5	0	1	1	0	0	0	0	0	0	0	0	0	12
1983	0	0	0	0	0	2	2	0	0	0	1	2	0	0	0	0	7
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	0	18	32	32	10	37	17	15	12	0	27	4	0	11	0	1	216

CONVENTIONAL TUGS IN MISCELLANEOUS TOWING SERVICE
Year-end 1984

Total Continuous Horsepower

YEAR BUILT	UNK	Under 500	500 999	1000 1499	1500 1999	2000 2499	2500 2999	3000 3499	3500 3999	4000 4499	4500 4999	5000 5499	5500 5999	6000 6499	6500 6999	7000 7499	Unk	TOTAL
UNK	4	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Pre-60	0	19	56	66	82	22	4	1	9	1	1	0	0	0	1	0	0	262
1960	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	4
1961	0	0	2	2	3	1	0	0	0	0	0	0	1	0	0	0	0	9
1962	0	1	1	1	1	2	0	1	0	0	0	0	0	0	0	0	0	7
1963	0	1	0	1	1	2	0	1	0	1	0	0	1	0	0	0	0	8
1964	0	5	2	3	2	2	1	1	1	0	0	0	0	0	0	0	0	17
1965	0	2	1	4	7	5	1	2	4	0	1	0	0	0	0	0	0	27
1966	0	2	2	0	10	4	5	1	2	2	0	0	1	0	0	0	0	29
1967	0	1	2	3	15	3	4	4	5	1	1	0	0	0	0	0	0	39
1968	0	1	1	1	7	4	4	4	1	1	0	0	4	0	0	0	0	28
1969	0	3	3	0	3	3	0	1	3	0	0	0	0	0	0	0	0	16
1970	0	1	4	4	5	2	3	3	3	2	0	0	3	0	0	0	0	30
1971	0	2	0	2	1	0	2	1	0	1	0	0	1	0	0	1	0	11
1972	0	0	1	4	1	1	0	5	0	0	0	0	1	0	0	0	0	13
1973	0	0	0	0	0	0	0	7	1	6	0	0	0	0	0	2	0	16
1974	1	0	2	5	1	3	0	1	1	0	0	0	0	0	0	2	0	16
1975	0	0	2	1	0	10	2	4	4	4	0	0	2	0	0	6	0	35
1976	0	0	3	1	1	4	0	5	8	4	1	0	1	0	0	12	0	40
1977	0	0	3	5	1	10	1	8	6	0	0	0	0	0	0	5	0	39
1978	0	4	1	4	4	4	0	3	2	1	0	0	1	0	0	0	0	24
1979	0	0	1	2	5	0	2	4	2	1	0	0	1	0	0	1	0	19
1980	0	1	5	2	3	2	0	0	0	0	0	0	1	0	0	1	0	15
1981	2	0	3	6	11	2	0	0	1	1	0	0	0	1	0	0	0	27
1982	1	0	3	0	7	6	2	1	4	1	2	0	1	2	0	0	0	30
1983	1	0	0	1	2	2	1	1	0	0	0	0	0	0	0	0	0	8
1984	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Totals	9	44	97	119	173	96	33	59	57	27	6	0	19	3	1	30	0	776

Offshore Service Vessels, Tugboat And Inland Towboat Fleets

AMERICAN INLAND TOWBOATS
31 December 1983

Horsepower Range

YEAR BUILT	1 499	500 999	1000 1499	1500 1999	2000 2499	2500 2999	3000 3499	3500 3999	4000 4499	4500 4999	5000 5499	5500 5999	6000 6499	6500 6999	7000 7499	7500 7999	8000 8499	8500 8999	9000 9499	9500 9999	10000 10499	10500 10999	11000 11499	Unk	TOTALS
Unknown	18	15	12	4	2	2	1	1	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	41	100
1870–1879	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
1880–1889	2	3	2	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
1890–1899	1	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
1900–1909	6	5	7	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22
1910–1919	7	3	0	9	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22
1920–1929	19	19	8	5	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	57
1930–1939	104	25	4	14	5	3	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	161
1940–1949	254	115	60	51	14	8	23	12	1	2	0	1	1	0	0	0	0	0	0	0	0	0	0	1	543
1950–1959	449	214	95	59	36	24	37	21	7	5	0	3	3	0	2	0	0	0	0	1	0	0	0	1	957
1960	43	19	5	8	1	0	6	3	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	88
1961	31	18	9	6	0	1	1	1	2	2	0	3	1	0	1	0	0	0	0	0	0	0	0	0	76
1962	35	28	8	6	3	0	1	2	3	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	88
1963	39	34	3	7	2	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	88
1964	42	30	7	5	3	0	2	4	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	96
1965	38	45	11	4	3	1	0	1	1	1	2	6	0	0	0	0	0	2	0	0	0	0	0	0	115
1966	70	51	18	6	5	7	4	3	1	1	4	3	0	0	2	0	0	2	0	0	0	0	0	0	177
1967	51	41	20	11	2	1	2	2	0	1	2	7	1	0	0	0	0	0	0	0	0	0	0	0	141
1968	40	41	20	8	5	1	3	1	2	2	2	6	0	0	0	0	0	0	0	0	0	0	0	0	131
1969	49	41	13	13	3	0	3	1	2	2	2	5	0	0	1	0	0	1	0	0	0	0	0	0	136
1970	48	39	19	6	1	6	1	1	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	127
1971	37	34	9	17	3	3	4	3	3	1	0	2	0	0	2	0	1	1	0	0	0	0	0	0	120
1972	29	42	14	13	3	3	1	3	2	0	0	3	0	0	4	0	2	1	0	0	0	0	0	0	120
1973	32	43	15	8	2	1	5	4	5	0	0	11	1	0	1	0	2	1	0	0	0	0	0	0	131
1974	22	71	21	10	4	1	6	5	10	0	0	12	1	0	0	0	0	3	0	0	1	2	0	0	169
1975	38	78	53	23	3	5	6	6	12	1	0	13	0	1	4	0	1	2	0	0	1	2	0	0	249
1976	30	58	17	13	3	3	4	0	9	2	0	12	0	0	0	0	0	0	0	0	0	3	0	0	154
1977	24	49	12	10	2	0	4	2	1	2	0	12	2	0	0	0	1	0	0	0	0	1	0	0	122
1978	30	67	7	8	1	1	1	0	4	1	0	2	2	0	0	0	0	0	0	0	0	1	1	0	126
1979	50	78	30	11	0	0	0	6	1	0	0	7	3	0	0	0	0	0	0	0	0	0	0	1	187
1980	58	159	57	12	2	2	1	4	0	3	0	6	7	0	0	0	0	0	1	0	0	0	0	1	313
1981	23	135	61	13	11	1	4	1	1	1	1	3	14	0	0	0	0	0	1	0	0	0	0	2	272
1982	17	35	29	9	10	0	7	6	4	0	1	8	10	0	1	0	1	0	1	0	0	0	0	5	144
1983	8	7	12	3	4	0	1	1	0	0	0	0	1	2	2	0	1	0	0	0	0	0	0	7	49
Totals	1744	1646	660	378	138	80	134	97	75	28	15	131	50	4	22	0	9	13	3	2	2	9	1	60	5301

INLAND TOWBOATS—This fleet consists of all towboats and tugs operated exclusively on the inland waterways and intracoastal canal system. The fleet includes vessels operated on the inland waters of the Pacific Northwest and the Atlantic Coast as well as those operated on the Mississippi River System and her tributaries.

U.S. COULD LEARN A LESSON FROM GREAT BRITAIN'S OFFSHORE OIL LEASING

By R. Nelson Crews
Chairman, National Ocean Industries Association
and President and Chief Operating Officer
Raymond International, Inc.

R. Nelson Crews

The current "oil glut" and the oversupply of natural gas have lulled Americans into a false sense of energy security. If something is not done to speed up the pace of domestic energy exploration and production, we will find ourselves more dangerously dependent on foreign energy suppliers in the not-too-distant future.

We have the capability to become energy independent by developing this nation's Outer Continental Shelf (OCS). The OCS is estimated to contain as much as 44 billion barrels of oil and 231 trillion cubic feet of natural gas.

But offshore energy is not a spigot that can be turned on at will. It takes an average of seven years from the time exploration starts until production of oil and gas can begin.

This means that we should be looking today for the energy that our nation will need in 1992. Yet America's development of its OCS has been slow and relatively unsuccessful in comparison with other countries.

Take Great Britain, for example. Until the mid-1960s, Great Britain imported virtually all of its oil and gas. However, after implementing a major licensing program to open the North Sea to exploration and production, Britain has moved from total dependence on foreign imports to independence. In less than 20 years, it has become a net exporter and the world's fifth largest oil producer.

The United States, on the other hand, currently imports about one-third of the oil it consumes. We can expect foreign imports to increase significantly unless new domestic supplies are found soon.

The U.S. took an important step toward energy independence in 1982 by implementing a concept that Great Britain has used very successfully for many years—areawide leasing. The Department of the Interior adopted this approach when they created the present five-year plan to expedite exploration and development of the OCS. For 28 years prior to that, offshore lands had been offered for lease under a "nomination" system, in which the federal government offered a limited number of specific tracts for leasing based on their geological prospects.

Since its inception, the five-year areawide leasing program has been a subject of intense controversy, attracting both strong support and severe criticism. Hoping to resolve some of the conflict, Interior Secretary **Donald Hodel** recently issued the first draft proposal of a new five-year program that reduced the pace of leasing activities and changed the original concept of areawide leasing.

It is unfortunate that the Department of the Interior feels compelled to take this action, because Great Britain's track record proves that the areawide approach works. While the U.S. "nomination" leasing program was in effect between 1954 and 1982, only 4 percent of the nearly 1-billion-acre OCS was offered for lease, and only 22 million acres were actually leased.

In the first two rounds of Great Britain's offshore program in 1964 and 1965, however, 113 million acres were offered and nearly 27 million acres were licensed (the British government grants licenses to explore and develop rather than leasing tracts). In just those two years, Great Britain licensed more acreage than the U.S. leased in 28 years. And in 16 years, the British government licensed nearly 58 million acres, more than twice what would have been *offered* for lease under the original U.S. five-year plan.

The result of licensing this acreage has been a steady increase in British offshore exploration and production. By 1982, Great Britain was producing an average of more than 2 million barrels of oil daily, nearly twice the daily average offshore production of the United States, which was in decline. The U.S., in fact, was the only nation in the world whose offshore oil production decreased during the 1970s.

The advent of areawide leasing was a shot in the arm for America's ailing offshore industry—at least judging by rig activity in the Gulf of Mexico, a recognized indicator of oil industry health. After bottoming out in mid-1983, the rig utilization rate rose sharply as a direct result of the attractive prospects offered in areawide lease sales.

Instead of making leasing more difficult and restrictive, the federal government should take a clue from the British and remove some of the obstacles hindering OCS development. We will then have a better chance to reduce our dependence on foreign oil and help insure the nation's energy future.

R. Nelson Crews, president and chief operating officer of Raymond International, Inc. of Houston, Texas, was elected chairman of the National Ocean Industries Association (NOIA) in April 1985. NOIA serves as the legislative and administrative spokesman for the nation's offshore and ocean-related industries. Its more than 450 companies include offshore drilling contractors, supply boat operators, diving crews, geophysical companies and many other kinds of business involved in ocean and marine-related development.

OFFSHORE DRILLING RIGS

OFFSHORE MOBILE DRILLING UNITS UNDER CONSTRUCTION, ON ORDER, OR WITH LETTERS OF INTENT TO SHIPYARDS — APRIL 1985

RIG OWNER	RIG NAME	DESIGN	WATER DEPTH	SHIPYARD	ESTIMATED COST ($MM)	DELIVERY DATE	CONTRACT
		JACKUPS — 19					
CNOOC	BOHAL 11	PRC, Friede & Goldman modified, cantilever.	131′	Dalien (Luda) Shipyard - Dalien, China		Undet	CNOOC - Const held u pending design change
Foramer/FELS	FORAMER UNAMED JACKUP 01	Friede & Goldman L-780 Mod V, 3 triangular legs, cantilever.	350′	Far East Levingston - Singapore	$40.0	06/86	Available.
IFESM Petromar	ATLAS	Offshore Co Orion, 4 triangular legs.	300′	Galatz Shipyard - Romania		06/85e	Petromar - owner operated - Romania - Black Sea.
IFESM Petromar	FORTUNA	Offshore Co Orion, 4 triangular legs.	300′	Galatz Shipyard - Romania		04/85e	Petromar - owner operated - Romania - Black Sea
INA Naftaplin	LABIN	Levingston Class 111 C, 3 square legs, cantilever.	300′	Viktor Lenac Shipyard - Rijenka, Yugoslavia		07/85	INA - owner operated Adriatic Sea.
Larson & Toubros	L&T UNNAMED JACKUP 01	Hitachi, cantilever.	350′	Hitachi Zosen - Japan		Undet	ONGC - India
Maersk	MAERSK UNNAMED JACKUP 01	Hitachi Drill Hope	350′	Hitachi Zosen - Japan	$50.0	06/86e	Available.
Maersk	MAERSK UNNAMED JACKUP 02	Hitachi Drill Hope.	350′	Hitachi Zosen - Japan	$50.0	06/86e	Available.
ONGC	SAGAR KIRAN	Baker Marine BMC 300 IC, Independent leg, Class M, cantilever.	300′	Mazagon Dock - Bombay, India	$45.0	08/85	ONGC - owner operate India.
ONGC	SAGAR UDAY	Baker Marine BMC 300 IC, Independent leg, Class M, cantilever.	300′	Mazagon Dock - Bombay, India	$45.0	05/85	ONGC - Owner operate India.
Penrod	PENROD 99	LeTourneau Class 82 SD C, 3 triangular legs, cantilever.	250′	Marathon LeTourneau - Brownsville, Tx, USA		05/85	Available.
Reading & Bates	GEORGE H GALLOWAY	Friede & Goldman L 780 MOD 11, 3 triangular legs, cantilever.	300′	Astilleros Corrientes - Argentina	$45.0	04/85	Available.
Rowan	ROWAN RIG 46	LeTourneau Class 116 C, 3 square legs, propulsion assisted, cantilever.	300′	Marathon LeTourneau - Vicksburg, Ms, USA		12/85	Available.
Rowan	ROWAN RIG 47	LeTourneau Class 116 C, 3 square legs, propulsion assisted, cantilever.	300′	Marathon LeTourneau - Vicksburg, Ms, USA		12/85	Available.
Transworld	TRANSWORLD 74	LeTourneau 150 88 C Gorilla, 3 square legs, propulsion assisted, cantilever.	328′	UIE - Clydebank, Scotland	$80.0	06/86	Available.
USSR	KOLSKAJA	Gusto Engineering, 3 triangular legs, arctic, cantilever.	300′	Rauma Repola Oy - Pori, Finland	$92.5	06/85	USSR - owner operate Barents Sea.
USSR	SAHALINSKAJA	Gusto Engineering, 3 triangular legs, arctic, cantilever.	300′	Rauma Repola Oy - Pori, Finland	$92.5	11/85	USSR - owner operate Sea of Okhotsk.
*USSR	USSR UNNAMED JACKUP 01	Unknown.	300′	Vyborg Shipyard - USSR	$67.0	06/86	USSR - owner operate Arctic.
*USSR	USSR UNNAMED JACKUP 02	Unknown.	300′	Vyborg Shipyard - USSR	$67.0	06/87	USSR - owner operate Arctic.

One asterisk (*) preceding the name of the contractor indicates a significant change in the status of a particular rig.

(continued on page 72)

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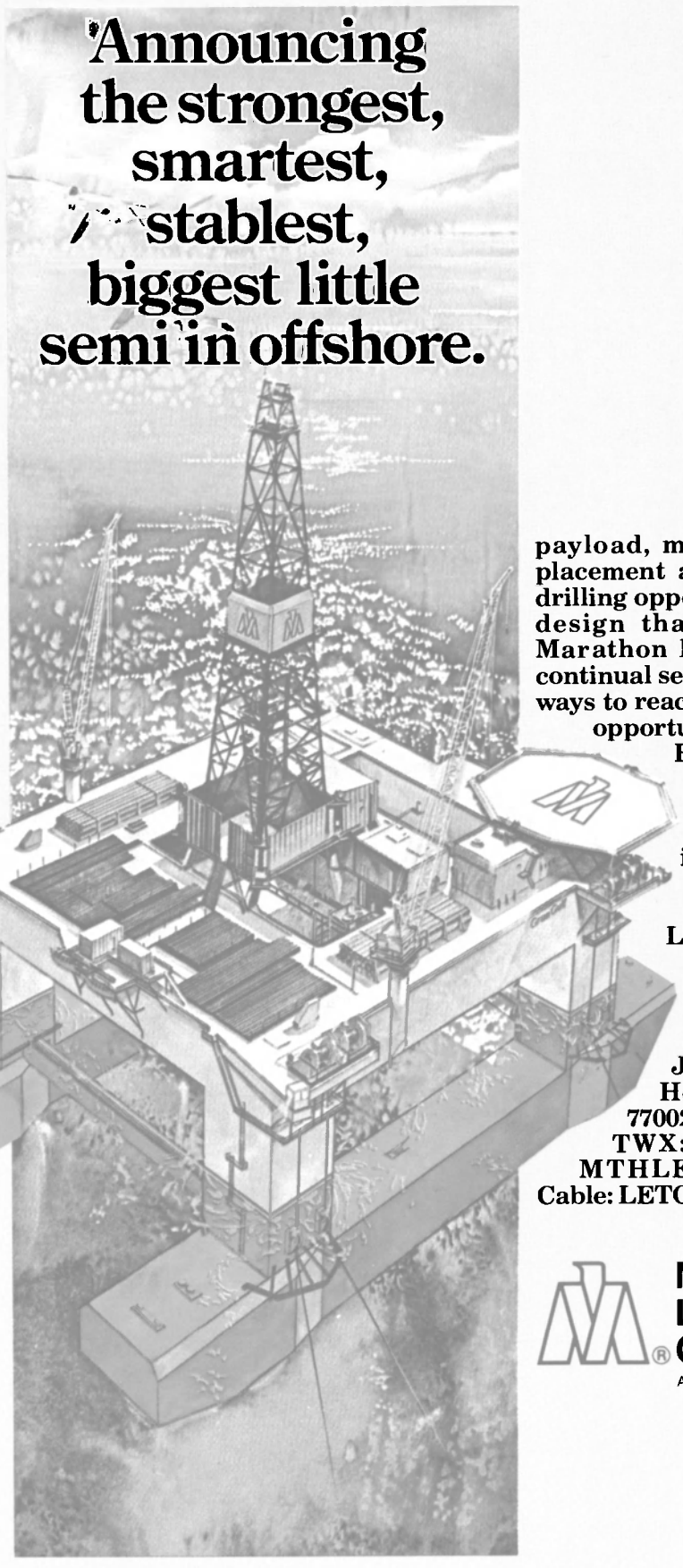

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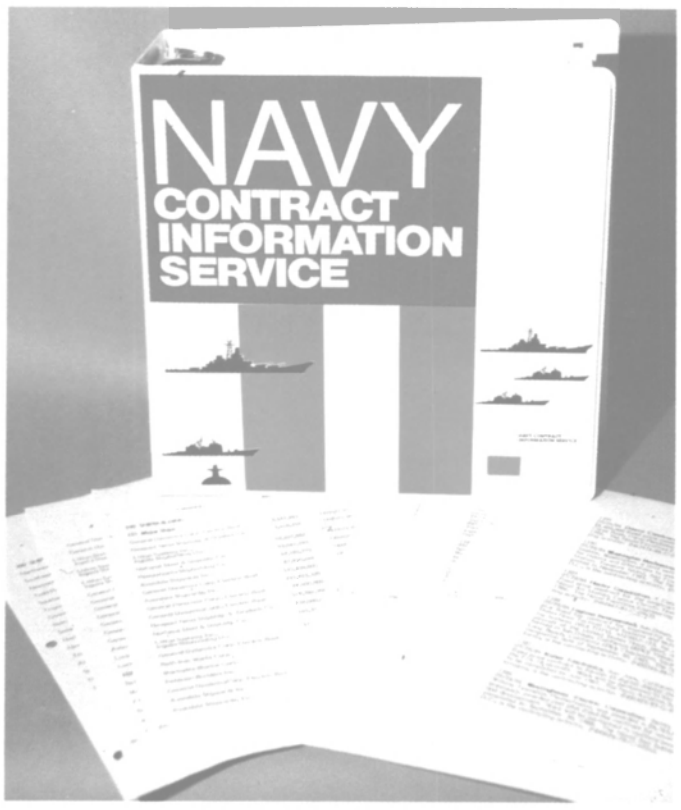

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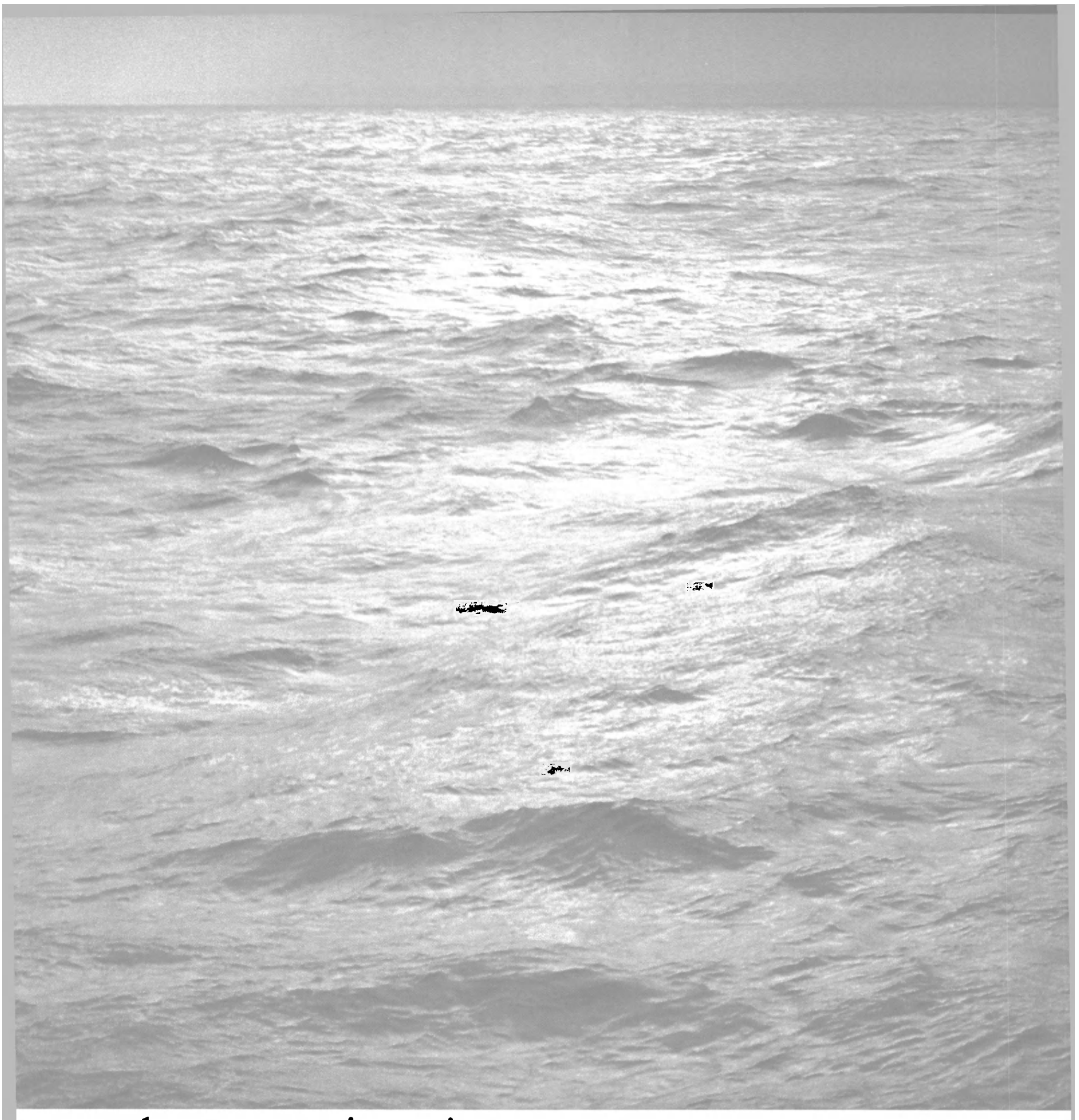

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OFFSHORE DRILLING RIGS

OFFSHORE MOBILE DRILLING UNITS UNDER CONSTRUCTION, ON ORDER, OR WITH LETTERS OF INTENT TO SHIPYARDS — APRIL 1985 (continued)

RIG OWNER	RIG NAME *	DESIGN	WATER DEPTH	SHIPYARD	ESTIMATED COST ($MM)	DELIVERY DATE	CONTRACT
		SEMISUBMERSIBLES — 31					
*Atwood Oceanics	ATWOOD OC'S UNNAMED SEMI 01	Mitsubishi, MD-602N.	2,000′	Mitsubishi - Japan		Undet	Available.
Ben Odeco Britoil	OCEAN ALLIANCE	Odeco Ocean Ranger modified, 8 columns, self propelled, dynamic positioning.	4,500′	Scott Lithgow - Greenock, Scot, UK	$180.0	09/86	Britoil - owner operate UK.
China Nanhai Baker (JFP Mgr)	NAN HAI 05	Baker Marine BMC 1600.	1,600′	Jiangen Yard - Shanghai, China	$100.0	11/85e	Available.
Consafe	SAFE TRITONIA	Gotaverken GVA 4000, 4 columns, self propelled.	1,500′	Gotaverken Arendal - Goteburg, Sweden	$85.0	12/85	Available.
Dyvi	DYVI UNNAMED SEMI 01	Dyvi Super Yatzy, self propelled, dynamic positioning capability.	2,500′	Boelwerf - Temse, Belgium	$65.0	06/87	Available.
Dyvi	DYVI UNNAMED SEMI 02	Dyvi Ultra Yatzi, self propelled, dynamic positioning capability.	2,300′	Nippon Kokan - Japan	$75.0	05/86	Available.
Golar Nor NFDS	GOLAR NOR UNNAMED SEMI 01	Aker H 4.2, 8 columns, self propelled.	2,000′	Hyundai - S Korea	$75.0	05/86	Available.
Gyllenhammer	GYL'MER UNNAMED SEMI 01	Aker H 4.2, 8 columns, self propelled, 4,000 T deck load.	2,000′	Hyundai - S Korea	$70.0	01/87	Available.
*INH	INH UNNAMED SEMI 01	Undetermined.	1,500′	Astano - El Ferrol, Spain	$160.0	Undet	INH - owner operated.
Mosvold Rederi	MOSVOLD UNNAMED SEMI 01	Super Yatzy, self propelled.	1,500′	Nakskov Skibsverft - Denmark	$90.0	03/87	Available.
Mosvold Rederi	MOSVOLD UNNAMED SEMI 02	Super Yatzy, self propelled.	1,500′	Nakskov Skibsverft - Denmark	$90.0	09/87	Available.
Odeco	OCEAN VALIANT	Odeco Ocean Odyssey, 8 columns, self propelled.	3,000′	Hyundai - S Korea	$65.0	08/86	Available.
Odeco	ODECO UNNAMED SEMI 02	Odeco Ocean Odyssey, 8 columns, self propelled.	3,000′	Hyundai - S Korea	$65.0	03/87	Available.
Odeco	ODECO UNNAMED SEMI 03	Odeco Ocean Odyssey, 8 columns, self propelled.	3,000′	Hyundai - S Korea	$65.0	06/87	Available.
Odeco	ODECO UNNAMED SEMI 04	Odeco Ocean Odyssey, 8 columns, self propelled.	3,000′	Hyundai - S Korea	$65.0	09/87	Available.
Polar Frontier	POLAR PIONEER	Sonat & Wilhelmsen, arctic, mooring assist, self propelled.	1,500′	Hitachi Zosen - Japan	$95.0	07/87	Norsk Hydro - 5 yr contract w/three 1 yr opts.
Reading & Bates	ZANE BARNES	Friede & Goldman L-1020 Trendsetter, self propelled, mooring assist.	5,000′	Ishikawajima Harima - Japan	$76.0	07/86	Available.
Ross Drlg	ROSS UNNAMED SEMI 01	Marotec/Ross design.	1,640′	Mitsubishi - Japan	$75.0	04/86	Available.
Smedvig	West Future	Marine Engineering, self propelled, dynamic positioning capability.	2,000′	Daewoo - S Korea	$87.0	05/86e	Statoil - to 1994.
Sonat	HENRY GOODRICH	Sonat & Mitsui SES 5000, 4 columns, self propelled, dynamic positioning capability.	2,000′	Mitsui - Japan	$75.0	07/85	Available.
Sonat	SONAT UNNAMED SEMI 01	Gotaverken GVA 4500, 4 columns, self propelled.	3,000′	Daewoo - S Korea	$70.0	12/86	Available.
Sonat	SONAT UNNAMED SEMI 02	Gotaverken GVA 4500, 4 columns, self propelled.	3,000′	Daewoo - S Korea	$70.0	03/87e	Available.
Sonat	SONAT UNNAMED SEMI 03	Gotaverken GVA 4500, 4 columns, self propelled.	3,000′	Daewoo - S Korea	$70.0	06/87e	Available.
Sonat	SONAT UNNAMED SEMI 04	Gotaverken GVA 4500, 4 columns, self propelled.	3,000′	Daewoo - S Korea	$70.0	05/88	Available.
Sonat	SONAT UNNAMED SEMI 05	Gotaverken GVA 4500, 4 columns, self propelled.	3,000′	Daewoo - S Korea	$70.0	10/88	Available.

(continued on page 74)

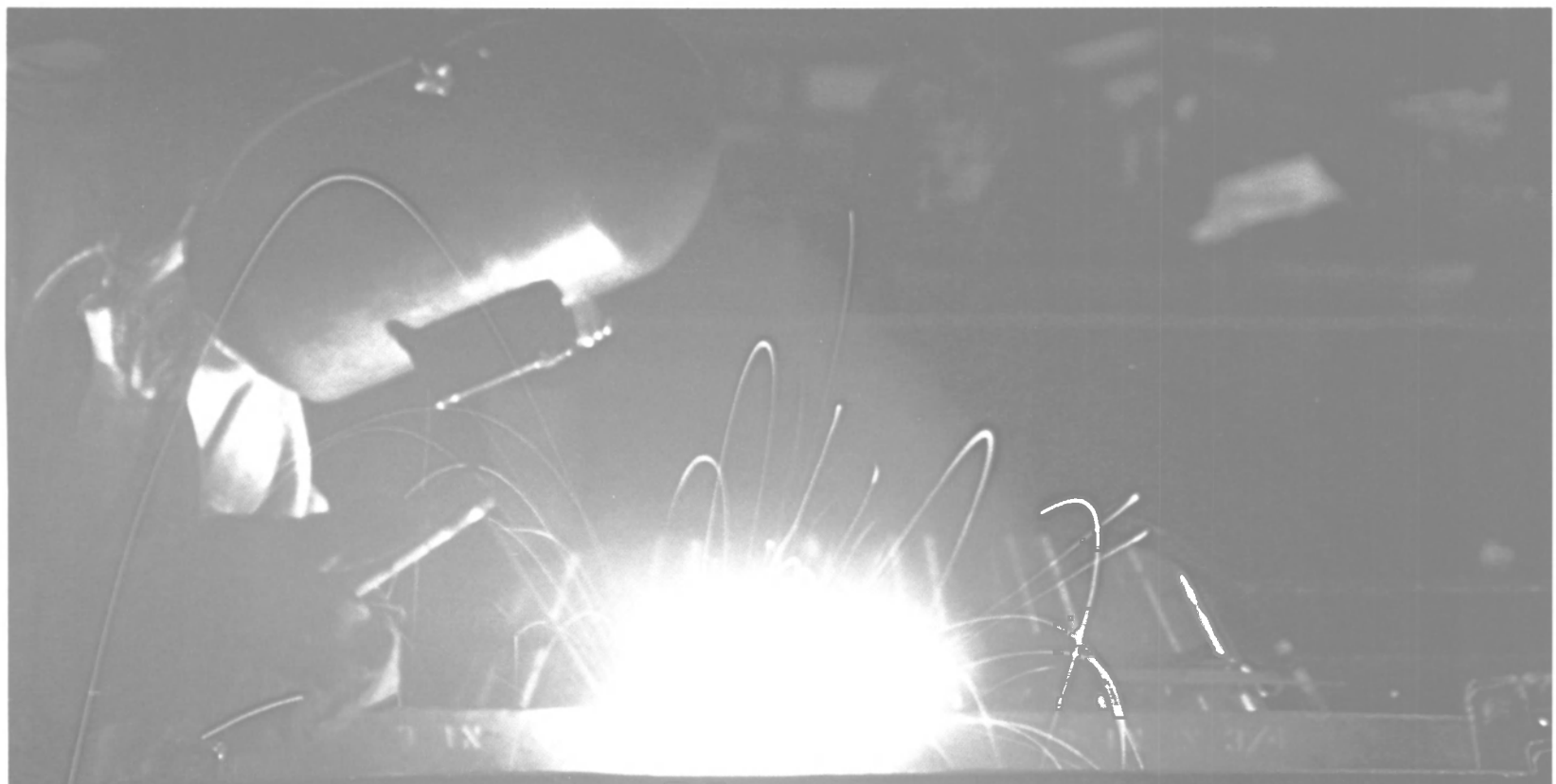
One asterisk (*) preceding the name of the contractor indicates a significant change in the status of a particular rig.

OFFSHORE DRILLING RIGS

OFFSHORE MOBILE DRILLING UNITS UNDER CONSTRUCTION, ON ORDER, OR WITH LETTERS OF INTENT TO SHIPYARDS — APRIL 1985 (continued)

RIG OWNER	RIG NAME	DESIGN	WATER DEPTH	SHIPYARD	ESTIMATED COST ($MM)	DELIVERY DATE	CONTRACT
Sonat	SONAT UNNAMED SEMI 06	Gotaverken GVA 4500, 4 columns, self propelled.	3,000′	Daewoo - S Korea	$70.0	06/89	Available.
Transocean	TRANSOCEAN 08	Aker H 4.2, 8 columns, self propelled.	2,000′	Hyundai - S Korea	$75.0	07/88	Available.
USSR	SHELF 03	Friede & Goldman enhanced Pacesetter, 6 columns, self propelled.	1,500′	Vyborg Shipyard - USSR		04/85e	USSR - owner operate Caspian Sea.
USSR	SHELF 04	Friede & Goldman enhanced Pacesetter, 6 columns, modified pacesetter, self propelled.	1,500′	Vyborg Shipyard - USSR		11/85e	USSR - owner operate Barents Sea.
USSR	SHELF 05	Friede & Goldman enhanced Pacesetter, 6 columns, modified pacesetter, self propelled.	1,500′	Astrakhan Shipyard - USSR		06/86	USSR - owner operate Sea of Okhotsk.
USSR	SHELF 06	Friede & Goldman enhanced Pacesetter, 6 columns, modified pacesetter, self propelled.	1,500′	Astrakhan Shipyard - USSR		11/86e	USSR - owner operate Caspian Sea.
		SHIPS — 2					
ONGC	SAGAR BHUSHAN	Gusto Engineering, Pelican w/conventional mooring	1,000′	Hindustan Shipyard - India		03/86	ONGC - India-owner operated.
USSR	USSR UNNAMED SHIP 01	Unknown		Unknown - USSR		1988	USSR - owner operate

Source: Offshore Data Services, Inc., Houston, Texas: The Offshore Rig Locator—published the first week of each month. Subscriptions available from Offshore Rig Data Services P.O. Box 19909, Houston, TX 77024. For full details on this and other publications and services from Offshore Data Services contact **Loran R. Sheffer**, president 3346 Walnut Bend, Houston, Texas 77042. Telephone (713) 781-2713; Telex 794 573



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CANADIAN SHIPBUILDING — 1985 —

By Henry M. Walsh, President,
Canadian Shipbuilding
and Ship Repairing Association

REVIEW AND OUTLOOK

The data in this annual statistical report brings home hard the fact that the Canadian shipbuilding, ship repairing and allied industries are at the crossroads. Policies must be implemented to strengthen our industry.

A new federal government was elected last September that promised changes in policy to revitalize the shipbuilding, ship repairing and allied industries. The Progressive Conservative Atlantic caucus said on August 2: "A top priority of a P.C. government will be to create a more viable and prosperous shipbuilding industry." But no changes in policy have been brought forward to date, although shipbuilders have

Shipbuilding and Ship Repairing Industry
— Statistical Highlights 1980–1984 —

	1980	1981	1982	1983	1984	Change from 1983 %
Order Book (Gross Tonnage)	353,100	309,900	208,900	171,000	151,700	−11.3
Order Book (Compensated Tonnage)	348,400	512,500	326,300	407,600	353,400	−13.3
New Orders—Commercial (Gross Tonnage)	163,900	106,100	7,600	17,900	29,200	+63.1
New Orders—Government (Gross Tonnage)	1,300	200	—	52,900	6,500	−87.7
New Orders During Year (Gross Tonnage)	165,200	106,300	7,600	70,800	35,700	−49.6
Deliveries (Gross Tonnage)	106,500	163,100	115,400	112,300	51,800	−53.9
Value of New Construction ($,000)	476,651	481,782	652,918	381,743	288,204	−24.5
Value of Repairs and Conversions ($,000)	207,108	313,700	296,228	204,222	250,685	+22.8
Value of Shipyard Production ($,000)	683,759	795,482	949,146	585,965	538,889	−8.0
Estimated Value of CSSRA Allied Industries Production ($,000)	135,750	155,000	151,000	153,500	155,875	+1.5
Total Value of CSSRA Shipyard and CSSRA Allied Industries Production ($,000)	819,509	950,482	1,100,146	739,465	694,764	−6.0
Value of Shipyard Production on Foreign Account ($000)	179,982	156,994	301,489	135,067	59,251	−56.1
New Construction—Fed. Gov't ($,000)	29,100	49,232	28,620	32,837	115,663	+252.2
Repairs & Conversions—Fed. Gov't ($,000)	48,564	69,801	81,345	58,433	87,426	+49.6
New Construction—Commercial ($000)	447,551	432,550	624,298	348,906	172,541	−50.5
Repairs and Conversions—Commercial ($000)	158,544	243,899	214,883	145,789	163,259	+12.0
Employment	14,599	15,305	15,205	11,300	9,433	−16.5
Average Weekly Earnings ($)	396.51	456.77	512.78	547.25	559.19	+2.2
Average Hourly Earnings ($)	9.84	11.16	12.68	13.69	14.14	+3.3
Dollar Output Per Employee ($)	59,926	66,584	79,520	75,172	76,743	+2.1
Shipments of Domestic Rolled Steel to the Industry (Tons)	42,500	27,800	25,600	18,600	20,800 (Oct. 31)	+11.8
Value of Exports ($,000)	360,437	210,931	310,431	179,799	234,075	+30.2
Value of Imports ($,000)	312,143	526,789	281,824	778,144	640,082	−17.7
Foreign Built Vessels Registered in Canada (Gross Tonnage)	70,549	143,711	48,750	198,743	235,975	+18.7
(Number of Vessels)	31	35	22	38	18	−52.6

Note: Data for 1983 have been revised.

Vessels Under Construction or on Order
in Member Yards—by Type as at December 31, 1982–1984
(Vessels Over 75 Gross Tonnage In Thousands of Tons)

Type of Vessel	1982 No.	1982 TONNAGE Gross	1982 TONNAGE Comp.	1983 No.	1983 TONNAGE Gross	1983 TONNAGE Comp.	1984 No.	1984 TONNAGE Gross	1984 TONNAGE Comp.
Government	—	—	—	16**	52.9	220.4	21***	59.4	237.1
Tankers	—	—	—	—	—	—	—	—	—
Cargo:									
Barge	—	—	—	—	—	—	2	2.0	1.8
Others	1	0.4	0.5	—	—	—	—	—	—
Bulk Carriers	5	119.9	100.1	3	75.2	65.0	3	69.7	60.7
Tugs	2	0.2	0.9	1	0.4	2.0	—	—	—
Ferries	1	0.3	0.8	2	15.3	38.2	4	17.1	42.6
Fishing	—	—	—	—	—	—	—	—	—
Offshore Supply Vessels	6	17.3	45.4	3	3.0	9.4	2	3.5	11.2
Offshore Drilling Rigs and Offshore Structures	3	35.0	105.4	1	24.2	72.6	—	—	—
Miscellaneous	2*	35.8	73.2	—	—	—	—	—	—
Total	20	208.9	326.3	26	171.0	407.6	32	151.7	353.4

* Comprises 1 data collection vessel and 1 drydock.
** Comprises 6 patrol frigates, 6 type 1100 navaids tender/light icebreakers, 3 Fisheries and Oceans vessels and 1 type 1050 navaids tender/light icebreaker.
*** Comprises all government orders of December 31, 1983, (with the exception of 1 Fisheries and Oceans vessel which was delivered in 1984), plus 2 type 800 navaids, 2 type "F" navaids, 1 type 1200 medium icebreaker and 1 acoustic sweep vessel.

Notes: 1) Government refers to Federal Government Departments.
2) Compensated tonnage is the gross tonnnage of a vessel adjusted to reflect manhours required in construction according to the O.E.C.D. formula and in some instances for specialized Canadian vessel types. From 1981, the factors have been further revised for Arctic Class vessels and barges.
3) Data for 1983 have been revised.

Source: Members of the Canadian Shipbuilding and Ship Repairing Association.

Value of New Construction, Repair and Conversions by Member Yards by Region and Destination 1982–1984 (Thousands of Dollars)

Area	1983			1984		
	Domestic	Foreign	Total	Domestic	Foreign	Total
West Coast	140,506	13,078	153,584	153,556	17,379	170,935
Great Lakes & St. Lawrence	199,747	33,484	233,231	235,077	1,956	237,033
East Coast	110,645	88,505	199,150	91,005	39,916	130,921
Total	450,898	135,067	585,965	479,638	59,251	538,889

Value of Repair and Conversions by Member Yards by Region and Destination 1982–1984 (Thousands of Dollars)

Area	1983			1984		
	Domestic	Foreign	Total	Domestic	Foreign	Total
West Coast	60,517	13,078	73,595	76,479	17,333	93,812
Great Lakes	39,140	156	39,296	39,316	100	39,416
St. Lawrence	33,833	1,700	35,533	51,499	1,856	53,355
East Coast	51,293	4,505	55,798	60,186	3,916	64,102
Total	184,783	19,439	204,222	227,480	23,205	250,685

constantly warned of the fragile state of the industry.

A joint Government/Industry meeting held on Parliament Hill January 23, 1985 unanimously endorsed resolutions to strengthen the industry. We are confident that implementation of these proposals will result in the revitalization of the industry and employment, including the generating effect, for over 42,000 Canadians.

Canada has historically been a nation of ships and shipbuilders. Canadian shipyards have remained remarkably resilient during the worldwide shipbuilding crisis, through the late '70's and early '80's. But last year saw the failure of two Nova Scotia yards. One was taken over by new management from ULS International Inc. while the provincial government is currently negotiating for a new buyer for Halifax Industries.

Because of the major government ship procurements during the year, Allied Industries marine production increased 1.5 percent. The CSSRA had a record 71 Allied members at the end of 1984. Many of our allied industries depend on healthy ship order books and their future is closely tied to the shipbuilding industry.

Last year the CSSRA submitted a brief to the Task Force on Deep-Sea Shipping, a follow-up brief to the Royal Commission on the Economic Union and Development Prospects for Canada, a personal brief to new Regional Industrial Expansion Minister **Sinclair Stevens** in October and a brief on the temporary entry situation was released in December. Another brief was presented at the joint Government/Industry meeting in January, 1985. All our briefs and comments were well received, but we have seen virtually no action on our recommendations.

The Canadian shipbuilding and allied industries are capable of filling domestic requirements. Many yards have upgraded facilities and with the cooperation of their unions have adopted realistic labour practices to meet this challenge.

Production Summary

CSSRA shipyards, which account for 95 percent of all vessels built in Canada 100 gross tonnage or more, had 32 vessels of 151,700 GT under construction or on order at December 31, 1984. Of these, 21 vessels, or 59,400 GT, were orders for the federal government. Federal government orders represented 39.2 percent of all new tonnage under construction or on order at the end of

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CANADIAN SHIPBUILDING

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1984. New government orders during 1984 included two type 800 navaids, two type "F" navaids, one type 1200 medium icebreaker, all for the Coast Guard, and one acoustic sweep vessel for Fisheries and Oceans. There was an increase of six units under construction or on order compared to the end of 1983, but an 11.3 percent decrease in tonnage levels. There was a total of 15 new orders in 1984, lower than the 23 recorded last year, but up from eleven ordered in 1982.

Member yards delivered eight vessels of 51,800 GT in 1984, including the M.V. "Prairie Harvest", a Great Lakes self unloader, and the "Bow Drill 3", a semi-submersible drilling rig. This compares with 17 deliveries of 112,300 GT in 1983 and 39 deliveries of 115,400 GT in 1982. The only export delivery in 1984 was the "Bow Drill 3".

Dollar value of new construction by member yards totalled $288,204,000 during 1984, a drop of 24.5 percent compared to 1983's level of $381,743,000. New construction for export totalled $36,046,000, down 68.8 percent from $115,628,000 in 1983. Of the 1984 total, $36,000,000 was for the "Bow Drill 3".

Repairs and conversions increased 22.8 percent to $250,685,000 from $204,222,000 in 1983. Federal government repairs and conversions amounted to $87,426,000, a 49.6 percent increase over 1983 levels.

Total dollar value of new construction and repairs and conversions slipped to $538,889,000, an eight percent drop from 1983's level of $585,965,000. The estimated value of CSSRA Allied Industries marine production was up 1.5 percent to $155,875,000. Total CSSRA member production declined six percent from $739,465,000 to $694,764,000.

Prices of most materials used by the shipbuilding and ship repair industry showed increases from 1983 to 1984, with the exception of wood products, copper and paints and varnishes, which decreased 5.1, 10.4 and 0.2 percent, respectively.

The world order book registered a decline in number of vessels and tonnage under construction or on order at the end of 1984 in comparison with 1983 levels. A total of 2,467 vessels, or 30,688,000 GT, were under construction or on order at the end of 1984, compared with 2,774 vessels of 32,620,000 GT at the end of 1983. Canada completed five merchant vessels totalling 26,000 GT last year, or 0.1 percent of the world total. Canada had 18 merchant vessels, or 0.4 percent of the world total, under construction or on order at December 31, 1984. At the end of 1983, Canada had 17 vessels and 0.3 percent of the total world order book.

Liu Elected Vice President Of American Bureau To Head R&D Division

Dr. **Donald Liu,** formerly assistant vice president of the American Bureau of Shipping, has been elected vice president. The announcement was made by ABS chairman and president **William N. Johnston** following the recent annual meeting of the Board of Managers in New York.

Dr. **Liu** joined ABS in 1966 as a surveyor on the Data Processing Staff in New York. In 1967 he was transferred to the Hull Technical Staff, and in 1968 was assigned to the Research and Development Department. He was appointed senior surveyor in 1969 and principal engineer of research and development in 1973. In 1978 he was named chief research engineer of the R&D Department. He became assistant vice president in 1983.

The Research and Development Department was raised to a Divisional level in November 1984. As vice president of this division, Dr. **Liu** will direct the many internal R&D programs of ABS, plus various sponsored research programs, and other research programs carried out in conjunction with companies in the marine and offshore drilling industry.

THE NEW DDG-51 CLASS GUIDED MISSILE DESTROYERS

—A Report—

by James Carroll

When the Navy announced on 2 April that Bath Iron Works had won the competition to build the first of the new DDG-51 (Arleigh Burke-class) Aegis guided missile destroyers it meant—for the Navy, and for the U.S. shipbuilding industry as well—the end of a very long wait.

The reason for the shipbuilders' enthusiasm is obvious: The Burkes represent, in terms of ship numbers as well as, probably, shipbuilding dollars, the biggest U.S. Navy new-construction program likely to be available from now until the end of the century. But, of that, more later.

To understand the importance of the program to the Navy it is necessary only to point out that to Navymen of all nations the destroyer is the combat ship par excellence. Unlike minesweepers, oilers, and other specialized ships such as aircraft carriers, submarines, and amphibious ships, the destroyer is available for duty—any type of duty—anywhere "At all times in all climes." The macho image of destroyers is such that for decades the standard advice given to newly commissioned male line ensigns of the U.S. Navy has been to "put in for destroyer duty." The U.S. Naval Institute's *Naval Terms Dictionary* (by Captain **John V. Noel Jr.,** USN-Ret., and Captain **Edward L. Beach,** USN-Ret.) even editorializes in its "destroyer" entry, describing the ubiquitous "tin can" as a "small, high-speed, lightly armed and un-armored jack-of-all-trades which deservedly has become the favorite of surface officers."

Destroyermen are as macho as the ships they ride. They don't get the bonus pay of the "nukes" and the "flyboys." They don't get the publicity, either—the glory that, also "deservedly," goes to those who serve aboard the Nimitz-class supercarriers deployed as a show of force off Central America, or to the crew members of the Poseidon and Trident ballistic missile submarines, least vulnerable leg of the nation's strategic deterrence triad. They're almost always overworked, have to endure the greatest extremes in weather, and stand at the far end of the line when it comes to habitability improvements. But they're sailors, by God, perhaps the last real sailors in this man's Navy, and they let you know it by the way they walk, by the way they talk, and by the way they fight.

All of which explains in large part why the 22 October 1967 sinking of the Israeli destroyer Eilat—sent to the bottom by a Soviet-built Styx anti-ship missile launched from an Egyptian Komar-class fast attack craft displacing only 70 tons—

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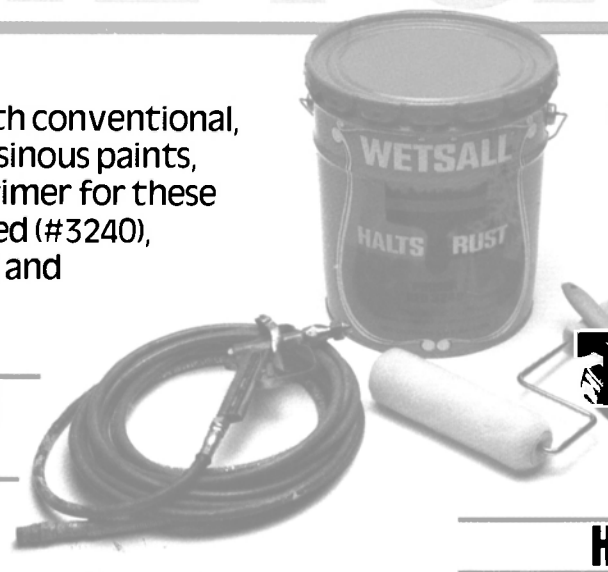

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created a tidal wave of anxiety among destroyermen everywhere. Until then, every effective threat against a surface combatant could be met by an equally effective counter-threat. Incoming enemy aircraft could be dispatched by one's own carrier-based aircraft. Other surface ships could be outrun, outmaneuvered, outgunned, and/or just simply outnumbered. Mines could be swept and neutralized. Submarines, even the USSR's superb new nuclear attack boats, could be located, identified, tracked, targeted, and eventually sunk.

But there was nothing in the inventory, or even in the long RDT&E (research, test, and evaluation) pipeline to counter the anti-ship missile—several improved versions of which, naval intelligence had reported, would soon be deployed. Among the newer versions which already had been tested were sea-skimmers invincible to U.S. shipboard radars designed for the detection of high-flying manned aircraft, and surface- and sub-launched shipbusters that could be launched from hundreds of miles away. Many would be supersonic, considerably faster than the 0.9 Mach SS-N-2 Styx missile that had sunk the Eilat.

Perhaps the most important new element in the equation, though, was the relatively low cost of the new missile vs. the much higher cost of the ship targeted. In theory, Navymen knew, any missile launched *could* be detected, *could* be tracked and targeted, and therefore *could* be shot down. But there was no way to stop the veritable swarm of missiles that could be simultaneously launched to simply overwhelm the then still primitive defensive systems of a single ship or an entire fleet.

It is almost axiomatic, though, that for every theoretical problem there is a theoretical solution. The theoretical solution the Navy sought as the answer to the not theoretical but very real problem of anti-ship missiles was to develop a new type of defensive system that could not only detect—at long range, in large numbers, and in all types of weather—incoming enemy missiles and aircraft, but also track all of them continuously, *and*, at the same time, almost automatically coordinate and direct one's own defensive complex of guns, missiles, and aircraft to meet and destroy the intruders. (The "almost" is mandatory, because mistakes in modern warfare could have such cataclysmic consequences that there must always be a human in the loop—in this case, the Navy's battle-force commander.)

That relatively easy-to-define solution was exceedingly difficult to implement, but two decades of trials and tribulations (dating, in fact, from before the Eilat sinking) led to the eventual deployment and early combat-testing of the felicitously named Aegis system. In Greek mythology, Aegis was the name of the shield belonging to Zeus. In today's U.S. Navy, Aegis is the umbrella term used to describe a complex of systems and subsystems collectively heralded as "the shield of the fleet."

If any naval warfare system deserves the description "miracle of modern technology," Aegis is it. Praised by Navy Secretary **John Lehman** as "the key to the survival of the battle group," the overall Aegis-equipped ship—integrates, coordinates, and directs a complex of some 25 separate elements, including but not limited to: the AN/SPY-1A radar system; air and surface search radars; numerous other sensor systems and ancillary display systems for battle-command purposes; navigation, radio, and other communications and support systems; and a broad spectrum of guns, missiles, torpedoes, and other weapon systems.

The heart of the system is the AN/SPY-1A radar, a unique fixed-antenna system which can automatically detect and track literally hundreds of targets while at the same time conducting a continuous scan of what Navy officials proudly, but guardedly, describe as "a vast volume of air and ocean surface space around the fleet."

It is not necessary to go into the detailed electronic specifications to

appreciate the marvels of the Aegis system, but a brief description of how the SPY-1 "phased-array" radar differs from other systems should be useful to an understanding, if only through interpolation, of the overall Aegis system. The "most obvious" difference between the SPY-1 and its conventional-radar predecessors is that, as is pointed out in an Aegis article in the May 1985 "Naval Review" issue of the *Naval Institute Proceedings,* the SPY-1 "does not have a rotating or oscillating antenna that 'paints' the target with a mechanically-swept beam on each rotation or scan.

"Instead," say the *Proceedings'* authors (Captain **Joseph L. McClane Jr.,** USN-Ret., and his son, Commander **James L. McClane Jr.,** USN), "a fixed antenna projects a narrow beam of energy in a brief pulse at a particular point. With its pencil-like beam (or 'dwell,' as it is called) searching a specified volume of space for about a millisecond [one thousandth of a second] according to a computer-controlled search doctrine, the phased-array radar does away with the ponderous inertia of the mechanically-sweeping radar antenna.

"In applications with Aegis," continue the two **McClanes,** pere et fils, "the SPY-1A provides extremely rapid target acquisition and tracking, and, equally important, the generation of constantly updated fire control data for launching and guiding missiles to their target."

The bullish title of the **McClanes'** *Proceedings* article is "The Ticonderoga Story: Aegis Works." The fact that the system does indeed work—as was dramatically demonstrated both in combat deployments off Lebanon and in numerous T&E (test and evaluation) firing missions—is one of the main reasons the Navy was finally able, after years of legislative backing and filling, to get Congressional approval to proceed with construction of the first of DDG-51 Arleigh Burkes.

To suggest that Congressional go-ahead—as well as the Navy's subsequent contract award on the first Burke—was as welcome to the nation's shipbuilders as to the Navy itself is to understate the obvious. Private-sector U.S. shipyards—and their second- and third-echelon suppliers, subcontractors, and systems manufacturers—have long been accustomed to working in "peaks and valleys" cycles, but almost never before have they had to face so depressing an outlook for future work orders.

The reasons why are complex and varied. The following, therefore, must be considered as an extremely simplified explication of the current situation:

(1) Except for routine repair and maintenance, post-WW II U.S. yards cannot expect much commercial business for the foreseeable future. There are virtually no new U.S.-flag bottoms now being built in U.S. yards, the construction differential subsidy (CDS) program is but a memory, and in the face of skyrocketing deficits direct financial relief from the federal government is almost unlikely. Moreover, unless and until the executive and legislative branches of government reach ideological agreement on the need for a sizable U.S.-flag merchant fleet for mobilization purposes, there is little hope for even indirect help through cargo-preference bills or other legislation.

(2) With commercial prospects so bleak, the private-sector yards and their suppliers and subcontractors have been turning increasingly to the Navy as now their only hope for long-term economic salvation. Fortunately—for the Navy as well as for the U.S. shipbuilding industry—the much publicized "Reagan defense buildup" is based, in naval/military terms, on a "forward strategy," and that means a heavy emphasis on sea service forces: the Navy to protect the sea lanes and to show the flag on an around-the-world basis, and the Marine Corps as a quickly mobilizable rapid deployment force in being.

(3) In 1968, at the height of the war in Vietnam, the Navy had in its active fleet inventory over 1,000 ships of all types. Many of those ships were on their last sea legs, though—holdovers from the WW II building boom and not really suited for naval warfare in an age of nuclear propulsion, anti-ship missiles,

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and instantaneous worldwide communications via satellite. By the late 1970s literally hundreds had been stricken from the register—scrapped, shifted to the National Defense Reserve Fleet (NDRF), sold or otherwise transferred to Third World allies, or assigned to the Naval Reserve. (It is worth noting that not one was sunk by enemy action.)

(4) In normal times—however "normal" is defined in this second half of the most abnormal century in all of recorded history—the ships dropped from the register would have been replaced, probably on a one-for-one basis. (Theoretically, fewer ships would be required, because the replacement ships would be, and are, much more capable than the ships being replaced; that factor is more than offset, though, by the increase in U.S. commitments worldwide and the burgeoning post-WW II growth of the Soviet Navy.) Moreover, the 1960s and 1970s were particularly bad times for the U.S. Navy. Shipbuilding was cut back repeatedly to pay for the more immediate needs of U.S. air and ground units on the scene in Vietnam; one year, only five ships were funded.

(5) There was no postwar catch-up period, either, largely because defense spending in general declined during the politically troubled Nixon/Ford years. There was a modest upturn during the Carter Administration, but Naval Acadamy graduate **Carter** and his Secretary of Defense, **Harold Brown,** favored a "Central Front" strategy which emphasized the importance of the air and ground units positioned on NATO's Central Front in Europe and relegated the Navy and Marine Corps to a more or less subordinate role. The Iranian hostage crisis demonstrated, rather belatedly, the continuing need for globally deployed naval/maritime forces, but by that time several private-sector yards already had gone belly up, and the overall shipbuilding industrial base was in a state of grim uncertainty.

(6) Depression changed to a state of near euphoria soon after Mr. **Reagan** was inaugurated and, with Navy Secretary **Lehman** and Secretary of Defense **Caspar Weinberger** acting as spokesmen, announced, articulated, and speedily implemented the previously mentioned "forward strategy" of defense with its emphasis on sea service forces. In one of Mr. **Carter's** last acts as President he submitted a fiscal year 1982 budget request that projected, among other things, construction of only 14 new ships (at a cost of $6.6 billion) with FY 1982 funding, and only nine ships (costing $6.7 billion) with FY 1983 funding. On 4 March 1981, Mr. **Weinberger** unveiled the much revised budget request sent to Congress the previous day and announced that Mr. **Reagan** was seeking an additional $32.6 billion for defense. Included in the overall total was $6.8 billion in supplemental funding sought for fiscal year 1981—the then-current fiscal year—and $25.8 billion extra for FY 1982. The latter increases represent the largest peacetime funding add-on for defense programs in U.S. history, and included $3.8 billion more for FY 1982 shipbuilding programs, bringing the overall SCN (shipbuilding and conversion, Navy) funding request to $10.4 billion. (The 4 March revisions also added $367 million to the FY 1981 SCN budget, and thus provided even earlier relief to the beleaguered U.S. shipbuilding industry.)

Congress has, in general, supported the forward strategy as well, and except for a few minor reductions and stretchouts has approved in toto all of Mr. **Reagan's** SCN requirements; the $10 billion annual shipbuilding budget is now almost a fixed cost item in the overall Defense Department budget, and can be expected to remain at or above the $10-12 billion level for at least the next several years, and probably longer.

There are several caveats that should be remembered, though. One is that, media and political criticism to the contrary notwithstanding, the Reagan Administration has been extremely parsimonious in doling out

its shipbuilding dollars. Navy Secretary **Lehman** does his homework well, and he is a hard bargainer. He almost always gets what he asks for from Congress, but then turns around and insists on getting from the private sector full value, and then some, for every shipbuilding or aircraft procurement dollar spent. He is wedded to the concept of competition, and has used it to drive down prices. He is also a bargain-hunter, willing to buy no-longer-competitive merchant ships, whether U.S.-built or foreign-built (the Sea-Land SL-7s are a particularly good example), for conversion, modernization, and subsequent assignment to either the active fleet or the Military Sealift Command's reinvigorated Ready Reserve Force (RRF).

A second caveat is that Pentagon procurement practices overall have been in a state of flux in recent years, with much greater emphasis on serious production and multi-year and multi-unit procurement. The net effect from the contractor's point of view is better long-term security and a potentially higher profit margin, but at the same time a higher element of risk involving difficult-to-absorb losses if actual costs exceed estimated costs.

Yet a third caveat, perhaps the most important insofar as the U.S. shipbuilding community is concerned, is that the Reagan/Weinberger/Lehman buildup to a 600-ship fleet is predicated largely on: (1) Conversions of ships already in the inventory (SLEP means service-life extension program); (2) Reactivation of older ships, such as the Iowa-class battleships; and (3) Increases in the building rate of ships proposed earlier in the Carter SCN program—e.g., SSN-688 (Los Angeles-class I) nuclear attack submarines, and the Ticonderoga-class Aegis guided missile cruisers.

In that context, the start of the DDG-51 Arleigh Burke construction program takes on special significance. With Newport News Shipbuilding locked in as prime contractor on all new aircraft carriers, and with Newport News and the Electric Boat Division of General Dynamics sharing the submarine programs between them (not necessarily on a 50-50 basis, though), the DDG-51s represented by far the biggest new-construction opportunity open to virtually all bidders. Added to that huge economic incentive are a number of other factors, including the following:

(1) Although present Navy plans project construction of only 29 Burkes—at a total program cost of $20-30 billion—earlier projections were based on a total program ranging from 49 ships (the number proposed by the Carter Administration) to 63 ships (the number earlier used by Reagan Administration witnesses before Congress, and *still* used by Congressional Budget Office staffers in their "most likely" scenarios developed for long-term budget planning.)

(2) The lead-ship award to BIW doesn't end the competition; it only ends Round One. The Navy plans to bring a second yard into the production program in 1987, and possibly a third yard a year or two later. There are several reasons for this approach: to spread the work around, and keep more yards economically viable; to get more ships into the active fleet at an earlier date; and to keep the competition alive—and, thus, to keep costs low—for the entire life of the program.

(3) The continuing drive for systems "commonality" and for use of "off the shelf" technology and components in new-ship construction makes it almost inevitable that those yards, suppliers, and subcontractors that win a piece of the Aegis action will have a leg up in the bidding for future contract awards, whether new-construction or repair/renovation/modernization.

One general observation, before looking at some of the more important specifics of the DDG-51 design and its various hardware and propulsion systems: Although the Arleigh Burke will be, like its illustrious destroyer predecessors, a naval jack-of-all-trades (and master of most), it will be as unlike the fabled "tin can" of the WWII years as today's "Right Stuff" astronauts are from the aerial barnstormers of the between-wars era. The machismo is

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there, and so is the swagger. But all systems have been upgraded. An article in the March/April 1984 issue of *Naval Surface Warfare* points out both the similarities and the differences between the "small boys" of old and the new Burkes.

The similarities: "In the Arleigh Burke-class, surface sailors will recognize a return to the classic destroyer with its characteristically excellent to superior capabilities across the entire spectrum of naval warfare, including the traditional warfare tasks of antiair, antisurface, antisubmarine, amphibious, and strike warfare."

The differences: The DDG-51 will have "the most advanced technology available" for each of its various combat missions. Its antiair warfare (AAW) systems represent "a tremendous advance . . . in terms of performance, reaction time, firepower, availability, and area coverage [and are] specifically designed to counter the threat expected in the 1990s and beyond." It also has "an excellent ASW capability thanks primarily to its "state-of-the-art long-range hull sonar system." Its AN/SQR 19 towed-array sonar "provides long-range passive detection, classification, and localization capabilities for both ASW and ASUW [antisurface warfare] over-the-horizon targeting engagements." Harpoon missiles and laser-controlled gunfire control system add significantly to the Burke's ASUW potential and, with the Tomahawk cruise missiles the hip also carries, "contribute to the 51's character as the most versatile and offense-capable destroyer built to date." The Tomahawks themselves "can be fired with great accuracy at long range against selected, fixed targets ashore as well as ships at sea," and give the Burke "a major strike warfare capability."

Paradoxically, perhaps, the Burke's state-of-the-art superiority over her immediate and more distant predecessors is reflected not so much in the hardware (and software) she carries, but in her displacement and manpower. The "full load" displacement of the Arleigh Burke, as listed in the 1984-85 edition of *Jane's Fighting Ships,* the independent U.K. publication long regarded as the "bible" of the world's navies, is 8,400 tons; complement is 271 (21 officers and 250 enlisted personnel). "This class is designated," *Jane's* notes, "as replacements for the Adams and Coontz classes of guided missile destroyers." Full-load displacement of the Charles F. Adams (DDG-2) and other ships of the Adams class is 4,825 tons; complement is 354 (24 officers, 330 enlisted). The Coontz (DDG-40) and other ships of her class (the hull numbers of which start with Farragut, DDG-37) are somewhat larger, displacing 6,150 tons; complement for Coontz-class ships is 377 (21 officers, 356 enlisted).

Earlier editions of *Jane's* (the 1974-75 volume, for example) show that the Allen M. Sumner-class destroyers of WWII vintage had a complement of 287 (17 officers, 270 enlisted), and displaced 3,320 tons, full load.

What has happened is clear: To meet the much more complicated, and much more versatile, spectrum of threats in today's high-density naval warfare environment, destroyers have, like a number of other ship types, necessarily had to be increased in size to carry the bewildering variety of ordnance and electronic systems and subsystems needed both for their own survival and to carry out the numerous and diverse missions likely to be assigned. But they also have—again, necessarily—gotten much more highly automated, as measured in the steadily changing complement/displacement ratio.

Following—from *Jane's,* the Navy League's 1985 *Almanac of Seapower,* and other publications—are the vital statistics on the DDG-51, and brief descriptions of some of the ship's principal armament, propulsion, and electronic systems.

Basic Statistics: length, 466 feet; beam, 60 feet; draft, 30 feet; speed, in excess of 30 knots; range, 5,000 miles (at 20 knots).

Design: The ship's "new hull

form," according to *Surface Warfare* (March/April 1984 issue), "is optimized for sea-keeping in heavy seas and is designed with better survivability than her predecessors. It reduces vertical motion at sea and allows higher speeds in increased sea states." Other design features: all-steel construction (except for the aluminum funnels); steel-space-steel plating to protect vital spaces; use of over 100 tons of Kevlar to coat and super-harden vital spaces; installation of a "collective protection system" which filters all incoming air and maintains internal air pressure at a higher level than external air pressure, thus blocking the ingress of NBC (nuclear, biological, chemical) contamination; added protection against EMP (electromagnetic pulsing—the specific protective measures planned and technology used are classified); and a heavy emphasis on "passive protection" through, among other things, a superstructure that slopes away from the hull (rather than forming right angles with it) and the location below the main deck of such vital spaces as the combat information center and communications room.

Armament: In addition to the Harpoons and Tomahawks, the Burke will carry ASROC (anti-submarine rocket) and SM-2 (Standard) surface-to-air missiles and will be fitted with two deck-mounted Mk 32 triple torpedo tubes, two improved Phalanx 20mm close-in weapon systems, and one 5″/54 caliber gun. Although she does not have a helicopter hangar, she does have a landing pad aft and is equipped with all the communications and other systems needed to handle the LAMPS (light airborne multi-purpose system) Mk III ASW helicopter. Perhaps her most important offense feature, though—it certainly is the most innovative—will be a vertical-launch system (VLS) for Tomahawks, SM-2s, and ASROCs. The Mk 41 VLS, built for the Navy by Martin Marietta, gives the DDG-51 the ability to carry and fire more missiles, more rapidly and more effectively, and with less chance of malfunction. The Burkes will carry two VLS units—a 32-cell system forward, and a 64-cell system aft.

Propulsion: The power plant will be much the same as that in the Ticonderogas: four General Electric LM 2500 gas turbines, two shafts, two rudders, 100,000 shp. "Second flight" Burkes (DDG-58 and after) also are likely to be equipped with Solar Turbines' so-called "Racer" (Ranking cycle Energy Recovery) system, which uses waste heat from the turbines to develop additional energy and make the overall power plant more efficient.

Electronics: Fitted with the SPY-1D—an improved, lighter-weight version of the Ticonderoga's SPY-1A—phased array radar (but with one transmitter, instead of two, and three rather than four illuminators), the Burke will be the most AAW-capable destroyer ever built. Other major electronics systems include: the SPS 67 (V) surface search radar (but no separate air search radar); the SQR 19 (TACTAS) towed-array sonar and a bow-mounted SQS-53C sonar: IFF, Tacan, and electronic countermeasures systems; and numerous computers, displays, and radio and navigation systems.

A few final points about the DDG-51 Arleigh Burke guided missile destroyer program itself, and about its significance to the U.S. shipbuilding industry, the Navy, and the nation:

• Possibly no other ship class in the post-WWII era has been better named. Former Chief of Naval Operations Admiral **Arleigh A. Burke,** USN-Ret., first gained fame in World War II in the Pacific, where his dash and daring as commander of DesRon 23 (Destroyer Squadron 23, better known as the "Little Beavers") won him the nickname "31-Knot Burke." The only officer ever to serve three tours as chief of naval operations, he is also one of the only two USN officers—Admiral **Hyman G. Rickover,** USN-Ret., "the father of the nuclear Navy," is the other—to have a ship (or, in Burke's case, a ship class) named after him during his own lifetime.

• The currently planned 29-ship program might easily be expanded, as suggested earlier, to 49, or 63, or even a larger number of ships. The rationale for an increase was spelled out by **Norman Friedman** in the

(continued on page 88)

DDG-51 CLASS

(continued)

March 1985 issue of *International Defense Review:* The combination of increasing commitments and probable retirement of a number of now-active surface combatants "leaves very large requirements for new destroyers, to support the Aegis cruisers and to protect underway replenishment groups and amphibious groups, all of which might well be exposed to intense air attack. Earlier Navy studies indicated there would be a requirement for "up to 63 missile-armed destroyers. . . . Note that by the late nineties it will be necessary to replace, in addition, the large number of ASW escorts built during the sixties. The replacement is now generally designated the FFX, but it might conceivably use the Burke's hull."

• Finally, it would be difficult if not impossible to overstate the Navy's need—both present and future—for a new destroyer of the Burke's capabilities. In that context, an assessment made many years ago by Fleet Admiral **Chester W. Nimitz**—and repeated in the October 1984 issue of *Sea Power Magazine,* in a DDG-51 article by **Vincent C. Thomas**—seems as relevant today as when it was first uttered: "Of all the tools the Navy will employ to control the seas in any future war, the most useful of the small types of combatant ships, the destroyer, will be there. Its appearance may be altered, and it may even be called by some other name, but no type—not even the carrier or the submarine—has such an assured place in future navies."

Equador Will Host 9th Panamerican Congress On Naval Engineering

The Panamerican Institute of Naval Engineering (IPEN) has announced that the 9th Panamerican Congress on Naval Engineering, Maritime Transportation and Port Engineering (COPINAVAL) will be held in Guayaquil, Equador, July 14-18 this year. The site will be the Uni Hotel located in downtown Guayaquil. A concurrent exhibition of marine products and services will take place at the same location.

The Organizing Committee for IX COPINAVAL is headed by Adm. **Guillermo Duenas Iturralde,** president of IPEN. Others on the Committee include: Tte. de Navio **Diego Mantilla Jaramillo,** general coordinator; Eng. **Roberto Toledo** and Eng. **Cristobal Mariscal,** protocol and social events; **Miguel Zea Laino,** public relations and press; and Eng. **Gustavo Frydson Caicedo,** the exhibition.

Several post-congress tours have been planned by the Organizing Committee at very attractive rates. These include a four-day trip to the Galapagos Islands; a three-day tour of Quito and surroundings; and a three-day visit to the city of Cuenca and surroundings.

For additional information on IX COPINAVAL, contact **Roberto Toledo,** P.O. 9138, Guayaquil, Equador; telephone 025-296-5.

Dutch Drydock Purchased By Norfolk Shipbuilding

Norfolk Shipbuilding & Drydock Corp. (Norshipco) of Norfolk, Va., has purchased a used floating drydock from the Verolme Botlik Shipyard in Rotterdam.

Built in 1960, the steel dock is in excellent condition and is expected to need no major repairs. It is 204 meters long (670 feet) by 39.29 meters wide (123 feet), and has a capacity for lifting vessels weighing up to 20,000 metric tons.

Heavylift oceangoing barges will carry the dock from Rotterdam to Norfolk in two separate sections, with the first scheduled to arrive this month, and the second in mid-July. The dock is expected to be operational by early fall.

Harris Gets Subcontract To Supply HF Equipment For Canadian Frigate Program

Harris HF Communications Group of Rochester, N.Y., is under subcontract with Paramax Electronics, Inc. of Montreal to supply HF communications equipment for the Canadian Navy under the Patrol Frigate Program. The HF equipment to be supplied is from Harris' extensive standard HF communications product line, and will include receivers, transmitters, performance monitors, and antenna couplers.

The Harris RF-590 receiver, for example, is now the standard HF receiver for the Canadian patrol frigate, and will be installed in six new frigates being constructed for the Canadian Navy. These receivers are manufactured in Dorval, Quebec, at Harris Farinon Canada, Inc. RF Communications Canada Operation, as well as at the main plant in Rochester.

The RF-590 covers the 10 kHz to 30 mHz range, and represents the latest in high-technology advances, with microprocessor functions providing easy operation and adaptability. It is a companion to the Harris RF-1130-01 1-kw transmitter, also a part of the CPF program. The latter unit features the Harris RF-1310 solid-state exciter, and is used to cover the 1.5 to 30 mHz frequency band.

For further information on Harris HF Communications Group,

Circle 54 on Reader Service Card

Brochure On "Sea Float" Marine Buoys And Floats Offered By Seaward

Seaward International, Inc. has published a new four-color brochure on their line of Sea Float marine buoys and floats. This brochure covers construction, advantages and range of designs for Sea Floats. It includes several color photographs, as well as a construction diagram of a typical Sea Float.

Seaward International's Sea Float marine buoys and floats are resilient, foam-filled surface floats for marine and offshore applications. Designed as an improvement over conventional steel buoys, Sea Float buoys are available in numerous standard configurations and sizes. Typical applications include use as anchor pendant buoys for offshore pipelaying and crane barges, and semisubmersible drilling and workover rigs. Sea Floats are also used as chain support buoys for single point mooring buoy hawsers and hoses, mooring buoys, and marker buoys, etc.

For additional information and a free brochure from Seaward International,

Circle 37 on Reader Service Card

Multi-Purpose Freighters To Be Built By Seebeck

Seebeckwerft AG of Bremerhaven, West Germany, has received orders to build two 3,000-ton multi-purpose freighters for two shipping companies in Leer. The vessels are of a new ship-type developed by the Seebeck shipyard in conjunction with their clients. The basis of this new construction is the ECO-type vessel, which was developed by Seebeck, with three being delivered to date. Three other ECO-type ships are on order from the yard.

The order of the two small multi-purpose freighters follows a recent order for two jumbo-ferry ships for the TT-Saga Line (each of 30,000 gt and with a total value of approximately $95.4-million).

The multi-purpose freighters destined for Leer will be strengthened for heavy-lift cargo and will be fitted for the carriage of containers. They will have space for 244 TEUs.

With the combination of the multi-purpose freighters and the ECO-freighters, Seebeck has set foot in a ship-class sphere which was previously the domain of the Rickmers shipyard.

Omnipure Awarded $1.3-Million Contract From Canadian Navy

A contract was awarded recently to Omnipure, a division of Sigma-Chapman, Inc., Houston, Texas, exceeding $1.3 million to design and build Marine Sanitation Devices (MSD) for six new patrol frigates of the Canadian Navy, according to **Leonard Langeland**, Omnipure president.

"These particular MSD units," said Mr. **Langeland,** "will be specially designed for high-impact shock resistance, and engineered for extremely low noise and vibration levels."

Mr. **Langeland** also stated that the smaller size and reduced weight of these MSD units on each 224-man vessel will allow additional equipment and supplies to be carried.

The Canadian Navy's decision to add these MSDs represents a growing trend of navies throughout the world to honor the "good citizen" concept of proper sewage treatment before discharge at sea.

The Omnipure MSD utilizes a patented electrocatalytic process for the treatment of both black and gray waste water, and is certified by the US Coast Guard, the International Maritime Organization, DOT-UK, Sweden, Denmark and several other authorities.

The "City Class" Patrol Frigates are being built by Saint John Shipbuilding Ltd., at shipyards in New Brunswick and Ontario, Canada, and will be completed during the period from 1986 to 1988.

For a free brochure containing complete details and specifications on the Omnipure units,

Circle 25 on Reader Service Card

Circle 315 on Reader Service Card

Circle 21[illegible] on Reader Service Card

New IMA Report On Future U.S. Navy Procurement Now Available

A totally new report has been completed by IMA. It is a thoroughly professional assessment of future U.S. Navy procurement. The report is designed to assist U.S. and foreign firms interested in selling to the $40-billion-per-year U.S. Navy market.

The 220-page report will be useful to business planners and marketing managers. It looks at the Navy through the businessman's eyes. All aspects of procurement are covered—shipbuilding, electronics and ordnance, mechanical systems, systems integration, and engineering services. Information in the report is current as of April 1985 and includes the DDG 51 award.

This is the fourth report prepared by IMA dealing with business opportunities thrown off by future U.S. Navy programs. Last July, IMA published an analysis of future Navy ship maintenance and overhaul. Each report is designed to provide data useful in setting business strategy and market plans.

As in previous reports the emphasis is on the future. Navy spending plans over the next 3-5 years are identified. Specific programs are then assessed to highlight the types of available business opportunities. Exhibits and appendices provide statistical data reporting contract awards and projected program quantities and costs.

Backup information required for market planning is included. Current competitors are identified. Navy planning and procurement management procedures are concisely described. Rules and procedures for market entry by U.S. and foreign firms are provided. Names and phone numbers are listed in a convenient format for marketing follow-up in Navy and industry.

Quarterly updates to the basic report will be issued. They will report changes which affect industry over the coming year. The first update will be issued August 1.

The report and four quarterly updates are available for $480. To order please send check or purchase order to International Maritime Associates, Inc., 1800 K Street, N.W., Washington, D.C. 20006. Orders can also be telecopied to (202) 293-7508 or telexed to IMA 64325.

Dubai Drydocks Reports Profit For Second Year —Literature Available

Dubai Drydocks, which declared a profit after its first year of activity, reported a profit exceeding expectations at the completion of its second year of operation at the end of February of this year.

Since opening the yard in March 1983, and despite the adverse effects of the Iran/Iraq war and the depressed shipping market in the world, Dubai Drydocks has become firmly established in the market as one of the largest ship repairers in the Persian Gulf.

By the end of the second year, 135 vessels with a total of 9.2 million dwt were successfully repaired by the yard, more than doubling the figures of 68 vessels of 4 million dwt for the first year. As of March 1, 1985, the number of vessels repaired was 183, with sizes varying from the smallest ocean research vessel to the largest ULCC—the 423,000-dwt Buyuk Selcuklu—bringing the total number of ULCCs repaired to 10 and the number of VLCCs to 31. A variety of tankers, general cargo and bulk carriers, supply vessels, dredgers, derrick barges, rigs and crane ships, etc., have all entered the drydocks for repairs and general maintenance.

The related activities of the yard, such as the tank cleaning station, galvanizing plant, electrical shop, laboratory and extensive machine shop facilities, are all fully operational and are said to serve the Gulf market with increasing demand and success.

The third year of operation is now underway for Dubai Drydocks, with an encouraging volume of outstanding orders pointing to a promising year ahead.

For further literature containing full information,

Circle 20 on Reader Service Card

Farboil Offers Free Four-Color Folder On Wetsall® Coatings

The Farboil Company of Baltimore, Md., is offering a free four-color folder on Wetsall®, the primer specially designed by Farboil, after years of extensive laboratory and field research, to penetrate damp, rusty surfaces.

Under the heading "Life Insurance for Metal Surfaces," the text of the brochure mentions that if you have painted over damp, rusty surfaces with conventional paint primers, you know what happens—the first coat of primer doesn't adhere properly and, since the entire paint system depends on that bond, the whole system fails. However, time and cost constraints often require that you paint under such conditions. Farboil's solution to the problem is Wetsall, which penetrates rust and moisture and chemically bonds tight rust and firmly adhering paint to steel surfaces. It forces moisture out through the paint and forms a tough coating that stops further rusting. Wetsall's penetration is said to be so effective that existing rust becomes an integral part of the coating.

Advantages pointed out in the publications are: Wetsall requires less preparation in that it eliminates the need for dry surfaces and the need for costly sand or shot blasting to remove rust; Wetsall is a fast drying coating that also performs well as a finish for up to 30 months, resisting exposure to salt spray, ultraviolet rays, chemical and oil fumes and spillage, humidity and moisture; and Wetsall has excellent coverage—one gallon will cover up to 400 square feet.

The back page of the folder contains results from extensive 30 and 54-month exposure tests conducted on Farboil's Wetsall coatings by the Steel Structures Painting Council. Wetsall scored an average rating of 8.2 and 8.9 out of a perfect 10 points, respectively. According to the manufacturer, Wetsall proved, at 1.4 mils thickness, to be among the highest performing, commercially obtainable and economically priced products in the test.

Wetsall is available in red, grey, white and black to cover all anti-corrosive priming needs.

For additional information on Wetsall and other Farboil marine paints and protective coatings,

Circle 36 on Reader Service Card

Devoe Offers Brochure On Marine And Corrosion Control Paints & Coatings

Devoe Marine Coatings Co., Division of Grow Group, Inc., has published a six-page color brochure that highlights the high-quality, technologically advanced marine and corrosion control coatings the company produces.

Titled "Full Speed Ahead With Devoe Marine Coatings Co.," the introduction informs us that as marine coatings specialists, the company manufactures a complete line of high-performance coatings for corrosion protection of every type of marine vessel and structure including ships, barges, drilling rigs, offshore production platforms, tugs, naval vessels and pleasure craft. Their extensive product line offers a coating for every area of the vessel—exterior hulls, cargo tanks, ballast tanks, chemical tanks, water tanks, sewage tanks, voids, decks, interior spaces and offshore equipment.

Devoe's Research and Development Laboratory, located in Louisville, Ky., is described as a complex where scientists, chemists, and technicians constantly analyze the corrosion, service requirements and application problems of the marine community, resulting in the continuous development of high performance coating formulations to address the needs of the marine and offshore industries. The epoxy resin was invented by Devoe chemists.

Among product lines discussed are the high performance Devran marine coatings systems; Catha-Coat high quality inorganic zinc coatings; the ABC-AF system of ablative antifouling coatings; the Bar Rust product line that provides economic corrosion control in situations where grit blasting is impractical or too costly; and the Devflex line of fire-retardant, water-based enamels.

The company's "Supply and Apply" service is explained as a concept where Devoe Marine is designated as the prime contractor by the owner or shipyard, with Devoe furnishing the coating material and application service. The significant benefits to the customer include a complete turnkey project from initial survey to final inspection and guarantee; the concept is applicable to a single task maintenance contract or to a long-term maintenance situation.

Devoe's commitment to safety, health and environmental protection is emphasized with the coal tar-free "coal tar epoxy" product line that eliminates the carcinogenic exposure risks associated with coal tar resins, and in a number of other products developed by the company.

A listing by name of high performance specialty coatings for commercial, offshore, and military use is included in the publication, along with photographs and drawings that complement the text.

For further information and a free copy of the brochure from Devoe Marine Coatings,

Circle 26 on Reader Service Card

New Portable Hoists Line With Failsafe Brakes Now Available From PHD

A new line of portable hoists featuring a unique, failsafe brake system is now available from Philadelphia Hoist Division of General Machine Products Co., Inc.

These Model 70 Series Ratchetlift hoists are available in capacities to six tons. They are rugged, low cost, lightweight and employ a brake system that permits the hoist to be used with complete safety and reliability even after accidental exposure to oil, water, grease, dirt, mud, most types of chemicals and other contaminants. They can remain in service with no loss of braking or hoisting efficiency after being exposed to water, oil or moisture. As a result they are ideal for use in a wide variety of applications that can prove harmful to other types of hoists.

The unit can be used vertically, horizontally or diagonally in any indoor or outdoor environment. Details and specifications on Ratchetlift Hoists in capacities from ¾ to 6 tons are given in Bulletin 762. To obtain a copy of the bulletin,

Circle 38 on Reader Service Card

World Transport Coordinates Wet Tow Of Western Oceanic Rig

In late 1984, Western Oceanic of Houston, Texas sought bids for the transport of their rig, Western Pacesetter II, and support cargo from Falmouth, U.K. to Sabine Pass, Texas. The Western Pacesetter II is a large semisubmersible offshore drill rig which was scheduled for overhaul in the U.S. Gulf at Sabine, Texas.

World Marine Transport & Salvage, Inc., and their sister company, Marinus Shipping Americas, Inc., both of Houston, Texas, submitted a complete package bid for transport of the rig and support cargo from Falmouth to the U.S. Gulf.

World Marine arranged for the 16,000 hp tug, Abeille Provence, owned by Les Abeilles International, to wet tow the rig from Falmouth to Sabine. Additional support cargo and equipment was shipped ahead by Marinus Shipping on the deep sea vessel, M.V. Inga Bastian, to await the rig's arrival.

The concept of a joint venture package of a wet tow for the rig and the ship transport for support cargo is not a new one for World Marine Transport/Marinus Shipping. The companies hope to demonstrate again to the offshore market the practicality and advantages of such transports as more drilling companies move their rigs worldwide. For additional information on the services offered by World Marine Transport/Marinus Shipping,

Circle 323 on Reader Service Card

Marinette Marine Installs First DWB Ship Transfer System In North America

Marinette Marine Corporation in Marinette, Wisc., is the first shipyard in North America to install a dual walking beam (DWB) ship transfer system as part of its continued upgrading of facilities and emphasis on state-of-the-art technology. The 1,600-ton transfer system, manufactured by Total Transportation Systems of Norway, will be used to move the wooden MCM minesweepers from Marinette's new 70,000-square-foot ship erection building to the outside launch area.

"With the DWB system, we're able to get the most out of our indoor facility because there is no longer a need for heavy cranes or separate covered building berths outside. This way, we build everything we can inside, obtaining maximum efficiency, then use the DWB system for moving the ship to the final staging area for launching," says **Larry N. Hairston,** vice president of marketing for MMC.

Installation of the TTS system is part of the shipyard's modernization program, which includes the most sophisticated engineering capabilities in American shipbuilding today, according to Mr. **Hairston.**

"We clearly see that we've got to maintain pace technologically if we're going to remain competitive in one of the world's most cost-conscious industries," he says. "The DWB project, together with Marinette Marine's investment in people, production equipment, and computer-aided design, enables us to participate in this highly competitive market," he adds.

Besides the cost savings, MMC is impressed with the DWB system's flexibility. Using eight dual walking beam units, the system can move large sections or complete ships in any direction, over surfaces such as sand, gravel, and concrete, without any rails or major preparations required.

Similarly, TTS is impressed with its first U.S. customer for the DWB system. "Marinette Marine is a great shipyard with a lot of forward-looking people," says **Steinar Draegebo,** president of Total Transportation Systems Inc. of Newport News, Va.

For more information on TTS ship transfer systems,

Circle 96 on Reader Service Card

Cassa Appointed Chief Marine Engineer At J.J. Henry Company

J.J. Henry Company, Inc. recently announced the appointment of **George C. Cassa** as chief marine engineer at their New York office. He will report to **Charles H. Gross Jr.,** vice president and manager of that office.

Mr. **Cassa** joined the company as a marine engineer in 1974. He graduated from the U.S. Merchant Marine Academy and received a master's degree in management science from Stevens Institute of Technology.

Displacement Vessel 'Brenda H.' Acquires New Stork-Werkspoor Engine

The Stork-Werkspoor 9FHD-240 diesel engine being lowered into the Brenda H.

The 20-year-old Edwin Monk-designed Brenda H. acquired a new Stork-Werkspoor 9FHD-240 diesel engine, with the area's first Masson reversing reduction gear, at Pacific Fisherman in Seattle, Wash. The 85-foot, 99.9-ton displacement vessel is operated in coastwise barge and log towing service by Boyer Towing, Inc., Ketchikan, Alaska.

The SWDiesel/Masson combination is popular in Europe, but very rare in the U.S.

The 1,900-hp engine was sold through SWDiesel Gulf, Inc.'s Seattle office. The Masson gear was supplied through Diesel Power International in New Orleans, La.

For further information on SWDiesel Gulf, Inc.,

Circle 10 on Reader Service Card

For more information the Masson reversing reduction gear,

Circle 11 on Reader Service Card

ELECTRONICS UPDATE

Norcontrol Offers Brochures On Navigation/Instrumentation Line Marketed In U.S. By Nav-Control

The Norcontrol Division of A/S Kongsberg Vaapenfabrikk in Norway has restructured its U.S. operations. Nav-Control, Inc. of Halesite, N.Y., has been appointed authorized agent for its navigation/instrumentation line of products. Nav-Control will also administer certain projects and in-process contracts on behalf of Norcontrol, which will fully honor all such outstanding commitments.

Dennis Hogan, who was formerly Kongsberg North America's sales manager for Norcontrol products, has been named president of Nav-Control, Inc. His experience and capabilities will continue to be available to Norcontrol. This arrangement will enable the company to continue to serve the needs of its customers promptly and effectively, and will strengthen Norcontrol's activities in the U.S.

Free brochures and other literature describing each product in detail are now available. Circle the appropriate number (or numbers), appearing below each description, on the reader service card in the back of this issue.

• DataBridge-7 Radar Navigation and ARPA System—In addition to containing explanatory text with il-

lustrations, this impressive brochure unfolds to reveal a large reproduction of the DataBridge-7 ARPA console. One of the major breakthroughs in modern navigation has been the development of the automatic plotting aid (ARPA), and now at the touch of a switch, an officer can insure accurate and automatic plotting and logging through the additional features provided for the system. The main innovation has focused on extending the system's unique radar map overlay functions by adding unlimited storage capacity, an X/Y track plotter, and datalogger. Another optional feature allows radar maps to be stabilized with the aid of navigation data where fixed points for radar tracking are missing. Norcontrol's DataBridge-7 is a third-generation ARPA that acquires and tracks up to 50 radar targets and continuously displays collision avoidance data on the most threatening 20. It will sound a collision-warning alarm whenever any of these targets exceed user-specified values for closest point of approach and time to closest point of approach. As a collision-avoidance system, DataBridge-7 meets or exceeds IMO recommendations and USCG and Maritime Administration standards.

Circle 12 on Reader Service Card

• DataChief-7 Monitoring and Control System—This eight-page color publication explains that the chief function of DataChief is to monitor the running condition of the ship's main propulsion machinery. In addition, the system monitors the main machinery's secondary parameters and controls motors, pumps, etc., to ensure optimum running efficiency. The DataChief-7 is based on microprocessor technology and satisfies the classification societies' requirements for unmanned operation of engine rooms for both diesel and steam-turbine ships. A ring data highway links a number of dedicated distributed microprocessors to a central control station, with the choice of local or central readout facilities. Standardized modules together with the ring data highway minimizes the possibility of system failure and ensures a high degree of redundancy without the need for extra components. Full system control is achieved from one or more operator stations via a variety of displays and functional keyboards.

Circle 14 on Reader Service Card

• Tank Level & Draught Gauging for Ship and Offshore—The demands for quick loading and discharging of cargo reduce the time available for efficient cargo planning and safety precautions. This eight-page color brochure explains that Norcontrol's cargo handling systems provide continual and accurate information on level measurement for cargo ballast and fuel tanks, on-line assessment of ship stability, vessel list and trim, hull sheer force and bending moment, etc., as well as providing cargo reports including damage stability. These systems were first introduced in 1971 and have been installed onboard tankers, bulk carriers and RO/RO-container ships.

Circle 15 on Reader Service Card

• Vessel Traffic Management Systems—Norcontrol's vessel traffic management systems significantly reduce the risk of ship collisions with offshore oil and gas installations, both on the surface and subsea, according to this 12-page color brochure on vessel traffic management for coasts and ports. The traffic surveillance system provides the operator with a detailed presentation of the traffic situation within the actual surveillance area together with continuous information on all vessels' positions, course, speed, range and bearing. Surveillance of traffic is undertaken centrally and the system may be tailor-made for offshore production fields, harbor areas and critical channels. It is based upon signals from a virtually unlimited number of radars, and the traffic situation thus detected is presented on the operator's console together with programmed information such as subsea installations, traffic lanes, boundary lines, anchoring areas, etc., and speed and course vectors for moving targets. All data concerning target movements may be recorded for later playback. Extensive warning func-

(continued from page 96)

Circle 167 on Reader Service Card ➔

Nav-Control

(continued from page 95)

tions are programmed into the various systems and are activated when certain predefined criteria are violated.

Circle 16 on Reader Service Card

• NAVSIM NMS-90 Radar and Navigation Training Simulators—This eight-page pamphlet, which is well illustrated with drawings and photos of students undergoing training in navigation, explains that simulation provides the solution to developing the ability to navigate a vessel safely and efficiently under all conditions with the highest levels of skill and judgment. The Norcontrol Navigation Simulator can duplicate virtually any ship, any waterway, any environmment and any situation that a deck officer will encounter. Furthermore, all exercises on a simulator are both controllable and repeatable. A typical Norcontrol simulator consists of up to six own ships and an instructor's station that permits the instructor to create and control all aspects of the training exercise. The system can be configured to train students whose experience ranges from maritime cadet to senior captain. Skills ranging from basic radar plotting to Bridge Team training can be effectively taught. With addition of the nocturnal visual system, night pilotage training is available.

Circle 17 on Reader Service Card

Santosuosso Named New President Of Lockheed Shipbuilding

Joseph R. Santosuosso

Lockheed Marine Systems Group president **Lawrence A. Smith** has announced the appointment of **Joseph R. Santosuosso** as president of Lockheed Shipbuilding Company. He will assume operating responsibility for the activities of the 2,000-employee shipyard in Seattle, where the company is currently building two 609-foot amphibious assault ships for the U.S. Navy. The 97-year-old yard will soon begin a $17-million renovation of three Washington State ferries.

Mr. **Santosuosso** joins Lockheed Shipbuilding from his executive position with Ebasco Services Inc. of New York. He earned BS and MS degrees in mechanical engineering, and was awarded an MBA from Arizona State University. He replaces Mr. **Smith,** who had been acting president of the shipbuilding company in addition to his presidency of the parent Lockheed Marine Systems Group, a position he will continue to hold.

Brochure Available On Industrial Coils From American-Standard

The American-Standard Heat Transfer Division, La Crosse, Wisc., has available a brochure on the company's wide selection of industrial heating and cooling coils.

The 24-page brochure contains detailed descriptions, complete data and applications concerning the heavy duty industrial coil product line manufactured by the Heat Transfer Division.

An easy-to-read chart lists all industrial coils offered, complete with the coil sizes, fin types, coil materials available and coil ratings of the standard and custom designed product line. An expanded description of mechanical specifications, including diagrams, for each coil is included in the brochure.

American-Standard's industrial coils are engineered for modulated and non-modulated steam heating, as well as water heating and cooling.

For a copy of the brochure,

Circle 40 on Reader Service Card

Nichols Brothers Builds New McNeil Island Ferry

Amid a festive celebration, the new McNeil Island ferry (shown above), built by Nichols Brothers Boat Builders, Inc. of Whidbey Island, Wash., was christened recently at the Nichols dock on Whidbey Island. The new ferry was built, only after years of using surplus vessels to ferry passengers and cargo back and forth to the facility on McNeil Island.

The State of Washington contracted Nichols Brothers, who were the low bidders on the design and construction of the boat which measures 68-feet by 25-feet and uses a five-foot draft. The monohulled vessel, which is presently in full service at the corrections facility, is equipped with two Detroit Diesel 8V-71 engines which allow a cruise speed of about 12 knots with a full load of 300 passengers and cargo.

Although built on a "bare-bones budget" for the state without any of the niceties Nichols has normally outfitted their passenger vessels with, the McNeil Island ferry is quite attractive, sporting large blue tinted windows and decorative stripping—a rather cheery site along the prison.

Rowan Offers Free Literature On Drill Rig 'Rowan Gorilla IV'

Rowan Companies, Inc. of Houston, Texas, is offering free literature on the design for the latest Gorilla rig, the Rowan Gorilla IV.

Constructed for Rowan Companies by Marathon LeTourneau Offshore Company of Vicksburg, Miss., the Gorilla rigs are a new and heavier class of rig, requiring twice the amount of fabricated steel used in former largest jackups. At 297 feet long by 292 feet wide, they are nearly 40 percent larger than the Marathon LeTourneau 116 Class jackups.

The brochure, which features color photos of the previously built Rowan Gorilla I, II, and III on the cover, contains drawings of Gorilla III shown in scale with Gorilla IV. Equipped with 605 feet of leg, the Gorilla IV is capable of drilling in 450 feet of water in the Gulf of Mexico. This exceeds the capabilities of any existing bottom-supported type jackup rig. Specifications for Gorilla IV are also listed, along with environmental criteria for both the Gulf of Mexico and the North Sea.

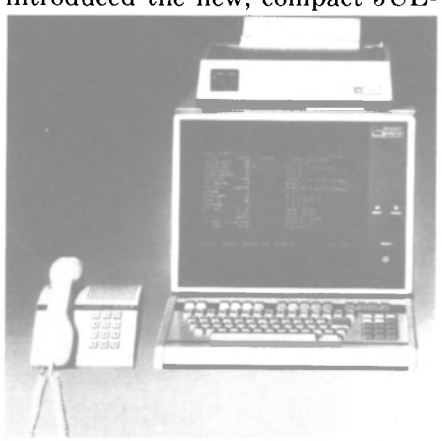
For a free copy of the literature and further information from Rowan Companies,

Circle 4 on Reader Service Card

ELECTRONICS UPDATE

Raytheon Introduces Newest SatCom For Fishing And Pleasure Craft

Raytheon Marine Company has introduced the new, compact JUE-35B SatCom for fishing and pleasure craft as well as oceangoing ships. It provides 24-hour global maritime communications by telephone, telex, and facsimile, as well as data transmission for special applications. The JUE-35B INMARSAT Ship Earth Station, manufactured by Japan Radio Company, one of the world's largest manufacturers of shipboard satellite communications terminals, is available exclusively from Raytheon in the United States, Mexico, and Scandinavian countries.



The JRC JUE-35B SatCom video display unit, RO printer and telephone set from Raytheon Marine Company.

The JUE-35B SatCom is similar to the popular JUE-35A SatCom except for its above deck equipment. The new model has a patented single flywheel antenna stabilization system, rather than conventional, more expensive, vertical gyro-stabilization systems. The new antenna system has been thoroughly tested at sea and has demonstrated reliability surpassing the 45,000-Hour Mean Time Between Failure (MTBF) established by its predecessor, the JUE-35A.

The antenna measures 55.6 inches (139 cm) in diameter. It houses a 35.6-inch-diameter (89 cm) antenna dish. The ADE weighs only 330 pounds (150 kg).

The JUE-35B SatCom video display unit features a 14-inch CRT, with large, easy-to-read characters

Crawford Fitting Introduces Gap Inspection Gages For SWAGELOK Tube Fittings

Gap inspection gages that provide a quick and easy way of confirming sufficient pull-up on SWAGELOK Tube Fittings are available from Crawford Fitting Company, Solon, Ohio.

The gages are especially useful in hard-to-reach locations. If the gage does not fit in the gap between the fitting's nut and body shoulder, pull-up is sufficient. If it does fit, the fitting has not been properly installed and more pull-up is needed.

The result is a reliable inspection method that insures worker safety and lowers cost by eliminating the chance of leakage due to under tightening.

Featuring stainless steel construction for greater durability, the compact gage can be used with SWAGELOK Tube Fittings in sizes from ⅛- to 1-inch and from 3- to 25-mm.

For further literature containing full information,

Circle 308 on Reader Service Card

Jeffboat Delivers Deck Barge For Nugent Sand Company

Jeffboat, Inc. of Jeffersonville, Indiana recently delivered the NSCO 63 deck barge (shown above) for Nugent Sand Company, Inc. of Louisville, Kentucky. This barge was one of a four-barge order placed by Nugent Sand Company.

General dimensions of the barges were 195-feet by 35-feet by 9-feet 6 inches. Each barge was constructed with ⅜-inch sides, deck and bottom. A 3-foot high deck coaming was also installed on each barge.

Jeffboat's construction consists of a 270-foot sternwheeler, 280-foot coastal tanker, a 2,800-hp retractable pilothouse towboat and a 6,000-hp towboat dock and hopper barge.

For additional information on Jeffboat and the services they offer,

Circle 324 on Reader Service Card

Unique Actuator Selection Slide Chart Available From Jamesbury Corp.

Information normally requiring references to 20 or more catalog pages is contained in a new only-of-its-kind Actuator Selection Slide Chart available from Jamesbury Corp., Worcester, Mass., a Combustion Engineering company.

With the Actuator Slide Chart, the user selects the type of Jamesbury valve (screwed end ball, flaged ball or high performance butterfly) and sets the slide of the Valve Torque Guide to the maximum differential pressure of the planned application. Torque requirements for available types and sizes are read from the moving scales of the tables, which also reflect variations, such as seat material, trunnion or non-trunnion design in ball valves, and shaft upstream or downstream in butterfly valves. Valve sizes covered range from ¼-inch to 60-inch.

The user, having determined the torque requirement of the application, turns the Slide Chart to the Actuator Selector side and selects from Jamesbury's seven general types an actuator best suited to the application.

For pneumatic and hydraulic operation, there are double-acting piston, spring-piston and spring diaphragm actuators.

Available air pressure is selected from the tabulations; torque requirements are set on the movable slide; and the user is rewarded with the designation of the actuator or actuators that will do the job.

For Jamesbury electric and manual gear actuators, non-movable tables give designations to meet the required operating torque.

Actuator torque outputs range from 4 to 6,250 ft. lbs.

For more information and copies of the Actuator Selection Slide Chart from Jamesbury Corp.,

Circle 44 on Reader Service Card

CRUISE '85

SHIPS • OPERATIONS • SERVICES

London

June 19-20

photo—Wartsila

Artist's conception of the cruise ship of the future.

Cruise 85, the first international conference and exhibition for people involved in the management, operation and services of cruise shipping, will take place at the Hilton Hotel, Park Lane, London, on June 19-20. The two-day event is being organized by the U.K. Secretariat of the well-known RO/RO Conferences, and many of the world's leading cruise operators are expected to attend this exchange of ideas on the future market and other aspects of the industry.

The program for the meeting has been arranged to be presented in three sessions during two days. Session I, "The Future," will take place on the first day, Wednesday, June 19, followed on Thursday, June 20, by Session 2, "Operations," and Session 3, "Ship Design." Lunch for registered delegates will be served on both days of the meeting, and an evening reception for all delegates, exhibitors and their ladies will take place after the close of activities on the first day.

A key speaker at the Cruise 85 Conference will be **Ronald J. Zeller,** chief executive, Norwegian Caribbean Lines and Royal Viking Line, Miami, Fla. The address by Mr. **Zeller,** titled "The Way Ahead," will be one of several views set forth in the opening session entitled "The Future." Other expressions on the view ahead will be put forward from differing sectors of the business: Arthur D. Little Inc. of San Francisco for the consultants; Wartsila of Finland for the leading builders of cruise vessels; the travel business, looking at the potential of the Mediterranean; and a questioning view from the Passenger Ship Association in London.

The conference will then go on to debate the operational and design aspects of the ships, with the geographical focus being worldwide and covering both existing and new areas of activity. Following on the theme of shipboard revenue, but widening the horizons, is a paper from Ocean Trading of Southampton, U.K., titled "70 Shops on 28 Ships—Different Markets Demand Different Approaches," which will illustrate the vagaries of the different markets.

Design aspects, including those affected by the regulatory bodies, IMO, U.S. Public Health Service and the Classification Societies, as well as futuristic concepts now being evaluated by the leading shipowners and designers, will be highlighted at the conference. Several of the world's leading shipyards will debate their role in stimulating the cruise market through new thoughts on the shipboard environment of tomorrow's ships.

An important and especially interesting part of Cruise 85 will be the exhibiting shipbuilders at the Exhibition in the London Hilton where, among other things, a Japanese yard is said to be unveiling a new all-in cruise ship package in an effort to offer a choice from the currently European-dominated construction of large cruise ships.

Details of both the Cruise 85 Conference and the associated Exhibition can be obtained from the Cruise Secretariat, 2 Station Road, Rickmansworth, Herts, WD3 1QP, England. Telephone: (0923) 776363; Telex: 924312 Gastec G.

CRUISE 85 CONFERENCE PROGRAM

Day 1: Wednesday, June 19
SESSION I: THE FUTURE

"Market-based Cruise Product Design," **D. Tatzin,** Arthur D. Little, Inc., San Francisco.

"Converting Concepts to Reality—The Development of Business Ideas With Sufficient Profit Potential to be Attractive for new Investors," **K. Levander,** manager, Research and Development, Wartsila AB, Helsinki, Finland.

"The Way Ahead," **R.J. Zeller,** chief executive, Norweigian Caribbean Lines and Royal Viking Line, Miami.

Coffee Break

"Cruise Investment Strategy," **R. Fain,** joint managing director, Gotaas-Larsen Ltd. and director, Royal Caribbean Cruise Line and Eastern and Western Cruise Lines.

"A European View," **B. Crisp,** UK director, Cunard Line and director, Cunard Cruise Ships Ltd. and managing director, Cunard Crusader World Travel.

"The SS United States—Preparing for 1987," Captain **J. Cox,** senior vice president, United States Cruises Ltd., Brisbane, Calif.

Luncheon Break For Registered Delegates

"U.S. Incentive Travel to Europe—The Danube River Cruise Concept," **I. Schneuing,** president, D-Line, Deutsche Donau-Kreuzschiffahrts GmbH, and the Incoming Tourist Service GmbH, Munich, West Germany.

"A Strategy to Increase Cruising in Egypt, the Red Sea and the Mediterranean," **M.S. Leheta,** president, Menatours, Giza and chairman, Egyptian Chamber of Tourism and Travel Agencies, Cairo, Egypt.

"Cruise Marketing—Obtaining a Better Return?" **K. Page,** director, Passenger Shipping Association, London.

Coffee Break

"Sail Cruisers and Market Segmentation," **Jean-Claude Potier,** president, Windstar Sail Cruises Ltd., Miami.

"The Often-Ignored Business Opportunities of On-Board Services: Designing Innovative Offerings and Managing Service Quality," **S. Buchin,** senior vice president and director, Marketing Services Group, Temple, Barker and Sloane, Inc., Lexington, Mass.

"At the Center of the Cruise Revolution—Miami Today and Tomorrow," **C.J. Lunetta,** port director, Port of Miami.

Evening Reception For All Delegates And Exhibitors

Day 2: Thursday, June 20
SESSION II: OPERATIONS

"Cruise Liner Berthing and Navigation in Restricted Waters—A Manoeuvering Simulation Study," **O. Tersloev,** naval architect, head of Maneuvering Section, Danish Maritime Institute, Lyngby, Denmark.

"70 Shops on 28 Ships—Different Markets Demand Different Approaches," **E. Symes,** managing director, Ocean Trading, Southampton, U.K.

"Planning a Catering System for Maximum Profitability—Are Turnkey Systems the Future?" **S. Krouvila,** chief designer, Oy Metos Marine, Kerava, Finland.

Coffee Break

"On-Line Viewdata Reservations and Accounting Systems for Cruise Lines," **D. Hinkley,** Viewdata Services IBM, and **R. Gwynn,** marketing director, Viewdata Information Processing Ltd., London.

"Maximising Shipboard Revenue on Passenger Overnight-Cruise Ferries," speaker to be announced.

"A Fresh Look at Vessel Appearance—Overcoming the Operator's Problem," **C. Stevens,** marketing manager, International Paint Marine Coatings, Felling, U.K.

Lunch For Registered Delegates

SESSION III: SHIP DESIGN

"Ship Design for the Further Development of the Cruise Market," **B. Hansen,** manager, Research and Development Dept., Aalborg Vaerft AS, Aalborg, Denmark.

Panel Discussion

The aforementioned presentation will examine areas where designers could possibly stimulate the market. In particular, the environment aspects of cabins and public spaces. There will then be a panel discussion led by Mr. **Hansen.**

Panelists:

R. Dussert-Vidalet, Project and Design Dept., Chantiers du Nord et de la Mediterranee; **V. Alraksinen,** manager, Ship Projects, Wartsilä AB; **N. Eide,** cruise ship designer—Oslo Project Involvement includes: "Rotterdam," "Sagafjord," "Vistafjord," "Song of America" and "Royal Princess"; **J. Victor,** managing director, Technical Marine Planning Ltd., London and consultant for Carnival Cruise Line.

Coffee Break

"The Cruise Ship and the Classification Society—Precontract Phase, the Building Period and the Ship in Service—New Cost-Conscious Survey Alternatives," **J. Telle,** principal surveyor, Det norske Veritas, Oslo, Norway.

" 'Fairsky' (Twin-Screwed Turbine Propulsion) and 'Atlantic' (Twin-Screwed Diesel Propulsion)—Two Similar Sized Large Cruise Liners but Different in Concept," **R. Dussert-Vidalet,** Project and Design Dept., Chantiers du Nord et de la Mediterranée, La Ciotat, France. This paper will discuss some of the main features of the liners including, hotel organization; vibration and sound levels; and electrical power distribution.

Phillips Cartner Broadens Client Base With New Acquisition

John A. Cartner, president of the consulting and engineering firm, Phillips Cartner & Co., Inc., Alexandria, Va., has announced the purchase of Simat International, Ltd. The acquisition gives Phillips Cartner additional specialization in transportation marketing and operations, with emphasis on marine and aviation.

Mr. **Cartner** noted that the acquisition of Simat International broadens the Phillips Cartner client base with major world ports, state agencies, the federal government and a variety of ocean carriers. In addition, the purchase brings with it resources and expertise in foreign trade and foreign-trade zone development and operation.

For further information about Phillips Cartner & Co., Inc.,

Circle 55 on Reader Service Card

Aeroquip T-J Division Offers New Series TP Proximity Switches —Literature Available

Aeroquip Corporation's T-J Division has come out with the new series TP proximity switches which provide fully adjustable position sensing and control of series TP NFPA interchangeable aluminum air cylinders.

Detailed information regarding series TP proximity switches is found in Aeroquip T-J Catalog 4100, which discusses four types of proximity switches: The .085 amp Magnetic Reed; the 3 amp Magnetic Reed; and the Hall Effect-Sink type and Hall Effect-Source type. This variety of switches provides automatic cycling and microprocessor control with a custom interface to fit a customer's particular logic system requirements.

These four types of proximity switches differ solely in their electronic sensing elements. All are based on their ability to detect a moving magnetic band located on the piston of an Aeroquip T-J series TP air cylinder.

The .085 amp Magnetic Reed switches are ideal to energize outboard LED indicator lights and to use as input for many types of sequencers and programmable controls.

The 3-amp Magnetic Reed is designed to meet the high power capacity required of industrial applications requiring AC input.

Aeroquip T-J offers two types of Hall Effect switches in order to match the input requirements of a customer's particular system. The sink type and the source type operate on 4.5 to 24 volts DC, and both are solid state devices with no moving parts. These switches are designed specifically to provide an input signal to programmable controllers, microprocessors and logic systems because they produce low voltage output that can be wired directly into the inputs of these logic systems.

Each of these switches is mounted externally and is quickly adjustable with the protective mounting bracket. To further facilitate these easy adjustments, each sensor contains an LED, or neon light, which indicates the piston's precise location.

This flexible position sensing system is finding widespread acceptance in applications where NFPA cylinder operations can be controlled electronically. Proximity switches and mounting brackets are optional accessories for Aeroquip T-J series TP air cylinders.

Aeroquip Corporation of Jackson, Mich., is a Libbey-Owens-Ford company (LOF). A worldwide leading manufacturer of fluid power and fluid system components, Aeroquip's diversified product lines include flexible hose, fittings and assemblies; quick disconnect and V-Band couplings; hydraulic and pneumatic cylinders; ball, rotary and swivel joints; custom-engineered rubber products; spring brakes; cargo control equipment; refrigeration/air conditioning components; railroad products and aerospace components.

For a series TP proximity switches Catalog 4100 free of charge,

Circle 22 on Reader Service Card

Valcor Catalog Includes Products For Marine And Naval Applications —Literature Available

Valcor Engineering Corporation, Springfield, N.J., has published a three-ring-binder Aerospace and Support System catalog that includes products that can be used in marine and naval applications.

Valcor Engineering has been a recognized leader in the design and manufacture of solenoid valves and critical flow control devices for aircraft, space and ground support systems since 1951. As pioneers in the development of solenoid valves used in fuel, hydraulic, cryogenic, pneumatic, and engine bleed air applications, they have amassed a library of over 5,000 valve designs that are utilized to solve a wide variety of system problems.

The catalog illustrates a broad view of Valcor's total Aerospace and Support System product line. It is divided into three sections—the first covering five basic valve application areas, the second for special purposes, and the third for brake valves, hydraulic accumulators, pressurization systems and other products.

The index is arranged by valve type and application to allow the basic valve series for a particular application to be readily found. Each data sheet in the catalog represents a *valve series*, not just a single valve.

Custom-tailored modifications can be made to any valve series to suit particular needs. To assist in making inquiries when choosing a Valcor valve, Specification Check Sheets are provided at the back of the catalog. The data requested on this form helps provide a prompt solution to valving problems.

The introduction to the catalog states that it is intended solely as a guide to Valcor's technological design capability. The company's experienced engineering staff stands ready to resolve the most difficult application problems for customers.

The index in the catalog lists, along with the proper page number, the type, design, series number and description of fuel valves, hydraulic valves, engine bleed gas valves, cryogenic valves, pneumatic valves, special purpose valves, and K-products.

In addition to a photograph of the product and a cutaway drawing, each data sheet gives the description, valve type, application, features and operation and complete specifications and ratings for each number in the valve series.

For further literature containing full information from Valcor Engineering Corporation,

Circle 18 on Reader Service Card

Apelco Introduces Loudhailer With Two-Way Intercom And Alarm Features

Apelco Marine Electronics has introduced a new loudhailer system, the HXL 1000 Hailer/Listener, with a two-way intercom and built-in alarm interface.

Unlike most loudhailers, the Apelco HXL 1000 two-way intercom will allow calls to be initiated from remote intercom stations to the master station. The speaker at an optional remote station, in the galley, for example, could initiate a call to a master station on a flybridge or other location. Up to three remote Apelco intercom stations can be used with the HXL 1000.

The Apelco loudhailer makes faint sounds audible from distant buoys, distress calls, pounding surf, etc. Its powerful 50-watt peak power speaker projects the operator's voice loudly over great distances. The HXL 1000 has a manual and automatic foghorn with automatic listening between blasts. The automatic mode is adjustable from one blast in five seconds to one blast in 120 seconds. The manual control is a push-to-talk button at the microphone. An alarm interface is built-in and can be used with most standard security alarms.

For further information about the Apelco Marine Electronics HXL 1000 Hailer/Listener,

Circle 32 on Reader Service Card

Marine Management Develops Demo Programs

Marine Management Systems (MMS) has developed demonstration programs for its Spare Parts Inventory Management and Planned Maintenance computer application software. The demo programs will run on any IBM PC to demonstrate the capability of MMS software and operational reports available.

According to **Don Logan**, MMS vice president, "These demonstration programs give our potential clients a very realistic feel of how effective and simple our systems are to operate in a typical maritime environment."

MMS, based in Stamford, Conn., is a leader in providing computerized management information systems, since 1969. The company deals exclusively with the shipping industry to provide services in the areas of shipboard and shoreside application systems, maritime information and management consulting.

The demonstration programs are available without charge to qualified prospects. For further information,

Circle 98 on Reader Service Card

Marco-Seattle Converts Two Combination Crabbers For New Fishery Roles

As a result of the move to trawling in the North Pacific fleet, two of this year's more complete conversions took place at the Marco-Seattle shipyard. A pair of Marco combination crabbers built in 1979—the 122-foot Columbia and the 123-foot American Beauty (ex-Northern Leader)—had extensive modifications made for their new fishery roles.

Work completed on the Columbia included a pair of new Marco WT266 MarTrawl winches and the IntelliTrawl computerized trawling system, fabrication of a stern ramp and 10-inch recessed roller, 8-foot-wide net flat, trawl door pockets, box-style stern gantry, net reels, hydraulically actuated stern ramp gates, extensive hydraulic and electrical systems work along with power supply changes, DC41 HPD with AirKlutch to better handle the requirements of the trawl machinery, Rapp net sound winch, Pullmaster haulback winch, two Pullmaster large-drum gilson winches, and an aft-facing console added to the pilothouse with controls for the entire trawling system.

The Columbia's propeller was repitched, chafing guards were added, engine room and exterior painting was done, and an extensive list of electronics was installed by Harris Electric, including Simrad ES-380 echo sounder, Simrad FA-100 catch indicator, ET-102 sounder with FR-500 Trawleye system, and a Furuno FCT-1411 color radar coupled with the GD-2000 color plotter.

In addition to having much of the same work performed, The American Beauty opted for a pair of Rapp TWS-1220 trawl winches, and the Autotrawl system, Rapp net sound winch, two Gearmatic gilson winches and Gearmatic inhaul winch, conversion of the Marco DP37 HPD on the Cat main engine to a DC37 with a 14-inch AirKlutch and the addition of a DG41 HPD on the starboard Cat 3408 auxiliary. Other items included a trawl console in the pilothouse, stern ramp wear plate, bin board guides, and hull and engine room painting.

Owner-furnished electronics were installed by Lunde Marine Electronics, including Simrad EQ echo sounder, FR-500 Trawleye system, and FA-100 catch indicator, plus a Raytheon NWU-50 color video plotter and NOM-50 tape data recorder.

An inclining experiment and stability report were provided for both the Columbia and American Beauty upon completion of their conversion.

Markey Supplies Tug With Two Capstans —Literature Available

Houma Fabricators in Louisiana is currently installing two additional CYP-90 Hydraulic Capstans from Markey Machinery Co., Inc. of Seattle on a tug being built for the Panama Canal Commission.

Rated for 9-inch circular Hawser, these units are duplicates of a series of capstans purchased over recent years for ship handling tugs. A major feature of the hydraulic system supplied by Markey is the use of dual hydraulic motors and a series/parallel valve. This layout provides high pull and high speed ranges. Also supplied is a reversing valve and dual pumps mounted to a clutched gathering box. The mounting plate of the capstan is welded directly into the deck, and faired to provide a clean above deck installation.

For further information on Markey's hydraulic systems,

Circle 330 on Reader Service Card

Southwest Marine Yard Repowering San Francisco Commuter Ferries With Detroit Diesel Allison Engines

New diesel engines in three of San Francisco's commuter ferries are expected to save their owner, the Golden Gate Bridge, Highway and Transportation District, more than a quarter-million dollars a year in fuel costs. A pair of fuel-efficient Detroit Diesel Allison 16V-149TIB engines are replacing the three gas turbines that were installed in each of the 725-passenger vessels when they were built in the mid-1970s. The repowering is being done by Southwest Marine, Inc. of San Diego.

The San Francisco, first of the three ferries to be repowered, has been in service for several months. Even during her break-in period, Ferry Division manager **Eric Robinson** has found "dramatically improved performance" from the repowered boat, leading to a savings in commute time as well as impressive dollar savings. These savings are being achieved despite a reduction of propulsion power from 7,500 shp with the original gas turbines to 3,100 bhp with the new diesels. Reliability has been 100 percent, and the noise level has been as low as it was with the gas turbines.

The economies gained from the repowering program will show up in expanded service of the ferries, which were built to relieve commuter congestion on the Golden Gate Bridge. When all three boats are back in service, Mr. **Robinson** expects ridership to increase by 40 percent over previous levels, further adding to the economic viability of the Ferry Division. He also notes a 60-percent reduction in fuel consumption during the first three-month operation of the San Francisco.

The three ferries—San Francisco, Marin, and Sonoma—provide passenger-only commuter service between the Ferry Building terminal close to downtown San Francisco and the port of Larkspur serving the residential communities of Marin County. Passengers travel in luxury during the 45-minute crossing, with beverage service and intercom music throughout the enclosed, multi-deck boats.

Fuel savings have already met the goals set for the repowering, and overall performance has exceeded expectations. Hourly full-power fuel consumption has averaged 170 gallons with the two diesels and one genset; the original gas turbines burned 500 gallons an hour. Cruising speed has met the boat's design speed of 20.2 knots—surprising in view of the great reduction in horsepower.

A critical demand has been that ferry service be increased to meet anticipated ridership, and that the Division's high level of on-time ferry departures and landings be maintained. The markedly improved performance of the boat at slow and intermediate speeds, the result of conversion from waterjet to propeller propulsion, is already paying off in terms of time saved during docking and departures, and has added an important margin of safety to ferry operation.

In order to convert from the waterjets to propellers, a five-foot "bustle" is added to the stern of each ferry to house rudders and steering mechanism. This slight increase in the waterline length of the 165-foot boats has contributed to maintaining the original design speed.

Repowering of the second and third boats is continuing, with the Marin and Sonoma expected to be in service by the end of this year.

For further information and free literature on Detroit Diesel engines,

Circle 95 on Reader Service Card

AMETEK Announces Computerized Inspection Management System

AMETEK/Offshore Research & Engineering Division, Santa Barbara, Calif., has announced the development of a computerized inspection management system. The system is based on the IBM-PC-XT (or compatibles) and offers inspection scheduling, data collection, multi-year analysis, comprehensive search functions and report generation. Options include data exchange with existing mainframe computers, locally and remote site, multi-platform data management, graphic displays of items of concern. The program is available as custom-designed software only, or as a turnkey package, customized to client requirements for data types, communications, reports and graphics needs. Dependence on a particular diving contractor or any other company is not required, and in fact the system is designed to aid the competitive bidding process, assuring more thorough understanding of the requirements by all the bidders, which should lead to better cost control throughout the contracting process, and fewer cost overruns on the actual work bid.

The system is suitable for managing underwater and above water inspections for platforms, rigs, vessels, pipelines, risers, systems, and many other applications both offshore and on-shore. Versions to run on other computers can also be furnished. AMETEK is also prepared to furnish the systems as a service, using customer or AMETEK-furnished inspection data to generate the required reports and information.

For further information on AMETEK's computerized inspection management system,

Circle 42 on Reader Service Card

"Marine Library" Literature Available From DDA

Detroit Diesel Allison (DDA) Division of General Motors has announced the availability of a new, totally revised and expanded Marine Library. This comprehensive technical publication contains features designed to benefit anyone involved with the marine industry.

The new library consists of three sections:

- Elements of Marine Propulsion—rewritten and enhanced to simplify the understanding of the engine installation and the determination of such elements as basics of marine shaft horsepower.
- Marine Installation Manual—includes easy-to-use technical data charts and engine systems information necessary for proper engine installation.
- Engine Specifications—features the latest specification sheets and installation drawings on Detroit Diesel's full line of marine propulsion engines.

To purchase a copy of the complete Marine Library or the first two sections, contact your local DDA distributor or dealer. Cost of the complete library is $50 but sections can be bought at less cost.

Furuno Introduces FR-803D Digital Radar

Furuno recently announced the introduction of their FR-803D high brightness digital radar. This is the latest and most cost competitive member of the Furuno digital radar family.

The FR-803D radar offers a steady picture 12-inch CRT, three kw transceiver with Furuno's special microwave IC front end circuitry, ¼ to 36-mile range and a 3.5-foot antenna system. It also has two variable range markers, two electronic bearing lines, adjustable sector and range guard zone with alarm, interference rejector, variable pulse-length and PRF's, universal 10-42 VDC power supply.

Its most unique feature is the multilevel quantizing circuitry where several levels of target return are recognized, thus eliminating the "holes" and other picture problems that are seen in other radars.

For complete information on the FR-803D digital radar,

Circle 41 on Reader Service Card

MariChem 85

London—June 25-27

MariChem 85, the sixth meeting in this series of conferences on the marine transportation, handling and storage of bulk chemicals, will be held in the Kensington Exhibition Centre, London, England, from June 25-27, 1985. The nearby Royal Garden Hotel, a modern five-star hotel with panoramic views of Hyde Park and Kensington Palace Gardens, has been selected as headquarters hotel for the meeting and will also be the location for the main evening reception during the event.

The program for the conference has, inevitably, a strong opening emphasis on Annex II of the MARPOL 73/78 antipollution treaty, described by IMO as "the most important international treaty ever adopted in the struggle against pollution of the sea." The mandatory provisions of Annex II come into force on October 2, 1986, and MariChem 85 therefore assumes special importance as only 16 months will remain before the impact of Annex II on the bulk chemicals industry.

MariChem 83 concentrated on what had to be accomplished in the three years before the mandatory provisions of MARPOL 73/78 Annex II came into force. MariChem 85, as mentioned, will again focus on the Annex II provisions, particularly in Session I, June 25, on "Legislation and Regulation," which will be chaired by **R.K. Roberts** of the U.K. Department of Transport, Marine Directorate, a past chairman of the IMO Subcommittee on Bulk Chemicals. **Robert E. Claypoole**, chairman of the Independent Liquid Terminals Association and president of GATX Terminals Corporation, Chicago, will address the meeting on the response of U.S. terminals to MARPOL Annex II proposals, while from Japan, **Hisayasu Jin** of Nippon Kaiji Kyokai will present the views of the Shipbuilding Research Association of Japan on the Japanese reaction to Annex II.

Further detailed examination of the way in which industry has to cope with the plethora of rules and regulations from existing and impending legislation will come in Session 2, June 26, on "Operations and Safety." This will be an all-day session with presentations aimed at those responsible for operating chemical carriers and terminals. European Community environmental legislation and the impact of IMO requirements on terminal facilities will be discussed by **Peter Cooke**, managing director of Powell Duffryn Terminals Ltd. Capt. **Alberto Allievi** will give the International Chamber of Shipping's view on the role that industry should play in developing operational and safety guidelines, and a paper authored by **Robert J. Lakey** of Robert J. Lakey and Associates, and co-author **K.J. Szallai**, president of Troll Tankers Inc., asks "Are the next generation of chemical tankers becoming too sophisticated?" The Operations and Safety session will conclude with a presentation on the determination of chemical/parcel tanker supply and demand, to be given by **R.L. Tollenaar** of the Netherlands Maritime Research Institute, Rotterdam.

In Session 3 on June 27, the meeting will examine the growing role of "Tank Containers in the Bulk Chemicals Trades," with presentations planned from operators and constructors active in this increasingly important sector of the industry. This will be a workshop session with a round-table discussion led by **David Gasson** of Unispeed, the session chairman, who is the current chairman of the Association of Tank Container Operators. The growing role of the intermodal tank container in movement of bulk chemicals will be debated, and technical developments will also be considered in Session 4 in the afternoon of June 27. This wil be an open-forum workshop session under the guidance of **T.R. Farrell** of Lloyd's Register of Shipping.

Exhibitions

The exhibitions, which are an integral part of the MariChem meetings, have grown in size and importance over the years, and more than 90 international companies will be displaying their technical expertise, products and services during the meeting. The MariChem 85 Exhibition will be open from 9 a.m. on Tuesday, June 25, until 5 p.m. on Thursday, June 27. The Exhibition will occupy the entire display areas of the Kensington Exhibition Centre adjacent to the Conference room.

Social Events

Welcome Party—A Welcome Party for all registered delegates, exhibitors and their guests will be held in the Kensington Exhibition Centre immediately after the end of the Conference sessions on the first day of the meeting, Tuesday, June 25, with the Norwegian Group of Exhibitors serving as co-host with the MariChem Secretariat.

Cocktail Buffet Reception—The main social event of the meeting will be a Cocktail Buffet Party to be held at 7:30 p.m. on Wednesday, June 26, in the Royal Garden Hotel. Admission to the Cocktail Buffet Party will be by invitation only. Invitation cards will be provided for all registered delegates.

Luncheons—Luncheons will be served (for delegates only) in the Kensington Exhibition Centre on Wednesday, June 26 and Thursday, June 27.

An interesting program of sightseeing tours in London, and historic locations near London, has been planned for participants' spouses who will also be welcome at the various social events held in conjunction with MariChem 85.

Further information on the Conference and Exhibition is available from: MariChem Secretariat, 2 Station Road, Rickmansworth, Herts WD3 1QP, England, telephone (0923) 776363; telex 924312.

MARICHEM PROGRAM

Tuesday, June 25

2 p.m.—Conference opens.

Opening remarks from conference director with welcome message from **C.P. Srivastava,** secretary-general, International Maritime Organization, London

Session 1—Legislation And Regulation

Chairman: **R.K. Roberts,** Department of Transport, Marine Directorate, London.

2:30 p.m.—"MARPOL Annex II: Modifications And Amendments Agreed Since Acceptance," **P. Bergmeijer,** head of Marine Environment Division; directorate general of Shipping and Maritime Affairs, Rijswijk, Netherlands; chairman, IMO BCH Working Group on Implementation of Annex II to the MARPOL 73/78 Convention.

3:00 p.m.—"Simplifications Of Procedures And Arrangements For Annex II," **T.A. Sharp,** Department of Transport, Marine Directorate, London.

3:30 p.m.—"MARPOL Annex II—A Shipping Industry Perspective," **U. Ackermann,** chartconsult S.A., Locarno, Switzerland; past chairman, Chemical Carriers sub-committee, International Chamber Shipping, London.

4:00 p.m.—"Do Governments Fulfill Their Part Of The International Maritime Anti-Pollution Regulations—Shipowners Do," **J.P. Page,** president-directeur general, Societe Française de Transports Petroliers, Paris; chairman, Intertanko Safety and Technical Committee.

4:30 p.m.—"The Response Of U.S. Terminals To MARPOL Annex II Proposals," **R.E. Claypoole,** chairman, Independent Liquid Terminals Association; president, GATX Terminals Corporation, Chicago, Ill.

5:00 p.m.—"An Outline Of The Present Situation On Bulk Chemicals Transportation In Domestic Waters Of Japan And Implementation Of MARPOL Annex II," **H. Jin,** senior surveyor, Nippon Kaiji Kyokai, Tokyo; member of the Shipbuilding Research Association of Japan.

5:30 p.m.—"A Comparative Study Of Multi-National Regulation Of The Marine Transport Of Bulk Chemicals," **R.L. Brown Jr.,** Riddell, Williams, Bullitt and Walkinshaw, Seattle, Wash.

6:00 p.m.—Welcome party, co-hosted by the Norwegian Group of Exhibitors and the MariChem Scretariat, for all registered participants and their guests at the Kensington Exhibition Center.

Wednesday, June 26

Session 2—Operations And Safety (1)

Chairman: **R.J. Lakey,** Robert J. Lakey & Associates, Inc., Houston, Texas.

9:30 a.m.—"The Role Of Industry In Developing Operational And Safety Guidelines," Capt. **A. Allievi,** chairman, Chemical Carriers sub-committee, International Chamber of Shipping, London.

10:00 a.m.—"The Possible Impact Of IMO Requirements And EEC Environmental Legislation Upon Terminal Facilities," **P.R. Cooke,** managing director, Powell Duffryn Terminals Ltd., Fleet, Hants, U.K.

10:30 a.m.—"Experiments On Efficient Stripping Systems For Chemical Carriers," **H. Van't Sant,** directorate-general for Environmental Control, Rijswijk, Netherlands.

11:00 a.m.—"STWC (1978) Chemical Tanker Certificates, Onboard Vs. Shore Training," **D.R. Owen,** marine manager, Sabre Gas Detection Limited, Aldershot, Hants, U.K.

11:30 a.m.—"The Economic Incentive For Employing High-Cost Crews: Chemical Carriers And Other High Technology Ships Could Benefit Most," **S.S. Plice,** Plice & Plice, Inc., Island Heights, N.J.

12:00 noon—"The Next Generation Of Chemical Tankers—Are They Becoming Too Sophisticated?" **R.J. Lakey**, Robert J. Lakey & Associates, Inc., and **K.J. Szallai,** president, Troll Tankers, Inc.

12:30-2:00 p.m.—Delegates' lunch break.

Operations And Safety (2)

Chairman: **F.M.J. Van de Laar,** Netherlands Dock Labour inspectorate, Rotterdam.

2:00 p.m.—"Practical Experience With Applying Inert Gas And Nitrogen Inerting To Chemical Carriers," **J.D. Mazzei** and **R.G. Terry,** Sun Refining And Marketing Company, Aston, Pa.

2:30 p.m.—"Operational Experience With Nitrogen Generation Through Membrane Separation On A Chemical Tanker," **Th. Johannessen,** Maritime Protection A/S, Kristiansand, Norway.

3:00 p.m.—"Handling Of Vapours Generated During Transshipment Of Liquid Bulk Chemicals," **J.W. Uijlenbroek,** Badger B.V., The Hague.

3:30 p.m.—"Legislation And Regulation Developments In The Netherlands: Focus On Air Pollution," **R.A. Hulscher,** Ministry of Public Housing, Physical Planning and Environment (VROM), The Hague.

4:00 p.m.—"Developments In The Movement Of Bulk Liquid Chemicals To And From New Zealand," **P.W. Entwistle,** Bulk Storage Terminals Ltd., Mount Maunganui, New Zealand.

4:30 p.m.—"Cargo Quality Control—The Role Of The Cargo Surveyor," **J. Vermeiren,** SGS Redwood (Depauw & Stockoe), Geneva.

5:00 p.m.—"Quality And Quantity Inspection—A Chief Officers' Guide," **A.E. Percey,** Caleb Brett (USA) Inc., Essington, Pa.

5:30 p.m.—"The Determination Of Supply And Demand For Chemical/Parcel Tanker Carrying Capacity In Deep Sea And/Or European Short Sea Trades," **R.L. Tollenaar,** Maritime Research Institute, Rotterdam, Netherlands.

7:30 p.m.—Cocktail buffet party in the Royal Garden Hotel for all the registered delegates and their accompanying guests.

Thursday, June 27

Session 3—Tank Containers In The Bulk Chemicals Trades (Workshop Session)

Chairman: **D.C. Gasson,** Technical Operations manager, Unispeed Intermodal Ltd., Southampton, U.K.: chairman, Association of Tank Container Operators, U.K.

A number of formal papers will be presented consecutively without discussion. Following a coffee break, the chairman will initiate a discussion session in which the presenters of the papers will be joined on the platform by a number of other tank container specialists. The formal papers are listed below in order of presentation.

9:00-10:30 a.m.—"Tank Containers Operated By The Shipper Versus The Tank Container Operator Concept—Which Is The Best Way?" **Mrs. E. Tiedemann-Schund,** Hoyers (UK) Ltd., Huddersfield, York, U.K.

"Multitanks—A New ISO-Compatible Generation Of Intermodal Tank Containers: 200-10,000 Liters Capacity," **H. Gerhard,** Westerwalder Eisenwerk Gerhard GmbH, Weitefeld/Sieg, Germany FR.

"Some Aspects Concerning The Maintenance Of Tank Containers," **D. Goyder,** Procor Tank Container Services, Birmingham, U.K.

"Bulk Liquids—The Flexible Alternative," **D.C. Gasson,** Unispeed Intermodal Ltd., Southamton, U.K.

10:30-11:00 a.m.—Coffee Break.

11:00-12:00 noon—"Discussion Led By Session Chairman." A panel of speakers will include those listed above in Session 3, as well as Capt. **H. Wardelmann**, IMO; **P. Hansen**, Sea Containers Services Ltd., London; **J. Huigen**, MiG International Network B.V., Limburg, Netherlands, and Capt. **C.J.C. Johnston,** M.N.I., U.K. Operational Services manager, Overseas Containers Ltd., London.

12:00-2:00 p.m.—Delegates' luncheon break, with lunch being served at 12:30 p.m.

Session 4—Technical Developments
Chairman: **T.R. Farrell,** Lloyd's Register Of Shipping, London.

2:00 p.m.—"Some Considerations On The Structure Of Chemical Carriers," **P.J. Latreilie,** Bureau Veritas, Paris.

2:30-4:00 p.m.—"Reclamation Of Chemical Solvents," **M.N. Wells,** London & Coastal Oil Wharves Ltd., Canvey Island, U.K.

"A Novel Automatic Level Gauging System With Very Accurate Measurements," **S. Pettersen** & **F. Bekkadal,** Autronica A/S. Trondheim, Norway.

"Microcomputer Technology For Optimisation Of Chemical Tanker Management," **F.R. Olschlager,** LGA Gastechnik GmbH, Remagen-Rolandseck, Germany FR.

"Development Studies On The Design Of A Floating Chemical Cargo Hose," **C. Barber,** T1 Flexible Tubes Ltd., Delph, Oldham, U.K.

4:00 p.m.—Discussion on the four preceding papers.

4:30 p.m.—"In-Service Maintenance And Handling Of Tank Coatings," **P. Hartland,** Sigma Coatings b.v., Uithoorn, Netherlands.

"The Effects Of Low Molecular Weight Cargoes Upon Tank Coatings," **D. Banks,** Camrex Ltd., Sunderland, U.K.

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Containers and Pressure Vessels Ltd
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Credfeld Camtorc
Delaval Turbine
Electronic Information Service
EMIS
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Eurotainer
Fairplay
Fauvet Girel
Fort Vale Engineering
GCS Container Service
Gefahrliche Ladung
Gestra
Hazardous Cargo Bulletin
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SAAB Marine Electronics
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Sigma Coatings
Skarpenord
Smith & Robinson
Smit Ovens
Societe Marine de Service et d'Equipment Naval
Ste. Gensollen
Svanehøj Pump
T.1 Flexible Tubes
Tanksystem
Thyssen Edelstahlwerke
Tofte & Jorgensen
Tsuji Heavy Industries
Unispeed Intermodal Ltd
Universal Bulk Handling
W.H. Willcox
Westad
Westerwälder Eisenwerk Gerhard
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All types of body or trim materials are offered in a wide range of sizes, pressure ratings and end connections. Each piece is hydrostatically tested before shipment. Test reports and physical certifications are available on all items.

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A full line of international marine valves, marketed under the brand name NEWCO, are available in a size range from 2 to 24 inches in gate, globe, angle and check types.

The company also offers a bolted bonnet and pressure seal series of valves. The bolted bonnet is available in a size range from 2 to 24 inches in gates, globes and checks.

A full line of NEWCO ball valves is designed specifically for high reliability in the oil, gas, petrochemical, and related industries. The ball valves are manufactured according to API 6D and fire-safe design standards.

For complete information on Newman's NEWCO valves,

Circle 78 on Reader Service Card

PITTSBURGH BRASS MANUFACTURING

Pittsburgh Brass Manufacturing of Irwin, PA, markets a complete range of two-way bronze valves in a choice of alloys with any type of

trim (including Monel). The valves feature sil-braze ends, Navy flanges, detenting handles and blow-out proof stems.

Manufactured to U.S. Coast Guard & Navy specifications, the PBM line of ball valves has been shock and vibration tested. The valves are available in ¼- through 4-inch sizes; pressures to 700 psig; and at temperatures to 450°F.

For a free copy of the Pittsburgh Brass Manufacturing catalog fully describing the line of PBM ball valves (including marine systems applications),

Circle 79 on Reader Service Card

SAAB

In the last year, Saab-Scania Combitech purchased the operations of Salwico Inc. (Hoboken, NJ). Saab is providing the same operations and services formerly offered by Salwico in a newly formed division—Saab Tank Control.

In addition to marketing Saab's microwave level gauging equipment, the new division will also market and service Gunclean fixed tank washing equipment; Ian-Conrad Bergan high level alarms and tank temperature gauging; and other marine products.

Saab Marine Electronics has developed a new version of its radar-based level-gauging system for tankers. The Saab TankRadar Model M, incorporates all the reliable components of the original SUM-21, but with added capabilities to supply temperature and inert gas pressure measurements. The system uses the same three-pair cable for both level, temperature and pressure transmission. Such features as color graphic CRTs, electronic remote control of pumps and valves, wireless portable deck readouts and volumetric data can also be incorporated in the system.

For free information on the Saab Tank Control division products as well as the TankRadar system,

Circle 80 on Reader Service Card

SIMS

Sims Pump Valve Company, Hoboken, NJ developed and manufactures Simsite® impellers, casing rings, and other components for marine and stationary centrifugal pumps. Sims was established in 1919 with the invention of the Sims pump valve for use in reciprocating pumps.

Recognizing that conventional metal impellers became porous when used in service such as salt water, Sims in 1955 introduced the casing ring made of Simsite. The innovative use of this composite material, a combination of reinforced resin and graphite, met with great success. It outlasted by far the life expectancy of bronze. Six years later the Simsite impeller joined the already proven casing ring.

Of Simsite's many advantages over metal, one is its resistance to corrosion in salt water and various chemical applications. As a replacement for worn original equipment and as a specification for new, the material's great strength and light weight make handling easy, and wear on pump parts is reduced greatly by the natural lubricating action of its graphite content.

For further information and a free copy of the Sims catalog,

Circle 81 on Reader Service Card

STACEY FETTEROLF

Stacey Fetterolf Corporation of Skippack, PA provides butt welded or flanged ends line blinds for tight shut-off.

The Stacey line blind can be changed quickly and reliably providing quick downstream protection with less maintenance. The line blinds are available in all sizes, pressures, materials and codes. Stacey Fetterolf also offers computer aided design allowing custom requirements to be satisfied cost effectively.

For complete free literature on the Stacey line blind,

Circle 82 on Reader Service Card

STOCKHAM VALVES & FITTINGS

Stockham Valves & Fittings, Birmingham, AL provides a wide selection of gate, globe, angle and check valves in bronze, iron, carbon steel, and stainless steel. The company also stocks quarter turn valves such as ball, butterfly, or Wedgeplug, in popular sizes and types.

A complete line of cast iron, malleable iron and ductile iron pipe fittings, along with grooved couplings and fittings, are also available.

Stockham products are all manufactured to meet strict engineering standards. For free literature on Stockham's product selection,

Circle 83 on Reader Service Card

TATE ANDALE

Tate Andale, Inc. of Baltimore, MD (formerly Tate Temco) offers pipeline strainers, hull drainage fittings, angle valves, cross valves, deck sounding tube fittings, duplex strainers, pressure vacuum relief valves, simplex strainers, vent check valves, vent terminal valves and other specialty marine equipment.

The company provides specialty as well as stock items. For free literature describing product specifications,

Circle 84 on Reader Service Card

THOMAS PRODUCTS

Thomas Products Ltd of Southington, CT offers the in-line fixed and adjustable flow switches used for detecting insufficient flow rates in liquids.

Standard models are available in sizes from ¾-inch to 3 inches.

Operation is simple—the shuttle housing a magnet is displaced by the liquid's flow or no flow condition to actuate a hermetically sealed S.P.D.T. reed switch. This switch is a safety device that can automatically shut down the system or activate an alarm before damage occurs from lack of flow.

For free literature on Thomas Products' line of flow switches,

Circle 85 on Reader Service Card

TIOGA PIPE SUPPLY

Tioga Pipe Supply Company, Philadelphia, PA offers MIL spec pipe & tubing as well as stock stainless, carbon and alloy steel pipe, fittings and flanges for any application.

Tioga is also qualified to provide ABS inspection, all forms of supplemental testing including ultrasonic, liquid-dye penetrant and hydrotesting, Level 1 material from stock and government source inspection.

For complete free literature on Tioga Pipe Supply's products and services,

Circle 86 on Reader Service Card

TRANSAMERICA DELAVAL/ GEMS SENSORS

Transamerica Delaval, Gems Sensors Division (Plainville, CT) provides level gauging for all types of liquid level applications.

Gems SureSite Level Indicators provide highly visible, accurate, safe, continuous indication. The indicator can be used with water, oil, or corrosive, flammable, or explosive liquids and can incorporate switches or transducers for remote indication, alarms, etc.

Dipstick and Drumstick Level Indicators from Gems operate manually in chemicals, oils, fuels, etc., and are available in a choice of materials and mountings.

Gems Sounding Tape is a portable tank gauge with easy-to-read fractionally-marked tape which reels out of a gun into a tank or hollow nonferrous, tank-mounted tube. The unit is Coast Guard accepted for restricted or closed loading use.

For full details on Gems' line of level gauging indicators,

Circle 87 on Reader Service Card

TRANSAMERICA DELAVAL/ PYRAMID PUMP

Transamerica Delaval, Pyramid Pump Division (Monroe, NC) provides three-screw and geared twin-screw pumps for liquid cargo applications.

Its AMR™ three-screw pumps are designed for: engine room, fire room, and shipboard hydraulic services; dedicated liquid cargo carriers; and high-viscosity refining, chemical, and process applications. Capacities range from one to 3,500 gpm, pressures to 4,500 psig, and shaft speeds to 10,000 rpm.

GTS® geared twin-screw pumps are for multi-cargo tankers and high-volume applications in pipelines, utilities, refineries, and chemical and process plants. Capacities are from 50 to 8,500 gpm, pressures to 400 psig, and shaft speeds to 3,600 rpm.

For free descriptive literature on Pyramid AMR three-screw pumps and GTS geared twin-screw pumps,

Circle 88 on Reader Service Card

UNION FLONETICS

Union Flonetics (Clinton, PA) line of valves includes the R-10 line of relief valves designed to prevent overpressurization of shipboard piping systems. Built to MIL-V-24332 specifications, the valves are available in sizes through 8 inches in bronze or steel. Special attention to the spring design assures that "set point" repeatability is maintained throughout the life of the valves. The R-10 Relief Valves have been tested and meet the vibration requirements of MIL-STD-167 and high shock requirements of MIL-S-901.

For free literature on the R-10 line of Relief Valves,

Circle 89 on Reader Service Card

VITA MOTIVATOR

Vita Motivator (New York, NY) provides multi-purpose eductors suitable for liquid cargo applications.

The VM deck eductor uses a hose lowered into the tank to vacuum liquids at a rate of 10-15 gpm at suction lifts of up to 70 feet or more. The unit needs no priming, has no moving parts and will not lose suction.

The VM portable eductor is a handy auxiliary pump for regular or emergency pumping of liquids from cargo spaces and tanks as well as ballast and bilge spaces. To operate, a hose is attached from the fire main and the eductor is lowered into the space to pump large quantities of liquid quickly and easily.

For free literature on Vita Motivator's full line of pumping products,

Circle 90 on Reader Service Card

ROBERT H. WAGER CO.

Robert H. Wager Company, Chatham, NJ, supplies vent valves from 1 to 12 inches in size. The valves are available in cast iron, bronze or steel with copper or monel trim, with or without covers. They meet or exceed virtually every marine spec.

Wager also supplies a line of deck drains made of galvanized steel with removable strainer plates of bronze. Six deck drain sizes are available to accommodate pipe from 1¼ to 6 inches,

For complete literature on Wager vent valve/deck drains,

Circle 91 on Reader Service Card

WARREN PUMPS

Warren Pumps, Warren, MA, offers a line of Pyroite® advanced reinforced composite pumps.

The line consists of horizontal and vertical centrifugal pumps and horizontal and vertical vortex pumps for capacities to 3,000 gpm and heads to 365 feet. Also available

from Warren are their Pyroite vertical turbine pumps for capacities to 3,000 gpm and heads to 300 feet.

Pyroite will handle acids, alkalines, hydrocarbons, salt water, deionized water and nearly all corrosive or erosive liquids at temperatures to 500°F.

For further information and free literature on Warren's Pyroite pumps,

Circle 92 on Reader Service Card

S.S. WHITE INDUSTRIAL PRODUCTS

Flexible reach-rods for operation of hard-to-reach valves are manufactured by S.S. White Industrial Products of Piscataway, NJ.

S.S. White Industrial Heavy Duty Flexible Reach Rods are used for safe remote control of valves in hazardous or inaccessible areas. Once installed, valves can be operated smoothly from distances up to 40 feet away. The flexible rods may be routed around curves and around obstacles. They require no additional operating gear such as universal joints or right angle gear boxes. The rods absorb shock and vibration and stand up to abrasion, abuse and corrosion. They are prelubricated and the only maintenance required is once-a-month operation.

S.S. White Industrial Heavy Duty Flexible Reach Rods are available in standard lengths from 3 to 36 feet and in three sizes to fit valves from ¾ to 16 inch diameter.

For free literature describing the S.S. White Industrial line of reach rods,

Circle 93 on Reader Service Card

WILDEN PUMP

Wilden Pump & Engineering Company of Colton, CA, manufactures an air-operated, positive displacement pump designed to handle very thick and very abrasive materials. The heart of the pump is its unique air valve that shifts the air supply to both diaphragms alternately with complete reliability under all conditions of head and flow. With no electrical connections, the pump is abrasion resistant, self-priming, submersible, and has variable volume/pressure and simple clamp band construction.

Up to 90 percent solids and more than 250-foot heads are no problem for the Wilden pump, as the double diaphragm design cuts velocity in the unit to half total discharge velocity. The most abrasive slurries are handled with ease, as there are no seals and no metal-to-metal contact.

Volume is infinitely variable by controlling the air flow to the pump, from a few gallons per minute to more than 14,000 gallons per hour. No pressure relief valve is required, and the pump can run dry indefinitely without damage.

Wilden pumps are available with wetted parts in aluminum, cast iron, stainless steel, and Hastelloy C; non-wetted parts are aluminum or cast iron. Elastomers are neoprene, Buna N, Nordel, Viton, or Teflon.

For free information on Wilden pumps,

Circle 94 on Reader Service Card

WILLIAMS VALVE

Williams Valve Corporation of Long Island City, NY offers a complete line of gate, globe, angle and swing check valves for commercial (and military) applications.

Williams valves are in use aboard U.S. Navy vessels. They are of superior design and engineering.

To obtain additional free literature on the entire line of Williams Valves,

Circle 61 on Reader Service Card

WHITEY CO.

Full flow, ¼-inch ball valves with swing-out bodies for fast, easy maintenance are now available from Whitey Co., Highland Heights, OH. The valve, designated the "62" Series, features high flow capacity and is rated to 2,200 psi (ANSI 1500-lb. Class) and 450°F.

This quarter-turn valve's standard features include a trip-proof oval handle and a blow-out proof stem for added safety. The unique stem packing is spring loaded to self adjust for wear as well as changes in

pressure and temperature, thereby preventing stem leakage. A patented three piece seat design compensates for wear and prevents leakage past the ball.

Brass and 316 stainless steel materials are standard. Modified versions are available to handle chlorine, sour gas and temperatures as low as −65°F. Air actuated models are also available.

Whitey offers a complete line of swing-out ball valves in sizes ranging from ¼-inch to 2-inch with SWAGELOK tube fitting, female NPT pipe fitting and weld end connections.

For information on Whitey's ball valves,

Circle 62 on Reader Service Card

WORTHINGTON PUMP

Worthington Pump Division, Dresser Industries Inc., Mountainside, NJ, manufactures a full line of cargo pumps for the marine industry.

The Worthington LNS centrifugal cargo pumps are specifically designed for fast, reliable and efficient tanker service. The LNS will pump large volumes of oil and other hydrocarbons as well as salt water ballast providing fast cargo unloading so vital to profitable tanker operation.

The LNS horizontal or vertical pumps are single stage, double suction, heavy-duty pumps designed and built to meet the needs demanded by modern high pressure cargo pumping.

Worthington LNS single stage pumps provide a great savings in space, weight, maintenance and repair costs, as well as initial cost without sacrificing reliability, performance or efficiency.

The Worthington LNS pumps' main features include: Casing designed to produce a smooth flow with gradual changes in velocity. A-1 LNS pumps have double colute casings. Stripper connections are fitted at the top of the suction spaces. The impeller is of double suction enclose type and is firmly secured to the shaft by a feather key. The shaft is ground to accurate dimensions and polished to a smooth surface. Shaft sleeves are fitted on sizes 10LNS-19, 10LNS-22 and 12LNS-21 to protect the shaft at the stuffing boxes. Stuffing boxes may be fitted with packing or mechanical seals as required.

For full details and free literature on the Worthington pump line,

Circle 63 on Reader Service Card

CAT PUMPS

Cat Pumps Corporation, Minneapolis, MN manufactures a line of over 150 models of pumps.

Cat Pumps supplies special corrosion resistant models constructed of Nickel Aluminum Bronze, Nitronic-50 and 316 Stainless Steel.

For full details and specific applications from Cat Pumps Corporation,

Circle 64 on Reader Service Card

Marathon LeTourneau GranGulf™ Semi Design Offers Economic Construction & Optimum Deck Load

Marathon LeTourneau's new GranGulf™, a large, lighter-weight semisubmersible drilling unit for Gulf of Mexico-type operating conditions, offers construction economies plus optimum deck load for a semi of its size and weight.

Rated for a 4,000-ton deck load when moored in 2,000 feet of water, the GranGulf can be easily upgraded for 2,500 feet of water with only minimal reduction in variable deck load. It also offers the options of propulsion assist and dynamic positioning for drilling in much deeper waters.

The GranGulf's larger diameter, shorter square vertical columns reduce steel weight and offer a number of construction advantages over columns of other configurations. Marathon expects that the rig will be less costly to build than semis with comparable deck load because the GranGulf requires less steel and less sophisticated fabrication.

The shape of the GranGulf's pontoons is also a major feature of the new design. This configuration gives the rig superior storm response characteristics, less transit resistance and better wave clearance all without loss of normal station-keeping performance while drilling. The pontoon configuration also permits use of the shorter vertical columns without a corresponding loss of air-gap. The GranGulf's pontoon size and shape incorporate principles of SeaTek's patented "B_2S" design as well as principles from a pending Marathon patent.

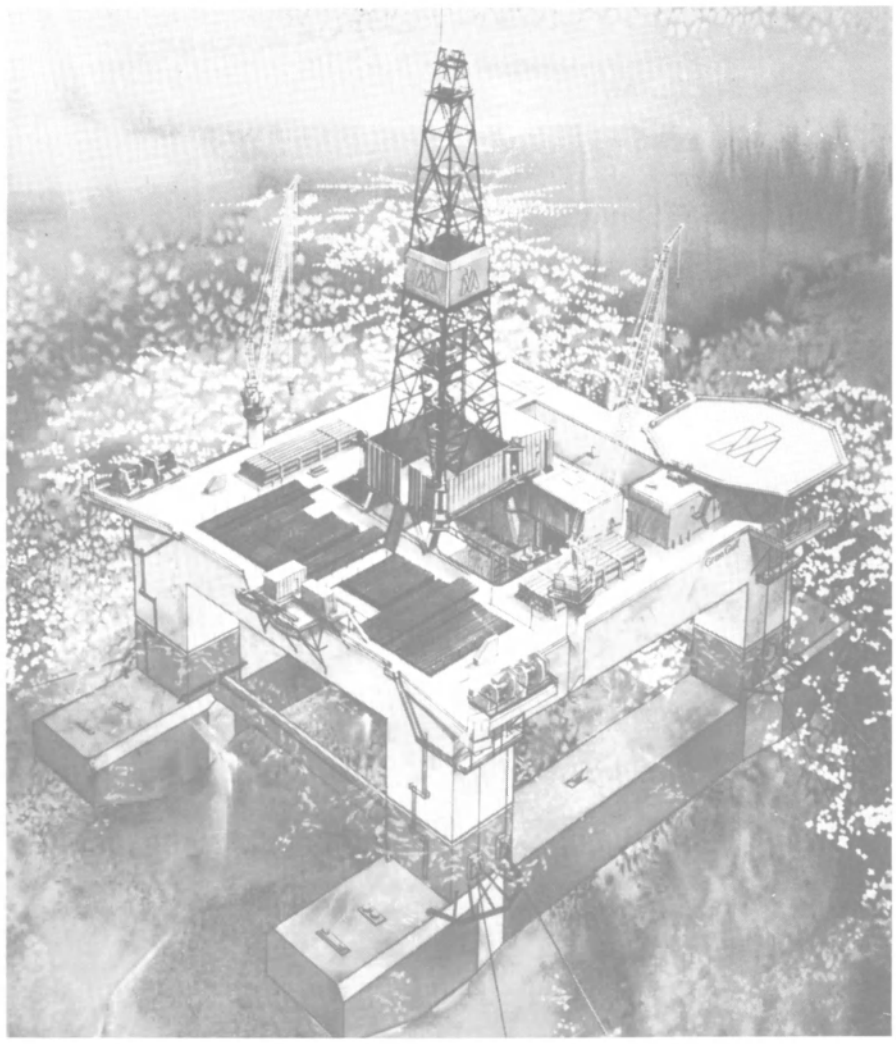
While the GranGulf's pontoons appear larger on the outboard side of the vertical columns, they actually have less displacement than the inboard pontoon sections. This pontoon shape capitalizes on variations in wave phase along the pontoons by reducing the vertical forces waves would exert on these pontoons compared with pontoons of uniform cross section and the same displacement. The GranGulf's unique pontoon shape also allows for its larger stabilizing columns and larger pontoon sections. These design features let the rig carry its full variable deck load during transit.

Overall length of the GranGulf is 280 feet, overall beam 195 feet, and height to the main deck 96 feet. Maximum storm conditions are: wave height, 100 feet; wind velocity, 100 knots; and current, 3 knots.

For more information from Marathon LeTourneau,

Circle 3 on Reader Service Card

Artist's conception of Marathon LeTourneau's new semisubmersible drilling rig.



Hedges Named President And Director of BP North America Petroleum

Jerry Hedges has been elected president and a director of BP North America Petroleum Inc. He was also named to the board of directors of BP North America Inc. He succeeds **John Rounce**, who has returned to BP's London offices.

Jerry Hedges

Mr. **Hedges** will continue to be located in BPNAP's offices in Hous-

$9.5-Million Contract Awarded To Raytheon

Raytheon Company, Submarine Signal Division, Portsmouth, R.I., was awarded a $9,520,071 cost-plus-fixed-fee contract for support for the AN/BQR-19 sonar system and AN/BQR-T4 on-board trainer. Work will be performed in Portsmouth and is expected to be completed by September 30, 1988. $3,101,056 of the contract funds would have expired by the end of the current fiscal year. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

Caterpillar Announces 3406 Overhaul Specials

Beginning immediately, Caterpillar Engine Division will offer three overhaul specials for 3406 engines. Customers will have their choice of a bearing roll-in, in-frame overhaul, or a pre-combustion to direct injection exchange engine upgrade. All three options feature improvements for the 3406 such as: copper bond bearings, improved fuel air-ration controls, and the revolutionary, ready-to-install, factory-assembled Remanufactured Cylinder Packs. Each option also includes a one-time-only special price.

The bearing roll-in and in-frame overhauls will be available as a dealer repair, or in handy do-it-yourself kits. The PC-DI upgrade is an exchange option only.

For additional information,

Circle 35 on Reader Service Card

Sells Named General Sales Manager For Matson Navigation

Matson Navigation Company of San Francisco has appointed **James F. Sells** as general sales manager, it was announced by **C.B. Mulholland**, senior vice president.

Mr. **Sells** formerly held senior executive positions with trucking, warehousing, and freight forwarding firms in southern California. He began his transportation career with Matson in 1970, and became assistant manager, southern California, before joining a trucking company in 1974. Prior to rejoining Matson, he was president of Royal Hawaiian Forwarding and Laerco Transportation in southern California.

AT&T Awarded $11.3-Million Contract For Engineering Support

AT&T Technologies Incorporated, Federal Systems Division, Greensboro, N.C., is being awarded an $11,300,615 cost-plus-fixed-fee contract for engineering support for the AN/BQR-15 sonar program. Work will be performed in Greensboro (80 percent); Burlington, N.C., (4 percent); and Whippany, N.J. (16 percent); and is expected to be completed by May 31, 1990. $6,866,614 of the funds will have expired by the end of the current fiscal year. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

$4.4-Million Contract Awarded To Superior Lidgerwood-Mundy

Superior Lidgerwood-Mundy Corporation, Superior, Wisc., has been awarded a $4,495,000 firm-fixed-price contract for the purchase of six steam winch systems for use on Military Sealift Command (MSC) oilers. The contract period is two and one-half years, with the first delivery scheduled for April 1986. Work will be performed in Superior. There were 19 bids solicited and five offers were received. Contract funds would not have expired at the end of the current fiscal year. The Military Sealift Command, Washington, D.C., is the contracting activity.

New Above Deck Shipping Covers Introduced By Reef

The Griffolyn® Division of Reef Industries, Houston, Texas has introduced a lightweight nylon-reinforced cover that can be fabricated to the shipper's requirements for protection of above deck cargo. The Griffolyn material is also available in stock roll form with attachments and tape for dockside fabrication by the shipper. Both custom cut covers and stock size covers are designed to reduce above deck shipping losses and in covering open-top containers.

For further information and a free sample,

Circle 99 on Reader Service Card

$10.4-Million Navy Contract Awarded To Sperry Corporation

Sperry Corporation, Defense Products Group, Great Neck, N.Y., has been awarded a $10,475,595 option under a previously awarded cost-plus-incentive-fee contract for global positioning antennas for the Trident II navigation system. Work will be performed in Great Neck and is expected to be completed in June 1988. Contract funds would have expired at the end of the current fiscal year. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

Automation Products Offers New Literature On Dynatrol® Systems

Automation Products, Inc. of Houston, Texas, is offering free new literature on their Dynatrol® Systems that are designed for measurement of density, specific gravity, or percent solids at process conditions.

The Dynatrol on-line sensing cell records density, specific gravity or percent solids measurement and control of liquids, slurries or gas for crude oil, products, LPG, CO_2, high-pressure natural gas streams, acids, or caustics at process conditions. This rugged, accurate and easy-to-install process tool has no moving parts and maintains long-term stability with little maintenance.

The new Dynatrol brochure details operation, shows response curves, and contains complete specifications.

For further information and a copy of the literature from Automation Products,

Circle 24 on Reader Service Card

Raytheon Awarded $20.6-Million Contract For Development Of Combat Control System

Raytheon Company, Submarine Signal Division, Portsmouth, R.I., has been awarded a $20,676,000 modification to definitize a previously awarded cost-plus-fixed fee letter contract for the development of the combat control system MK-1 computer program C-4. Work will be performed in Portsmouth, and is expected to be completed in June 1987. Contract funds would not have expired at the end of the current fiscal year. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

G.E. Awarded Navy Contract For $12.3-Million

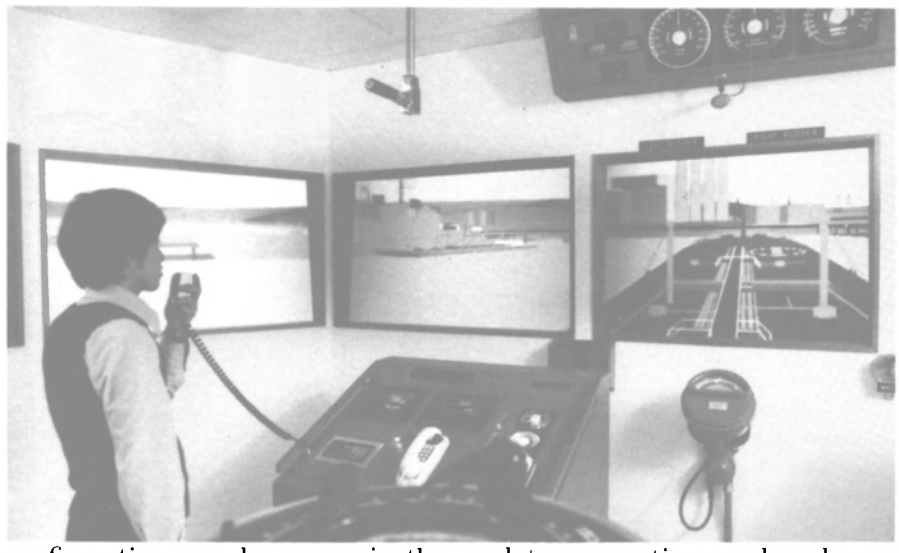
General Electric Company, Electronics Park, Syracuse, N.Y., was awarded a $12,300,000 fixed-price-incentive contract for long lead materials and services for installation of AN/SQS-53 (C) (V) sonar onboard Arleigh Burke (DDG-51) class destroyers. Work will be performed in Syracuse, and is expected to be completed in April 1987. Contract funds would not have expired at the end of the current fiscal year. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

Circle 106 on Reader Service Card

Circle 314 on Reader Service Card

ELECTRONICS UPDATE

First Interactive Shiphandling Simulators From Ship Analytics Being Commissioned



This month, June 1985, the Seafarers International Union will commission what is reported to be the world's first interactive, color day, night and dusk visual shiphandling simulators. Located at the Harry Lundeberg School of Seamanship, Piney Point, Md., this facility contains a full bridge simulator and three radar bridge simulators. These bridges will operate interactively in the same visual data base or indepently in separate visual data bases. Ship Analytics, North Stonington, Conn., designed and built this facility utilizing their modular Pilotship and Schoolship simulation technology interfacing visual systems between the full bridge and the radar cubicles.

Ship Analytics utilized its Schoolship configuration to provide basic shiphandling training capability within a radar cubicle at moderate cost and within a small space. Schoolship provides high resolution, color day, night and dusk visual scenes up to 110 degrees horizontal field of view, complementary bridge and navigation equipment and hydrodynamic models interfaced with the radar simulator. The Schoolship configuration can be conveniently upgraded to the Pilotship configuration as training demands increase.

Ship Analytics utilized its Pilotship configuration to provide senior officer shiphandling training capability within the full bridge setting for collision avoidance, piloting and navigation, docking, anchoring, tug and tow operations and underway replenishment. Pilotship provides ultra high resolution, color day, night and dusk visual scenes up to 230 degrees horizontal field of view including aft view for tow operations. Included in the Pilotship simulation are interchangeable sets of bridge equipment which reflect the differences between deep draft and tug controls and displays interfaced with appropriate hydrodynamic models and the radar simulator.

The Pilotship simulator configuration was successfully installed and has been in operation for one year, upgrading the skills of hundreds of pilots, merchant marine and U.S. navy officers at the Maritime Training and Research Center, Toledo, Ohio. Operational experience over this period demonstrated an availability level which exceeded 98 percent with less than $10,000 spare utilization. Ship Analytics is presently interfacing the Pilotship technology with its combat information center simulation to provide a shiphandling training capability for the U.S. Coast Guard Academy, New London, Conn. This system is scheduled for delivery in late 1985.

In addition to supplying complete shiphandling Pilotship and Schoolship simulators, Ship Analytics offers full shiphandling training courses conducted by expert instructors at the firm's own facilities.

Free color literature is available which describes Ship Analytics' ability to meet any simulation training requirement from design to manufacture and from operation to instruction.

For your free copies,

Circle 48 on Reader Service Card

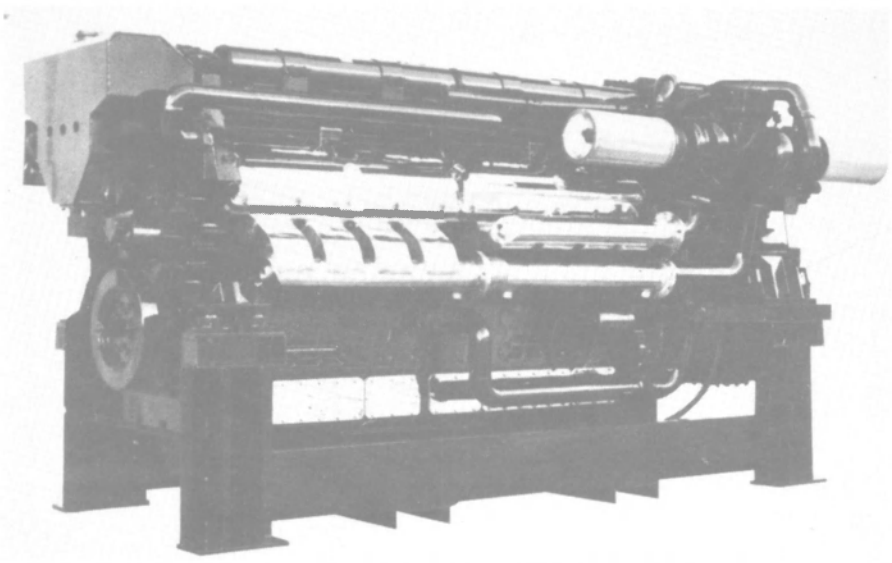
Krinsky Appointed Deputy Superintendent Of USMM Academy

Paul L. Krinsky of Bethpage, N.Y., has been appointed deputy superintendent of the US Merchant Marine Academy and promoted to the rank of commodore in the US Maritime Service. A 1950 honors graduate of the Academy, he is currently the second ranking administrative officer at the federal maritime institution responsible for overall planning and operation.

Stewart & Stevenson 'Mean 16' Provides Patrol Boats With New Power And Cruising Range

Increased speed, durability and cruising range required for patrol boats is now possible with the "Mean 16" from Stewart & Stevenson. This 2,000-hp high-performance Dieseldrive® was adopted from the proven GM Detroit 16V-149TIB basic engine.

Stewart & Stevenson's 2,000-hp high-performance Dieseldrive®.



The "Mean 16" has an advanced air induction system that enhances air flow for greater fuel economy. This system, combined with high efficiency turbochargers, intercooling and improved unit fuel injectors has increased fuel efficiency by more than 12 percent over the already popular naturally aspirated 16V-149. Greater fuel economy means increased cruising range for patrol boats.

The quick response characteristics and tremendous acceleration capability of the Mean 16 make it possible to go from normal patrol speeds to flat-out pursuit in seconds.

The Mean 16 is one of the lightest-weight engines available today in the 2,000-hp class with a weight-to-power ratio of approximately 6.95 lbs/hp. This new low silhouette diesel represents an outstanding combination of power, quick response, performance and fuel economy, all the features which are very desirable for highly maneuverable and versatile military patrol boats

For more information on Stewart & Stevenson's "Mean 16,"

Circle 47 on Reader Service Card

Literature Available On Navlink From Datamarine

Datamarine recently announced the introduction of Navlink, a new waterproof cockpit remote instrument that displays Loran information valuable for steering and navigation.

Navlink displays information received from Datamarine's Navigator LC Loran. Displayed data includes range to mark, bearing to mark, cross track error, course made good, speed over ground and Loran VMG. It is compatible with Datamarine's Link system of computer-based instruments but will also work independently of Link.

Navlink will operate in conjunction with Navigator LC Lorans shipped after March 1985. Sets purchased earlier can be upgraded by Datamarine at the factory.

For further information on Datamarine's Navlink,

Circle 21 on Reader Service Card

Tracor Awarded $3.6-Million Contract For Sub Maintenance

Tracor Incorporated, Austin, Texas, is being awarded a $3,633,394 cost-plus-fixed-fee modification for submarine extended operating cycle maintenance and modernization programs support. Work will be performed in Rockville, Md., and is expected to be completed September 30, 1985. Contract funds would not have expired at the end of the current fiscal year. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

Elliott White Gill Names New Sales Agent For Taiwan

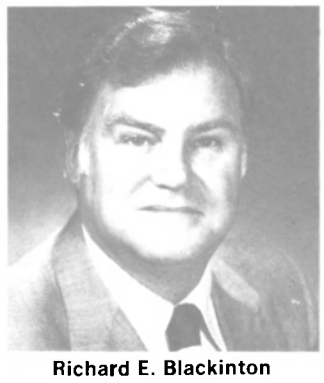
Pey Hwa Enterprises Company Ltd. of Kaohsiung, Taiwan, Republic of China, has been appointed the new sales representative for United Technologies Elliott White Gill thrusters for Taiwan. Pey Hwa specializes in machinery, equipment, and fittings for the marine industry. **K.H. Liu,** president of Pey Hwa, has completed an orientation course at Elliott's Springfield, Ohio, plant.

Elliott Company, a division of United Technologies, manufactures the White Gill thrusters at two locations—in Springfield and at Cowes, Isle of Wight, U.K., with sales offices worldwide. The company's thrusters are produced in four styles designed in various sizes to transmit power from 50 to more than 2,000 hp. They are powered by either electric motors or internal combustion engines.

For more information on Elliott White Gill thrusters,

Circle 50 on Reader Service Card

Blackinton Named General Manager Of Bethlehem-Beaumont Yard



Richard E. Blackinton

The appointment of **Richard E. Blackinton** as general manager of Bethlehem Steel Corporation's Beaumont (Texas) Yard has been announced by **David H. Klinges,** vice president of Bethlehem's marine construction group. Mr. **Blackinton,** who had been general manager of operations and facilities, marine construction, will succeed **Sherman C. Perry.**

Following graduation from the University of Rhode Island in 1951 with a B.S. degree in civil engineering, Mr. **Blackinton** joined Bethlehem Steel's management training program for college graduates and was intially assigned to the Hoboken, N.J., yard. He transferred to the corporation's former yard in Brooklyn, N.Y., in 1953, and two years later returned to Hoboken as a planner and then estimator.

In 1957, he was assigned to shipbuilding headquarters then located in New York City as assistant to construction engineer, and later as technical assistant to the vice president. In 1966 he returned to the Hoboken yard as a ship superintendent and became assistant project superintendent at the San Francisco yard later that year.

Mr. **Blackinton** was promoted to general superintendent at Bethlehem Steel's shipyard in Beaumont in 1969 and subsequently served there as plant engineer, methods engineer and assistant to the general manager. He returned to the Hoboken yard as general superintendent in 1978 and the following year was named general manager. He was appointed to his present position in 1982.

DCC is generally used throughout vessels and offshore units where the ceiling design must comply with and meet the combined requirements of fire protection, sound regulation, aesthetics and simple installation.

DAMPA Continuous Ceiling Approved By U.S. Navy—

Free Brochure Available

DAMPA Marine has made available a free 20-page brochure on the DAMPA® Continuous Ceiling System (DDC) that the company manufactures. The U.S. Navy (NAVSEA)-approved DAMPA Continuous Ceiling is a lightweight galvanized steel and baked enameled with unperforated or perforated surface for increased sound absorption.

The publication, which is generously illustrated with photos, drawings and graphs, describes DCC as a steel ceiling system that can be mounted either before, during or after the installation of partitions. Fire resistant and sound absorbing, the lightweight steel construction combines rigidity and strength. The ceiling units are supplied pre-cut to fit each individual room requirement, thus reducing labor costs, installation time (approximately six minutes a square foot), and waste of materials; and a wide range of integrated components such as luminaires, loudspeakers and ventilation units are available. DCC is marketed through a worldwide network of subsidiaries and partners, and designers, shipowners and yards have specified and used it in more than 1,000 vessels.

In addition to being U.S. Navy (NAVSEA)-approved for future application onboard U.S. Navy and Military Sea Lift Command vessels (new and conversions), DCC fulfills "A" class divisions of A-0, A-15, A-30, and A-60 standards and "B" class divisions of B-0, B-15, and B-30, respectively, as defined by IMO International Conference on Safety of Life at Sea 1974 (SOLAS 1974).

For more information and a free copy of the DAMPA Marine brochure,

Circle 312 on Reader Service Card

Erlandson Promoted To Manager, Engine Division Of FABCO Equipment Inc.

Joseph G. Fabick, president of FABCO Equipment Inc., recently announced the promotion of **Dave Erlandson** to manager of FABCO Power Systems, the company's engine division.

FABCO Equipment Inc. is the Caterpillar dealer for the entire state of Wisconsin and Upper Michigan.

Ingersoll-Rand Forms New Compressors Division

Ingersoll-Rand Company, Charlotte, N.C., recently announced the formation of a new division, the single stage products division, whose initial product offering will be X-FLO, a mixed-flow single-stage turbo compressor. The new single stage products division, based in Charlotte, will be headed by **Peter Baldwin**, vice president and division general manager.

"The new division will allow Ingersoll-Rand to fill out its product line and to showcase X-FLO, a major advancement in impeller technology," said Mr. **Baldwin.** "We're filling a sizable segment of the compressor marketplace with X-FLO, and we plan to expand the new division to include similiarly innovative products," he said.

Adaptable to air, gas and steam applications, X-FLO will serve major industries such as chemicals, utilities, wastewater treatment, pulp and paper, food, mineral processing and industrial pollution control. The X-FLO is a more compact machine and, therefore, is easier to package, install and maintain. A typical X-FLO impeller is 30 to 40 percent smaller in diameter than typical centrifugal impellers, while achieving higher efficiencies and energy savings. X—FLO's simple design, coupled with its few moving parts (only the rotor assembly and gear), provides maintenance-free operation for extended period of time.

Integral gear designs are available to 175,000 CFM. Other features include: A horizontally-split gear casing, providing accessibility for easier inspection and maintenance of bearings and gears; case hardened AGMA Class 12 gearing; a shaft driven lube pump; variable inlet guide vanes to adjust flow rate; a variety of materials and seals to match application needs; and three types of bearings—tilting pad, three-lobe and tapered land thrust.

For more information on Ingersoll-Rand's new single stage compressor division and X-FLO,

Circle 30 on Reader Service Card

Menge Named Agent For Seaward Fenders

John H. Menge IV

Menge Marine Equipment Company, Inc., New Orleans, La., has joined Seaward International's worldwide network of sales representatives. They will be responsible for the sales and promotion of Seaward's entire line of foam-filled marine fenders and buoys in the eastern section of the U.S. Gulf Coast, which includes Louisiana, Alabama, Mississippi and the Florida panhandle.

Menge Marine was formed in 1980 to provide manufacturers' representative services for firms involved in the oil field and oil field-related industries. The company currently acts as agents for Red Fox Industries, Inc., for their marine sewage treatment systems; Zodiac of North America, Inc., for their inflatable rescue and work boats; Electro-Lube Devices, Inc., for their by-pass lube oil refining systems; and Kent Oil Co., for their moly-based lubricants.

The president of the firm, **John H. Menge IV**, is a graduate of the Kent School in Kent, Conn., and received a B.A. degree in economics from the University of the South in Sewanee, Tenn. He represents the fourth generation of his family to be involved in a marine equipment business along the Gulf Coast.

For more information about Menge Marine Equipment Company, Inc.,

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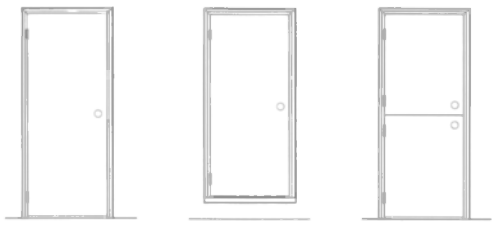

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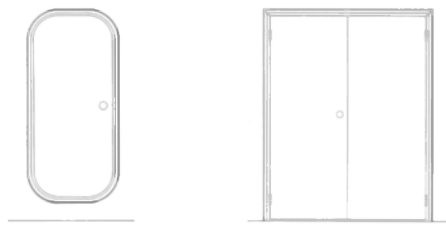

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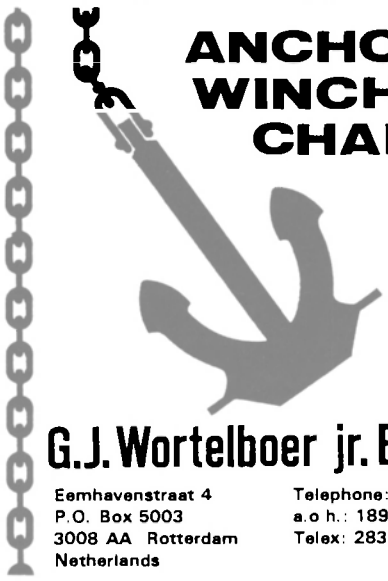

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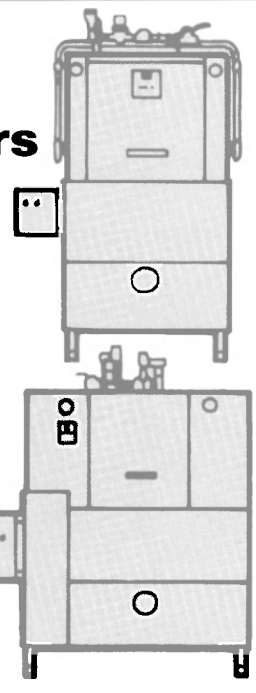

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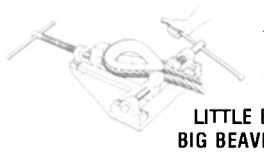

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Circle 175 on Reader Service Card

Lanzendorfer Will Manage Fairbanks Morse Service Facility in San Diego

Glenn Lanzendorfer

Fairbanks Morse Engine Division of Colt Industries recently announced the opening of a new service facility in San Diego, established to offer complete engine and component rebuild and parts service for the Fairbanks Morse and Colt-Pielstick engine lines. The new facility will serve customers in the southwestern states and Mexico.

Glenn Lanzendorfer will manage the new service operation. He has been with Fairbanks Morse for the past 12 years, most recently on special assignment in Seattle as service manager for the Navy's LSD-41 ship construction program at Lockheed Marine Division. Before that, he was in Beloit, Wisc., headquarters as manager of contract administration for 10 years.

Fairbanks Morse Engine Division builds diesel engines for marine and stationary service in a power range from 640 to 29,286 bhp.

For additional information on the new San Diego facility,

Circle 56 on Reader Service Card

$5.3-Million Navy Program Received By Tracor

Tracor, Inc., has received a three-year $5.3-million program to provide technical and logistics support to the Naval Sea Systems Command, Surface Ships Directorate.

Dr. **William C. Moyer**, group vice president of Tracor Applied Sciences, said this contract reflects continued successful involvement in the Shore Intermediate Maintenance Activity (SIMA) upgrade program. The work will be performed by the Systems Technology Division of Tracor Applied Sciences from its headquarters in Rockville, Md., under the general management of **William M. Pugh**, division vice president and **Lelan B. Cable**, engineering division director.

Mr. **Pugh** announced that **Hugh M. DeJarnette** will serve as program manager. He and his staff will be headquartered in Rockville with site representatives in Long Beach and San Diego, Calif.; Pearl Harbor, Hawaii; Norfolk, Va.; and Charleston, S.C.

Tracor, Inc., is an international technological products and services company headquartered in Austin, Texas. The company is a major technical contractor in sonar, communications and aviation programs; a leader in the development and production of passive electronic countermeasures systems and military telecommunications terminals; and a major manufacturer of scientific instruments and electrical and electromechanical components.

Nolan Appointed GM Of Marine Operations For Sun Transport

James R. Nolan has been appointed general manager of marine operations for Sun Refining and Marketing Company. He had been manager of fuels planning for Sun R & M, whose parent corporation is Sun Company of Radnor, Pa. He replaces **Joseph Mazzei**, who was recently named manager of Sun's refinery in Marcus Hook, Pa.

Under the name of Sun Transport, headquartered in Aston, Pa., marine operations operates a fleet of oceangoing tankers, tugs and barges. This fleet handles crude and petroleum products shipments worldwide for both Sun R & M and third party customers.

Gensler Named Director Of Marketing And Sales For InterTrade Industries

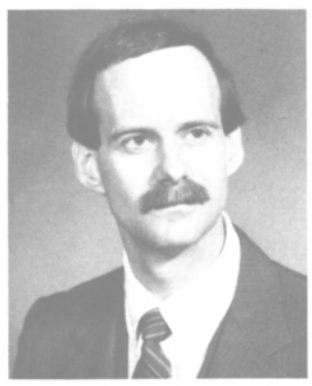
Marvin Gensler

InterTrade Industries, Ltd. of Huntington Beach, Calif., has announced the opening of a metropolitan Washington, D.C., office and the appointment of **Marvin Gensler** as director of marketing and sales. This new office, at 1680 East Gude Drive in Rockville, Md., will provide sales and technical support to InterTrade customers.

Mr. **Gensler** will be responsible for marketing and sales of the company's entire line of products. These include the Ship Guardian marine fender, Hi-Tec and Super Hi-Tec marine fenders, buoys, oil spill booms, and flotation and mooring systems.

Prior to joining InterTrade, he was manager of North American sales for another marine products company. He has a BSME degree and a background of more than 25 years of sales and marketing experience.

Johnson Named Marketing Communications Manager For Twin Disc Inc.



Dave Johnson

David H. Johnson has been appointed manager of marketing communications at Twin Disc, Incorporated of Racine, Wisc.

He fills the vacancy created by the retirement of **Louis A. Peccarelli**, director of marketing communications, and a 30-year veteran Twin Disc employee.

Mr. **Johnson** held a similiar position at Waukesha Engine Division of Dresser Industries, Inc. In his new job, he will be responsible for all advertising, sales promotion, and trade shows for Twin Disc, a leading manufacturer of heavy-duty, off-highway power transmission equipment.

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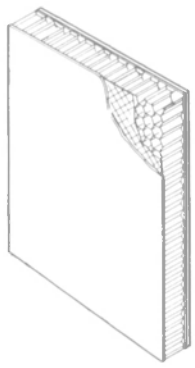

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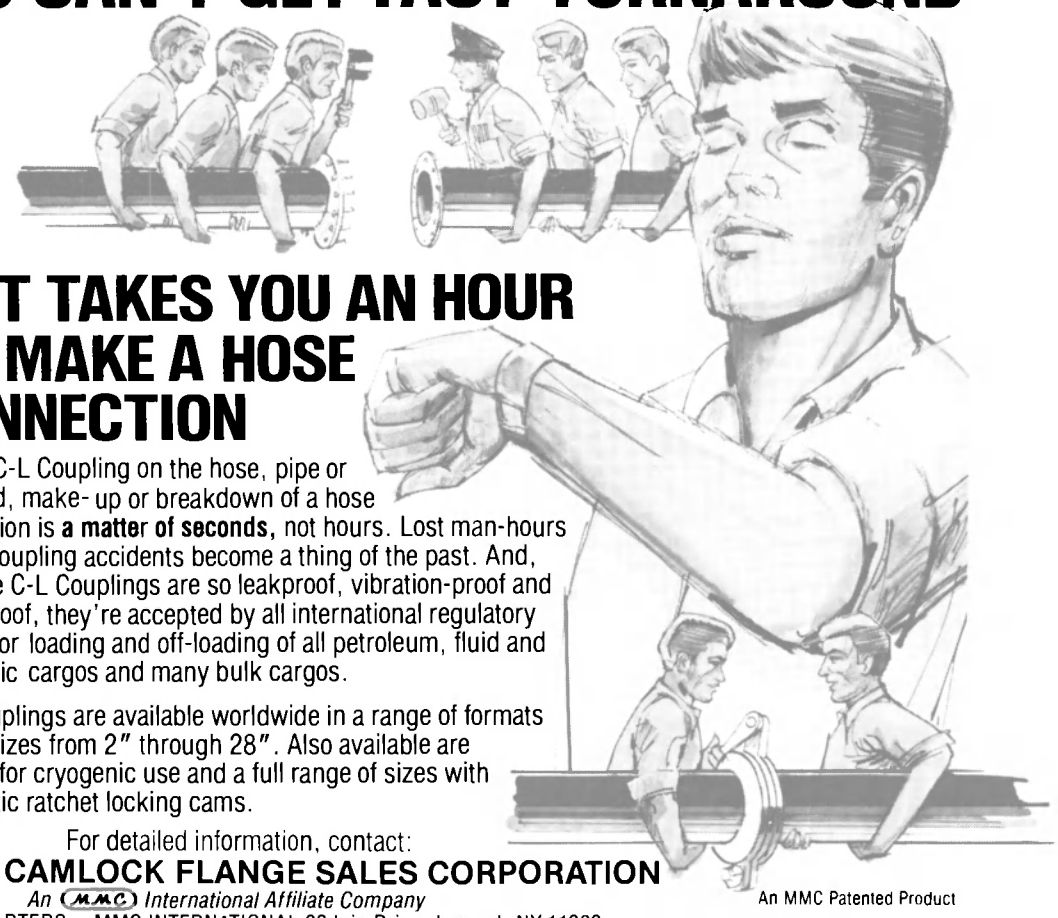

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The purchase of Capitol Finishes, Inc., with current work orders totaling more than $3 million, will strengthen the services of Steigerwald in the Northeast from Pennsylvania north. These services include deck covering, insulation and small joiner installation work.

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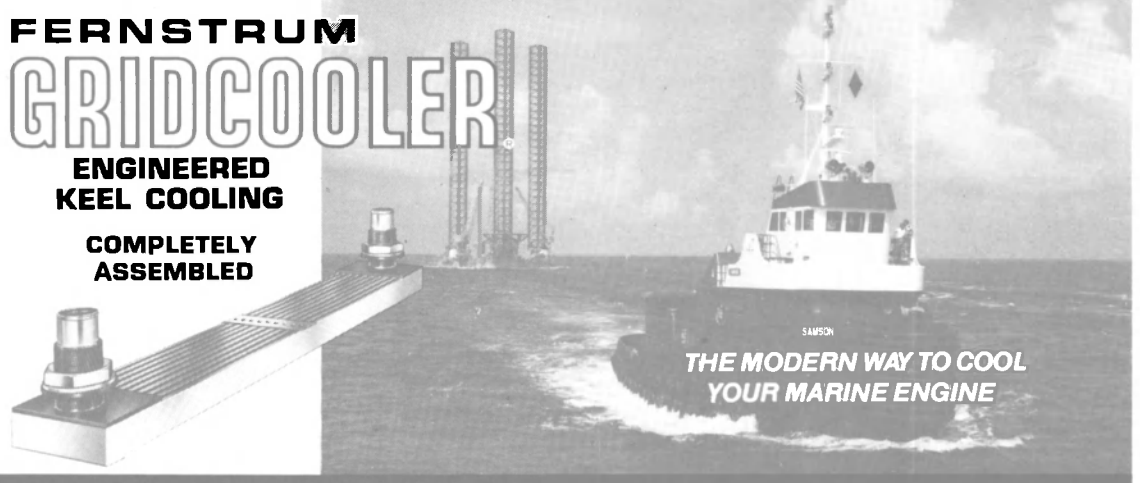

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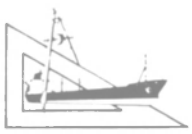

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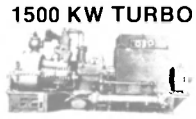
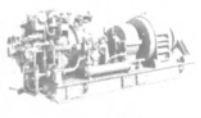
Ex-USN — GEI-16846 — type FN3-FN24 — seven stage — 10033 RPM — typical serial # 49351 or 61718. Single helix reduction gear — 10033/1200 RPM — type S-187. GENERATOR: 750 KW — 6-pole 0.8 P.F. — 450/3/60/1200. EXCITER: 10 KW — 120 volts. Steam inlet flange 2½" — exhaust 17¾" X 25¾" rectangular. Overload 25% 2 hours. Units can be upgraded to 1250 KW for USN applications. Complete with throttles, etc. 8 Available.

1500 KW TURBO GENERATOR SET



11-Stage turbine — FN4 — 8145 RPM — 3¾" steam — 525# — 825° TT. GEARS: 195-8145-1200 RPM. GENERATOR 1500 KW — 450/3/60/1200 RPM — 2405 amps — 0.8 P.F. EXCITATION: 13.2 KW — 120 volts DC. Weight 36,000 lbs — exhaust flange 18" X 38"

L.P. 450KW A.C. TURBO GENERATORS



Suitable for waste heat turbo generators on motor ships

175 PSIG — D&S — 27½" vacuum. GENERATOR: Westinghouse 450KW — 563KVA — 450/3/60—1200 RPM. GEAR: 6097/1200 RPM. TURBINE 175 lbs/D&S—27½" vacuum. Other pressures & temps: 250# @ 40° C—27½" vacuum. Turbine serial #7801-7802. OAL 13 1-3/16"—OAH 5'—OAW 5'½". Total dry wt. 17,100 lbs. Plans on request

TURBINES/ROTORS REDUCTION GEARS

ROTORS: DRU-618M-73 — 700 KW — 10938/1200 RPM — GEI 90755 — 850#. DIAPHRAGMS: Labyrinth — bearings GEAR: S-432 — Form B — 10938/120

G.E. ROTORS: 600KW — 700KW — 618M — 6-stage — 10022 RPM — G E I. 34822. GEAR: S-277A — 10022/1200 RPM — MARAD units

G E. ROTOR: DRU-318 — MRI non-condensing — 10938/1200 — 24 lbs

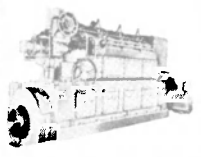
DeLAVAL TURBO GENERATOR SETS: ROTOR 7-stage class CD — 5910 RPM. REDUCTION GEAR type KD — 5910/1200 — double helical. Newport News hulls 499-504. Some Sparrows Point hulls.

DeLAVAL 1000 KW TURBO GENERATOR SET ROTOR: 1442 HP — Class G.J.N. — 10009 RPM — 9-stage

300KW GM 8-268A 120/240 DC DIESEL GENERATOR SET

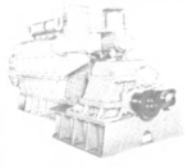
ENGINE: GM 8-268A — 6", x 7 — 1200 RPM. Heat exchanger cooled — equipped with heavy duty coolers. Just overhauled and can be seen running. Good condition

NEW CLARK 500 BHP DIESEL



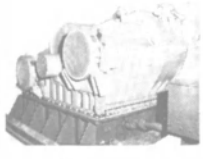
500 BHP @ 400 RPM. 4-Cylinder straight inline type — 12½" X 16" — 2-stroke single acting — liquid cooled — direct reversible. CW rotation. With standard shaft-connected starting air compressor. Wt 25,000 lbs — 228" long — 98" wide — 132" high. Designed for heavy duty, rugged use, its extreme simplicity will result in lower operating and maintenance costs

MATCHED PAIR 900 HP GM 12-567A DIESELS W/ FALK REVERSE & REDUCTION GEARS



ENGINE: GM 12-567A 8½" x 10 2-cycle V-type — 747 RPM — electric starting. GEAR: Falk Airflex reverse & reduction — 2.48:1 forward — 2.52:1 reverse. From USN LST

UNUSED FARRELL-BIRMINGHAM MAIN PROPULSION REDUCTION GEAR



Single reduction 1.81:1. Will handle up to 3200 HP input at 402 RPM. Complete with hydraulic coupling. Port

SHARPLESS OIL PURIFIER

225 GPH — type M85-34-5-23-BY-44 — bowl speed 17,000 RPM — 2 HP — 440/3/60/3400 RPM. Reconditioned

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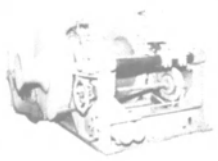
ALMON JOHNSON CONSTANT TENSION LST STERN ANCHOR WINCHES WITH ALL CONTROLS

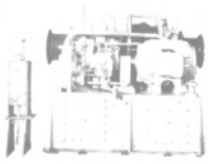


Drum capacity 900' of 1⅛" wire. Gypsy performance 12,000 lbs @ 125 FPM. OAL 12 — CAW 10'1". Driven by 50 HP 230 VDC 181 amp motor. 2 Available with controls

PERFORMANCE

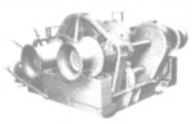
	Max. Control	Auto. Tension Control	
Line Speed	100,000 lbs	26,000 lbs	3000 lbs
Line Tension	10 FPM	Stall	400 FPM

50HP VARIABLE SPEED ELECTRO-HYDRAULIC CARGO WINCH



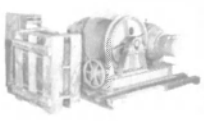
Made by Lakeshore. DUTY 7400 lbs St.P — 220 FPM — drum size 24" diameter — 15" wide. Complete with ratchet & pawl. CAPACITY: 600' of wire. MOTOR: 50 HP — 440 volts — 66.3 amps — 3-phase 60 cycle — squirrel cage — 1200 RPM constant — Frame CC-445-N

7X10 AH&D 10,000 LB CARGO WINCHES



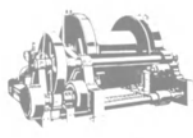
2-Speed single drum — reverse throttle operation. LINE PULL: low gear 10,000 lbs — high gear 5000 lbs. LINE SPEED: low gear 125 FPM based on 1st layer of ¾" diameter rope — high gear 250 FPM based on 1st layer ¾" diam. rope. DRUM: 26" diam. — 20" long — 26" flange diam. Rope capacity of drum: ¾" diam. rope in 6 layers — 650' ¾" diam. rope in 8 layers 1200'. Steam pressure at throttle 115 lbs. Operating weight 6450 lbs

GENERAL PURPOSE WINCH 3500 LBS AT 200 FPM



New — Unused — Ex-USN A.C. Motor drive — 25/12.5 HP — GE 440/3/60 — 40°C AB — 1750 RPM — Type KR — full load amps 32. Motor drives winch through Falk reduction gear. Has compression hand brake

LARGE STEAM TOWING ENGINE 9X10 TWIN ENGINE DRIVE

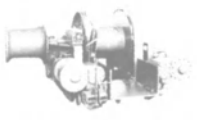


Air or Steam — 125/250 PSI. Heavy duty Clyde with 36" diam. X 51" Face single drum. Flanges 68". CAPACITY up to 2800' of 2" wire rope. Normal line pull 40,000 lbs @ 50 FPM. Steam or air pressure required 125 to 250 PSI. Can be adapted to electric drive or increased steam or air pressure to a capacity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

12" X 14" STEAM MOORING WINCHES

Steam Or Air Driven with foot brake & declutchable gypsy head 20,000 LBS @ 100 FPM — FIRST LAYER

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

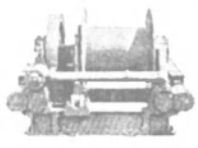


Drum will stow 1500' of 1", wire in 9 layers. Steam inlet 3½" — 4" exhaust — 171 PSI working pressure. BASE DIMENSIONS: 6' X 6'3" — overall 8'4" wide X 9' long. Mfg by Friedrich Kocks — Bremen, Germany. Remover from ARCO "Challenger". ALSO IN STOCK — 12" X 14" Double gypsy unit. Can be demonstrated running.

UNUSED STEAM WINCH FOR MOORING & CARGO SERVICES

Lidgerwood 10X12 with Morse controls. 10,000 lb. line pull — declutchable gypsy — hand compression brake.

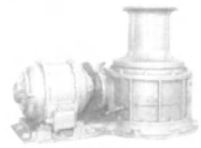
SMALL 4 X 6 WINCH



STEAM OR AIR

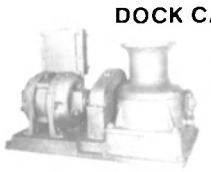
DRUM: 20" Diameter X 23" width — 8" flange. Rated 2000#/90 FPM on 3rd layer of rope. 125# Steam or 3500 @ 90 FPM. 150 PSI steam. 13,000 lb. static load. Fitted with ratchet & pawl so drum can be locked in off and on position.

HEAVY DUTY 2-SPEED DOCK CAPSTANS



For tugs, docks, etc. Suitable for manila or wire rope because barrel is ridged. 40/40 HP — 1200/600 — 24,000# @ 30 FPM — 12,000# @ 60 FPM. Barrel size 22" diameter by 24" high — with controls.

DOCK CAPSTANS



Spool 10" diam. X 4". 15 HP — 220/440/3/60. 10,000 lbs @ 40 FPM. 48" Long — 32" wide — 28" high

DEAN BROS. ALL-BRONZE STRIPPING PUMP BILGE & BALLAST 12 X 10 X 18

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

WORTHINGTON 16" X 14" X 18" VERTICAL DUPLEX STRIPPING PUMP

1400 GPM @ 110PSI — suction lift 11.5 ft. — steam back pressure 15 lbs. 14" Suction — 10" discharge — 2" steam — 4" exhaust. Overall width 6'8" — overall height 9'11" — depth 3'9". Wt approx 10,000. Reconditioned 1980 ABS — ready to go.

HIGH PRESSURE HULL CLEANING PUMP

Mfg by Hypro — type L — 25 HP — 220/440/3/60 — Frame 284T. Pump capacity 25 GPM @ 500 PSI — 600 RPM

DEMING MOTOR DRIVEN RECIPROCATING PUMP

For sanitary and potable water use. 30 GPM @ 90 lbs. 190 RPM — 2" suction — 1½" discharge. GE motor — 2 HP — 440/3/60/1735 RPM

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25000 CFM — A25A4W6 — 42½" ID — 52" high — 25/14 HP — 440/3/60 — 1200/900 RPM — 36/24 amps. 4 Available

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5000 CFM — A5A4W6 — 23½" ID — 29½" high — 4 HP — 1150/1750 RPM. Mfg by Joy. 1 Available

12000 CFM A12AX6 Explosion-proof — 29½" ID — 37½" high — 10/3 HP — 1800/1200 RPM — Frame 254U — group D Reliance motor

ALSO MARAD FANS

40665 CFM — size 43 AF — 60 HP

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Steel — with 12mm (½") cover and 19mm (¾") flange. Gasket between top cover and flange. Mounting bolts are stainless steel.

Style A has flush deck mounting flange with 24½" diameter bolts. Style B has extended deck mounting flange with 20½" diameter bolts.

21" & 24" I.D. MAN-WAY 2-DOG HATCHES

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

QUICK OPENING HATCH

Handwheel top & bottom. 4-Dogs 16"X24" with 5" coaming. Drawing #60-40

4-DOG GENERAL PURPOSE 15"X23"X5" HATCH

QUICK-ACTING 4-DOG HATCHES

Heavily constructed Handwheel operated Handwheels top & bottom. Size A: 27" X 21" w/12" coaming. SIZE B: 31"X31" w/12" coaming. For ocean-going barges, etc.

TANKER EXPANSION TRUNK

36" Diameter — 26" coaming — 7-dog drop-bolts. Drawing 36/26

20" ROUND HATCH

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

36" X 48" — 24" X 36" DECK HATCHES

Has 10 brass dogs — 18" coaming. Coaming is 12mm — top is 11mm.

FLUSH HATCHES 24" X 30" 30" X 30"

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

NEW 18" & 24" HATCH COVERS

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

NEW 3-DOG WEATHERTIGHT DOORS 26" X 78"

NEW QUICK-ACTING WHEEL OPERATED WATERTIGHT DOORS

6-DOG 5/16" Steel frame — ¼" panel — 26" X 48" — 30" X 60" — 30" X 69" — 30" X 54"

QUICK-ACTING LEVER-OPERATED 8-DOG WATERTIGHT DOOR

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Clear opening 16" X 20" — 10" radius — 36" high — 40½" long. For extra large tankers or heavy dredges where 1¼" wire or eye-spliced loop must pass through chock. VLCC type from 250,000 ton tankers

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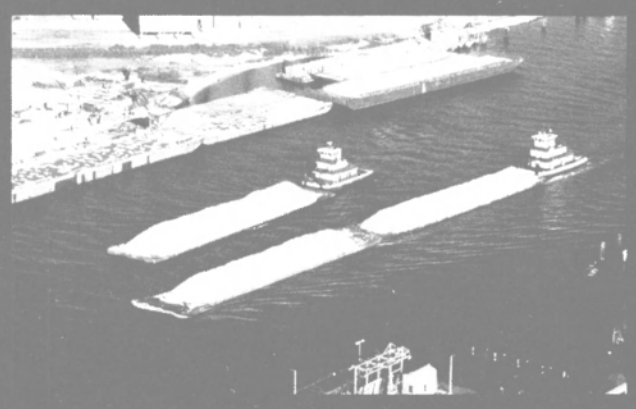

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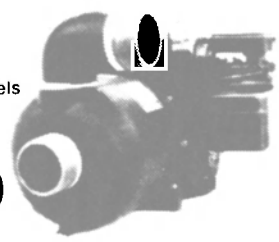

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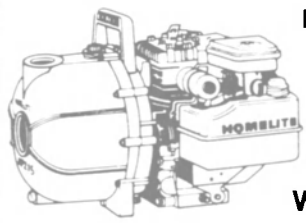

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Taylor Tools Offers Brochures On State-Of-The-Art Testing Of Relief Valves In Place

Taylor Tools of Oklahoma City, Okla., has announced the availability of three new literature pieces describing state-of-the-art testing of relief valves in place. Titles for the informative brochures on three of the most recently added innovative products to the Taylor Tool line include Inservice Testing Device (ITD) General Information, ITD Installation and Operation, and Relief Valve Leakage Tester.

The text of the three-hole-punch brochures is generously illustrated with photographs and drawings and contains explicit information on how to order.

For more information and a copy of the brochures from Taylor Tools,

Circle 58 on Reader Service Card

Simmons Named Non-Exclusive Surveyors For Florida & Bahamas By Panama Register Corporation

Panama Register Corporation has appointed Simmons Associates as non-exclusive surveyors for Florida and the Bahamas, excluding Jacksonville. Simmons Associates is empowered to issue Statutory and Loadline Certificates on behalf of the Government of Panama.

They may be reached at (813) 921-1231, Telex 9103808486 (Simmons Assoc) or, in New Orleans at (504) 834-5039.

WABCO Offers 8-page Brochure On Logicmaster™ Marine Propulsion Control Systems

The WABCO Fluid Power Division of American-Standard, Lexington, Ky., has published an eight-page brochure on Logicmaster™ pneumatic control systems for marine engines equipped with hydraulic clutch reverse gears.

WABCO Logicmaster controls incorporate the interlocks and protective circuits required for proper engine and reverse gear operation without relying on operator judgement to time or anticipate propulsion machinery functions. Features listed in the publication are remote single-lever "fingertip" control; fast maneuvering; maximum protection for propulsion machinery; compact, space-saving components; and factory assembled and 100 percent operational tested.

Service proven interlocks and features of Logicmaster control systems are discussed along with different systems that may be selected, such as the LM1 standard system, LM2 standard with shaft brake control, and LM3 proportional reversing interlock system, designed for high-speed vessels like crewboats, which operate on reversal to utilize the engine compression to decelerate the propeller and shaft to idle before reverse clutch engagement. Operating sequences are also given for the systems.

All Logicmaster systems have the new HD-2-FC Controlair® valve and the Logicmaster Control Unit, and the features of both are listed.

The brochure is well illustrated with photos and drawings, among which is a one-page drawing of a typical two-station, single-engine control system package with listed available options.

For further literature containing full information from WABCO,

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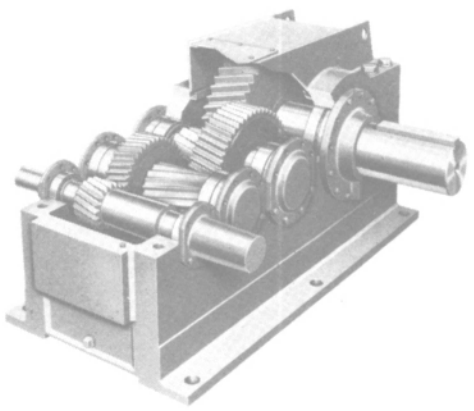
Free 12-Page Color Brochure Availale From Falk On New Shaft Speed Reducer Line



Many significant improvements are claimed for a new line of gear-type speed reducers introduced by the Falk Corporation, Milwaukee, Wisc. Essentially the new line, carrying a new "A" Unit designation, combines significantly higher performance with reduced space requirements. In making the announcement, a Falk spokesman stressed that the new design is an improvement on a good thing, noting that Falk has been a leading U.S. producer of parallel shaft reducers for more than 25 years.

A full-color 12-page brochure on Falk "A" Unit parallel shaft speed reducers is offered free by the company. The attractive publication uses photos, drawings, diagrams, etc., as well as text to describe and point up the advantages of the new line.

Primary among the new improvements is the use of computer-aided design and finite element analysis as a means of putting more strength into a more compact speed reducer package. Similarly, advanced case carburizing techniques produce gears that are both stronger and longer wearing. A spokesman noted that even the bearings of "A" Unit reducers are state-of-the-art, providing added load-carrying capability. Effective thermal design, primarily through efficient use of fans and cooling tubes, are said to be carried forward from previous designs as an important contributor to reliable performance.

Along with the "A" Unit's state-of-the-art design, Falk has employed leading-edge manufacturing techniques designed to improve reliability and performance. Housings are 100 percent robot welded, and modern two-stage ovens add precision and control to the heat treating and hardening of gears to highest practical Rockwell hardness. Another advanced technique is "gear tooth lead and pinion profile modification"—an engineer's way of saying that tooth contact under load is optimized for lower stresses and longer life.

Not new but very important to the unit are the Magnum Seals that are standard and said to eliminate oil leaks and to prevent dirt and grit from entering the bearing chamber.

"A" Unit reducers are available for single-speed reductions from 1.8 to 1, and more than 400 to 1 with multiple reductions. Torque ratings range from 130,000 inch-pounds to more than 2 million inch-pounds. Related equipment such as soleplates, bedplates, cooling systems and backstops are also available.

For further information and a copy of the free brochure on Falk "A" Unit parallel shaft speed reducers,

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BUYERS DIRECTORY

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AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, NY 11231
Flakt AB, Box 8862, S-40272, Gothenburg, Sweden
Stal Refrigeration AB, Butangsgatan 16, S 601 87 Norrkoping, Sweden
Carrier Transicold Division, Carrier Corp., P. O. Box 4805, Syracuse, NY 13221
ANCHORS AND CHAIN
Baldt Incorporated, P.O. Box 350, Chester, PA 19016
G.J. Wortelboer Jr. B.V., Eemhavenstraat 4, P.O. Box 5003, 3008 AA Rotterdam, Netherlands
ANODES—Cathodic Protection
American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Engelhard Industries Division, 2655 U.S. Route 22, Union, NJ 07083
Federal Harco, P.O. Box 40310, Houston, TX 77240
Wilson, Walton International, Inc., 66 Hudson St., Hoboken, NJ 07030
BALLASTS
Genstar Stone Products Co., Executive Plaza IV Hunt Valley, MD 21031
BASKET STRAINERS
Riley Beaird, P.O. Box 31115, Shreveport, LA 71130
BEARINGS—Rubber, Metallic, Non-Metallic
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Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Lucian Q. Moffitt, Inc., P.O. Box 1415, Akron, OH 44309
Norton Chemplast, 309-150 Dey Rd., Wayne, NJ 07470
Thomson-Gordon Limited, 3225 Mainway, Burlington, Ontario, Canada L7M 1A6
Waukesha Bearings Corp., P.O. Box 798, Waukesha, WI 53186
BLASTING—Cleaning—Equipment
Butterworth Inc. (USA), 3721 Lapas Dr., P.O. Box 18312, Houston, TX 77223-9989
Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
E.I. DuPont De Nemours & Co., Inc., Starblast Division, Room X39186, Wilmington, DE 19898
Key Houston Division of Jacksonville Shipyards, 13911 Atlantic Blvd., Jacksonville, FL 32225
BOILERS
Combustion Engineering, Inc., Windsor, CT 06095
Senior Green Inc., P. O. Drawer 517, Lyman, SC 29365
BOILER CLEANING
Asea Stal, 50 Chestnut Ridge Rd., Montvail N.J. 07645
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Capt. Astad Company, Inc., P.O. Box 53434, New Orleans, LA 70153
ECO Inc., 1036 Cape St. Claire Center, Annapolis, MD 21401
Mowbray's Tug & Barge, 21 West St., New York, NY 10006
Western Maritime, 701 B Street, San Diego, CA 92101
BRONZES—COMMEMORATIVE
Duramax Metals, Inc., 2401 Wesley Street, Portsmouth, VA 23707
BUNKERING SERVICE
Belcher Company, Inc., 8700 West Flagler, P.O. Box 525500, Miami, FL 33152
Gulf Oil Trading Co., 535 Madison Ave., New York, NY 10022
National Marine Service Inc. (Transport Div.), 1750 Brentwood Blvd., St. Louis, MO 63144
CARGO HANDLING EQUIPMENT
MacGregor-Navire International, Box 8991, S-402 74 Goteborg, Sweden
MacGregor Navire U.S.A. Inc., 135 Dermody St., Cranford, NJ 07016
CASTINGS/FORGINGS
NKS Industria Pesada, Grupo Industrial, Reforma 404, 140 Piso, Mexico, D.F. 06600 U.S. REP.—Lexington Transport (New York) Inc., 551 Fifth Ave., Room 910, New York N.Y. 10017
CHOCKING SYSTEMS
Philadelphia Resins Corp., 20 Commerce Drive, Montgomeryville, PA 18936
CLOSURES—Marine
Mock Manufacturing Inc., 777 Rutland Rd., Brooklyn, NY 11203
COMPUTERIZED INFORMATION SYSTEMS
Marine Management Systems, Inc., 102 Hamilton Ave., Stamford, CT 06902
Maritime Data Network, Ltd., 102 Hamilton Ave., Stamford, CT 06902
Military Contract Information Service, Inc. Dist. by Maritime Reporter/Engineering News, 118 East 25 St. N.Y. N.Y. 10010
TIMSCO, 622 Azalea Rd., Mobile, AL 36609
Veson Systems, 29 Broadway, Suite 1002, New York, NY 10006
CONDENSERS
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130
CONTROL SYSTEMS—Monitoring
American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
ASEA, Inc., 4 New King St., White Plains, NY 10604
Barringer Research, 304 Carlingview Dr., Rexdale, Ontario, Canada M9W 5G2
Biospherics Inc., 4928 Wyaconda Rd., Rockville, MD 20852
Cooper Energy Services, Mount Vernon, OH 43050
Ergon, Inc., P.O. Drawer 1639, Jackson, MS 39205
Failsafe Motor/Generator Protector, Marine Safe Electronics Ltd., 101 Jardin Dr., Unit 24/25, Concord, Ontario, Canada L4K 1B6
Indikon Corp., 26 New St., Cambridge, MA 02138
Kongsberg North America Inc., 400 Oser Ave., Hauppauge, NY 11738
Leslie Co., 401 Jefferson Rd., Parsippany, NJ 07054
Marine Moisture Control Co., 60 Inip Dr., Inwood, NY 11696
Marine Safe Electronics, 37 Staffern Drive, Concord, Ontario, Canada, L4K 2X2
Pandel Instruments Inc., 2100 N. Hwy. 360, Grand Praire, TX 75050
Propulsion Systems, Inc., 21213 76 Ave., Kent, WA 98032
Teleflex Inc., 771 First Ave., King of Prussia, PA 19406
Thomas Products Ltd., Flow Switch Div., 987 West St., Southington, CT 06489-1023
Transamerica Delaval, Inc., Gems Sensors Division, Cowles Road, Plainville, CT 06062
Valmet Automation A.S., P.O. Box 130, N-3430, Spikkestad, Norway
COUPLINGS
CamLock Flange Sales Corp./Marine Moisture Control Co., 60 Inip Dr., Inwood, N.Y 11696
CRANE BUMPERS
Kastalon Inc., 4101 West 123rd St., Alsip, IL 60658
CRANES—HOISTS—DERRICKS—WHIRLEYS
Allied Marine Crane, P.O. Box 23026, Portland, OR 97233
Appleton Marine, P.O. Box 2339, Appleton, WI 54913
ASEA Hagglunds Inc., P.O. Box 7949, The Woodlands TX 77380
HIAB Cranes & Loaders Inc., 258 Quigley Boulevard, New Castle, DE 19720
Marine Travelift, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235
J.D. Neuhaus, Hebezeuge, D5810, Witten Heven, West Germany
CMH Heleshaw, Inc., 201 Harrison St. Hoboken N.J. 07030
Cunningham Marine Hydraulics Co. Inc., 2030 E. Adams St. Jacksonville, FL 32202
DECK MACHINERY—Cargo Handling Equipment
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, WA 98134
Schoellhorn Albrecht, Div. of St. Louis Ship, 3460 So. Broadway, St. Louis, MO 63118
DECKING—GRATING
Alligned Fiber Composites, Highway 52, South Chatfield, MN 55923
International Grating, 7625 Parkhurst, Houston, TX 77028
Selby, Battersby & Company, 5220 Whiby Ave., Philadelphia, PA 19143
DIESEL ACCESSORIES—CYLINDER LINERS
Colt Industries Inc. Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511
General Thermodynamics Corporation, 210 South Meadow Road, P.O. Box 1105, Plymouth, MA 02360
Haynes Corporation, P.O. Box 179, Jackson, MI 49204
Illman Jones, 1111 Green Island Rd., American Canyon, CA 94589
Stewart & Stevenson Services, Inc.—MWM, P.O. Box 1637, Houston, TX 77251-1637
Transamerica Delaval Engine & Comp. Div., 550 85th, Oakland, CA
DIESEL ENGINE—Spare Parts & Repair
Alban Engine Power, Inc., 6455 Washington Blvd., Baltimore, MD 21227
Alco Power Inc., 100 Orchard St., Auburn, N.Y. 13021
Colt Industries Inc. Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511
Cummins Engine Co., Inc., Mail Code 40642, Box 3005 Columbus, IN 47202-3005
Granges Repair Service GMBH, Gutenbergring, 64 D-2000 Hamburg-Norderstedt TX:0215553
Schoonmaker Service Parts Co., Inc., P.O. Box 757, Foot of Spring St., Sausalito, CA 94966
Stewart & Stevenson Services, Inc.—MWM, P.O. Box 1637, Houston, TX 77251-1637
Sulzer Brothers Inc., 200 Park Ave., New York, N.Y. 10166
Transamerica Delaval Engine & Comp. Div., 550 85th, Oakland, CA
ELECTRICAL EQUIPMENT
Newmar, P.O. Box 1306, Newport Beach, CA 92663
Sigmaform Corporation, P.O. Box 515, Richboro, PA 18954
Stewart & Stevenson Services, Inc.—MWM, P.O. Box 1637, Houston, TX 77251-1637
Ward Leonard Electric Co., 31 South St., Mt. Vernon, NY 10550
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, OR 97201
ELECTRONIC SYSTEMS
Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 TX: 125327
EMULSIFICATION SYSTEMS
Cleanodan A/S, N. American Agents, American United Marine Corp., 5 Broadway, Route 1, Saugus, MA 01906
S/S Research & Development Inc., 1050 State St., Perth Amboy, NJ 08862
Todd Marine Systems, 61 Taylor Reed Place, Stamford, CT 06906
ENGINE TEST EQUIPMENT
General Thermodynamics Corp., P.O. Box 1105, 210 S. Meadow Road, Plymouth, MA 02360
EQUIPMENT—Marine
American General/Levin Corp., 445 Littlefield Ave., So. San Francisco, CA 94080
ASEA Hagglunds Inc., P.O. Box 7949, The Woodlands TX 77380
Band-It Division, Houdaille Industries, Inc., P.O. Box 16307, Denver, CO 80216
Beaver Tool Co., 1525 SE 29th St., Box 94717, Oklahoma City, OK 73143
Boston Metals Co., 313 E. Baltimore St., Baltimore, MD 21202
Thomas Coudon Associates, 6655 Amberton Dr., Baltimore, MD 21227
Fitz-Wright Suits Ltd., 17919 Roan Pl., Surrey, B.C., Canada V3S 5K1
Hamworthy Engineering Ltd., 10555 Lake Forest Blvd., Suite 5F, New Orleans, LA 70127
Kearfott Marine Products, 550 South Fulton Ave., Mount Vernon, NY 10550
Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302
Raytheon Service Co., 100 Roesler Rd., Suite 103, Glen Burnie, MD
Republic-Lagun Machine Tool Co., 1000 E. Carson St., Carson, CA 90749 TX: 181098
Viking Life Saving Equipment, 3305 N.W. 37th Street, Miami, FL 33142
Waterman Supply Co., Inc., 2815 E. Anaheim Street, P.O. Box 596, Wilmington, CA 90748
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Aqua-Chem Inc., P.O. Box 421, Milwaukee, WI 53201
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130
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Hartzell Fan Company, 901 Downing Street, Piqua, OH 45356
Joy Manufacturing Company, 338 So. Broadway, New Philadelphia, OH 44663
Jon M. Liss Associates, Inc., 411 Borel Ave., P. O. Box 5554, San Mateo, CA 94402
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FENDERING SYSTEMS—Dock & Vessel
InterTrade Industries, 15301 Transistor Lane, Huntington Beach, CA 92649
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Seaward International, Inc., 6269 Leesburg Ave., Falls Church, VA 22044
FILTERS
Dahl Manufacturing, Inc., 2521 Railroad Ave., Ceres, CA 95307
FINANCING—Leasing
Gulf Western Leasing Corp., 1500 City West Blvd., Suite 300, Houston, TX 77047
JMJ Marine Investors, P.O. Box 51509, New Orleans, LA 70151
FIRE PROTECTION, DETECTION & ALARM SYSTEMS
Walter Kidde, Walter Kidde Dr., Wake Forest, NC 27586
FUEL OIL/ADDITIVES—Analysis & Combustion Testing
Ferrous Corporation, 910-108th N.E., P.O. Box 1764, Bellevue, WA 98009
Hamworthy Engineering Ltd., 10555 Lake Forest Blvd., Suite 5F, New Orleans, LA 70127
McTigue Industries Inc., 1615 9th Ave., Bohemia, NY 11716
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Comfort-Mate, Inc., 7988 NW 56th Street, Miami, FL 33166
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GANGWAYS
Rampmaster Inc., 9825 Osceola Blvd., Vero Beach, FL 32960
HATCH & DECK COVERS—Chain Pipe
CamLock Flange Sales Corp./Marine Moisture Control Co., 60 Inip Dr., Inwood, NY 11696
Marine Moisture Control Co., 60 Inip Dr., Inwood, NY 11696
MacGregor-Navire Internatinal, Box 8991, S-402 74 Goteborg, Sweden
MacGregor Navire U.S.A. Inc., 135 Dermody St., Cranford, NJ 07016
Mock Manufacturing Inc., 777 Rutland Rd., Brooklyn, NY 11203
HEAT EXCHANGERS
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Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130
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HULL CLEANING
Butterworth Inc. (USA), 3721 Lapas Dr., P.O. Box 18312, Houston, TX 77223-9989
Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
Petroferm Marine, Route 2, Box 280, Amelia Island, FL 32034
Phosmarine Equipment, 21 Bd. de Paris, 13002, Marseille, France
Seaward Marine Services, Inc., 6269 Leesburg Pike, Falls Church, VA 22044
Seaward International, 5409 Beamon Rd., Norfolk, VA 23513 TX: 710-881-1182
Taylor Diving & Salvage Co. Inc., 701 Engineers Rd., Belle Chasse, LA 70037
HYDRAULICS
Aeroquip Corp., 1130 Maynard Road, Jackson, MI 49202
Bardex Hydranautics, 6338 Lindmar Dr., P.O. Box 1068, Goleta, CA. 93116
Cunningham Marine Hydraulics Co., Inc., 201 Harrison St., Hoboken, NJ 07030; 2030 E. Adams St., Jacksonville, FL 32204, TX: 710-730-5224
CMH Heleshaw, Inc., 201 Harrison St. Hoboken N.J. 07030
Del Gavio Marine Hydraulics Inc., 207 W. Central Ave., Maywood, NJ 07607
Hydra-Dynamics, Inc., 2141 Greenwood Ave., Wilmette, IL 60091
Washington Chain & Supply, Inc., P.O. Box 3646, Seattle, WA 98124
INERT GAS—Generators—Systems
Maritime Protection A/S, N. American Agents, American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
INSULATION—Cloth, Fiberglass
Bailey, Carpenter & Insulation Co., Inc., 74 Sullivan St., Brooklyn, NY 11231
Duracote Corp., 350 North Diamond St., Ravenna, Ohio 44266
Superior Energies, Inc. P.O. Drawer 386, Groves, TX 72619
INSURANCE
Adams & Porter, 510 Bering Dr., Houston, TX 77057-1408
Adams & Porter, 1 World Trade Center, Suite 8433, New York, NY 10048
Wm. Keith Hargrove, Inc., 1300 Post Oak Blvd., Suite 2050, Houston, TX 77056
United States P&I Agency, Inc., 80 Maiden Lane, New York, NY 10038
JOINER—Watertight Doors—Paneling
Advanced Structures Corp., 235 W. Industry Ct., Deer Park, NY 11729
Astech, 3030 S. Red Hill Ave., Santa Ana, CA 92711
Bailey Distributors, Inc., 74 Sullivan St., Brooklyn, NY 11231
Masonite Commercial Division, Dover, OH 44622
Megadoor Inc., 441 Lexington Ave., Suite 903, New York, NY 10017
Walz & Krenzer, Inc., 400 Trabold Road, Rochester, NY 14624
KEEL COOLERS
R.W. Fernstrum & Co., 1716 Eleventh Ave., Menominee, MI 49858
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights
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Perko Inc., P.O. Box 6400D, Miami, FL 33164
Phoenix Products Company, Inc., 4769 North 27th Street, Milwaukee, WI 53209
LINE BLINDS
Stacey/Fetterolf Corp., P.O. Box 103, Skippack, PA 19474

MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING
A-C Brake Co., 308 E. College St., Louisville, KY
CMH Heleshaw, Inc., 201 Harrison St. Hoboken N.J. 07030
Cunningham Marine Hydraulics Co. Inc., 2030 E. Adams St. Jacksonville, FL 32202
Jered Brown Brothers Inc., 1300 Coolidge, P.O. Box 2006, Troy, MI 48007
American General/Levin Corp., 445 Littlefield Ave., So. San Francisco, CA 94080
Goltens, 160 Van Brunt St., Brooklyn, NY 11231
Rosan, Inc., 2901 West Coast Hwy., Newport Beach, CA 92663
METALS
Bayou Steel Corp., P.O. Box 5000, Laplace, LA 70068
MINING
Rocky Mountain Energy, 10 Longspeake Dr., Box 2000, Broomfield, CO 80020
NAME PLATES—BRONZE—ALUMINUM
Duramax Metals, Inc., 2401 Wesley Street, Portsmouth, VA 23707
NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS
ACB Industries, 3400 Camp Street Suite 100, New Orleans, LA 70130
Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Highway (Suite 1300), Arlington, VA 22202
Aero Nav Laboratories, Inc., 14-29 112 St., College Point, NY 11356
American Hydromath Inc., Box 2450, Danby-Pawlet Road, Pawlet, VT 05761
American Systems Engineering Corp., P.O. Box 4265, Virginia Beach, VA 23454
Amirikian Engineering Co., Chevy Chase Center Bldg., Suite 505, 35 Wisconsin Circle, Chevy Chase, MD 20015
Art Anderson Associates, 148 First St., Bremerton, WA 98310
B.C. Research, 3650 Wesbrook Mall, Vancouver, B.C. Canada V6S 2L2
Del Breit Inc., 326 Picayune Place (Suite 201), New Orleans, LA 70130
C.A.C.I., Inc., 1815 No. Fort Myer Dr., Arlington, VA 22209
C.D.I. Marine Co., 5520 Los Santos Way, Suite 600, Jacksonville, FL 32211
C.T. Marine, 18 Church Street, Georgetown, CT 06829
Phillips Cartner & Co., Inc., 203 So. Union St., Alexandria, VA 22314
Century Engineering, inc., 32 West Rd., Towson, MD 21204
Childs Engineering Corp., Box 333, Medfield, MA 02052
Crandall Dry Dock Engrs., Inc., 21 Pottery Lane, Dedham, MA 02026
Crane Consultants Inc., 15301 1st Ave., So. Seattle, WA 98148
C.R. Cushing, 18 Vesey St., New York, NY 10007
Design Associates Inc., 14360 Chef Menteur Highway, New Orleans, LA 70129
Designers & Planners, Inc., 1725 Jefferson Davis Highway, Suite 700, Arlington, VA 22202
ECO Inc., 1036 Cape St. Claire Center, Annapolis, MD 21401
Encon Management & Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706
Capt. R.J. Fearson & Associates, P.O. Box 983, Tampa, FL 33601
Christopher J. Foster, Inc., 16 Sintsink Drive East, Port Washington, NY 11050
Gibbs & Cox, Inc., 119 West 31st Street, New York, NY 10001
John W. Gilbert Associates, Inc., 66 Long Wharf, Boston, MA 02110
The Glosten Associates, Inc., 610 Colman Bldg., 811 First Ave., Seattle, WA 98104
Phillip Gresser Associates, Ltd., 3250 South Ocean Blvd., Palm Beach, FL 33480
Morris Guralnick Associates, Inc., 620 Folsom Street, Suite 300, San Francisco, CA 94107
Hamilton Cornell Associates, Box 188, Snug Harbor Station, Duxbury, MA 02331
J.J. Henry Co., Inc., 40 Exchange Place, New York, NY 10005
Hi-Test Laboratories, Inc., P.O. Box 226, Buckingham C.H., VA 23921
HydroComp, Inc., 10 Cutts Road, P.O. Box 865, Durham, NH 03824
Intramarine, Inc., P.O. Box 53043, Jacksonville, FL 32201
R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073
Jantzen Engineering Co., 6655-H Amberton Drive, Baltimore, MD 21227
James S. Krogen & Co., Inc., 3333 Rice St., Miami, FL 33133
Rodney E. Lay & Associates, 13891 Atlantic Blvd., Jacksonville, FL 32225
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
John J. McMullen Associates, Inc., 1 World Trade Center, New York, NY 10048
McLear & Harris, Inc., 28 West 44 Street, New York, NY 10036
Fendall Marbury, 1933 Lincoln Drive, Annapolis, MD 21401
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, OH 44114
Marine Design Inc., 401 Broad Hollow Road, Rte. 110, Melville, NY 11746
Marine Technical Associates, Inc., 95 River Rd., Hoboken, NJ 07030
Maritime Design, Inc., 2955 Hartley Rd., Jacksonville, FL 32217
George E. Meese, 194 Acton Rd., Annapolis, MD 21403
R. Carter Morrell, 715 S. Cherokee, Bartlesville, OK 74003
NKF Engineering Assoc., Inc., 8150 Leesburg Pile, Vienna, VA 22202
Nelson & Associates, Inc., 610 Northwest 183rd St., Miami, FL 33169
Nickum & Spaulding Associates, Inc., 2701 First Ave., Seattle, WA 98121
Northern Marine, P.O. Box 1169, Traverse City, MI 49685
Ocean-Oil Internatinal Engineering Corporation, 3019 Mercedes Blvd., New Orleans, LA 70114
PRC Guralnick, 5252 Balboa Ave., San Diego, CA 92117
Pearlson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, FL 33156
S.L. Petchul, Inc., 1380 S.W. 57th Avenue, Fort Lauderdale, FL 33317
Q.E.D. Systems Inc., 4646 Witchduck Rd., Virginia Beach, VA 23455
M. Rosenblatt & Son, Inc., 350 Broadway, New York, NY 10013 and 667 Mission St., San Francisco, CA 94105
Sargent & Herkes Inc., 611 Gravier St., New Orleans, LA 70130
Schmahl and Schmahl, Inc., 1209 S.E. Third Ave., Fort Lauderdale, FL 33316
SEACOR Systems Engineering Associates Corp., 19 Perina Blvd., Cherry Hill, NJ 08003 (Publications Division at Cherry Hill location)
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Seaworthy Systems, Inc., 28 Main St., Essex Ct. 06426; 17 Battery Place, N.Y. N.Y. 10004, P.O. Box 205, Solomons, MD 20688
Seaworthy Electrical Systems, 17 Battery Pl. N.Y. N.Y. 10004
George G. Sharp, Inc., 100 Church St., New York, NY 10007
Simmons Associates, P.O. Box 760, Sarasota, FL 33578
R.A. Stearn, Inc., 253 N. 1st Ave., Sturgeon Bay, WI 54235
J.F. Stroschein Associates, 666 Old Country Rd., Garden City, NY 11530
Richard R. Taubler, Inc., 610 Carriage La., Dover, DE 19901
Thomas Coudon Associates, 6655 Amberton Drive, Baltimore, MD 21227
Timsco, 622 Azalea Road, Mobile, AL 36609
Tracor Hydronautics, Inc., 7210 Pindell School Rd., Laurel, MD 20707
Thomas B. Wilson, Associates, 1258 North Avalon Blvd., Wilmington, CA 90744
NAVIGATION & COMMUNICATIONS EQUIPMENT
Atkinson Dynamics, Section 6, 10 West Orange Ave., South San Francisco, CA 94080
British Telecom International, The Holborn Centre, 120 Holborn, London EC1N 2TE
CMC Communications Inc., 5479 Jetport Industrial Blvd., Tampa, FL 33614
COMSAT World Systems, 950 L'Enfont Plaza, S.W., Suite 6151 Washington, DC 20024
A/S Elektrisk Bureau, P.O. Box 98, N-1360 Nesbru, Norway
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
General Electric Company, Mobile Communications Division, Lynchburg, VA 24502
Harris Communications (RF Communications), 1680 University Avenue, Rochester, NY 14610
Henschel Corp., 9 Hoyt Drive, Newburyport, MA 01950
Hose McCann Telephone Company, Inc., 9 Smith Street, Englewood, NJ 07631
ITT Mackay, 441 U.S. Highway #1, Elizabeth, NJ 07202
Japan Radio Co., Ltd., Akasaka Twin Tower, 17-22, Akasoka 2-chome, Minato-ku, Tokyo 107, Japan U.S. Rep: 405 Park Ave., New York, NY 10022
Kongsberg North America Inc., 400 Oser Ave., Hauppauge, NY 11738
Kongsberg Vopenfabrikk, Norcontrol Division, P.O. Box 145, Horten 3191, Norway
Krupp Atlas-Elektronik, 1453 Pinewood St., Rahway, NJ 07065
Micrologic, 20801 Dearborn, Chatsworth, CA 91311
Nav-Com, Inc., 9 Brandywine Drive, Deer Park, NY 11729
Navigation Sciences Inc., 6900 Wisconsin Ave., Bethesda, MD 20815 TX: 705999
Perko Inc. (Lights), P.O. Box 6400D, Miami, FL 33164
Racal Marine Inc., 1 Commerce Blvd., Palm Coast, FL 32037-0029
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Raytheon Marine Co., 676 Island Pond Road, Manchester, NH 03103
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Raytheon Service Co., 103 Roesler Rd., Glen Burnie, MD 21061
Robertson Autopilot, 400 Oser Ave., Happauge, NY 11738
S.P. Radio A/S, DK 9200 Aalorg, Denmark
Sperry Corporation, Great Neck, NY 11020
Standard Communications, P.O. Box 92151, Los Angeles, CA 90009
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Armco Steel/Advanced Materials Div., 703 Curtis St., Middletown, OH 45043
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Boston Metals Co., 313 E. Baltimore St., Baltimore, MD 21202
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Isotta Fraschini S.p.A., c/o Italian Aerospace Industries (U.S.A.), Inc., 1235 Jefferson Davis Hwy., Suite 500, Arlington, VA 22202
KHD Canada Inc., 180 Rue de Normandie, Boucherville, Quebec J4B 5S7, Canada
Lips Propellers, 3617 Koppens Way, Chesapeake, VA 23323
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Michigan Wheel, 1501 Buchanan Ave., S.W., Grand Rapids, MI 49507
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North American Marine Jet P.O Box 1232 Benton, AR 72015
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Skinner Engine, Co., P.O. Box 1149, Erie PA 16512
Stewart & Stevenson Services, Inc., P.O. Box 1637, Houston, TX 77251-1637
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Volvo Penta of America, P.O. Box 927, Rockleigh, NJ 07647
WABCO Fluid Power, an American-Standard Company, 1953 Mercer Rd., Lexington, KY 40505
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Waukesha Engine Division, Waukesha, WI 53187
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Goltens, 160 Van Brunt St., Brooklyn, NY 11231
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Ingersoll—Rand Pump Group, Dept. B—346, Washington, N.J. 07882
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Everpure, Inc., 660 N. Blackhawk Dr., Westmont, IL 60559
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NEW
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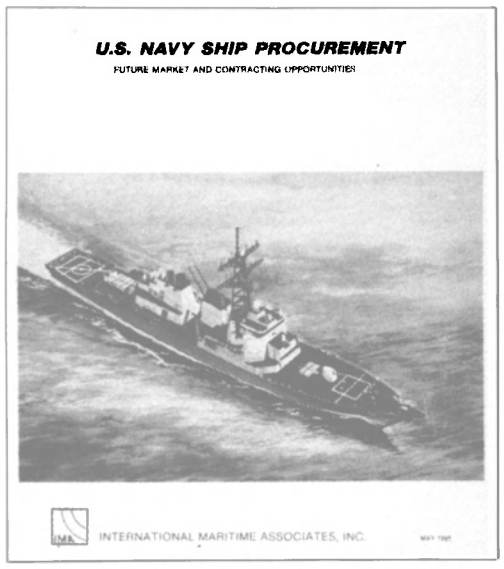

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- Engineering Service Firms
- Contract Operators
- Summary of Recent Work Distribution

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- Future Spending Plans
- Projected Industry Impact
- Projected Geographical Impact
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- Ordnance Programs
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- Engineering Services
- Ship Operation Contracts

IV. PROCUREMENT PROCESS
- Organization Structure
- Program Development
- Congressional Budget Process
- Ship Acquisition Process
- Recent Variants in Navy Procurement

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- Bidder's List
- DOD Contract Types
- Source Selection Process
- Specifications
- Set Asides
- Buy American Requirements
- Defense Sharing Agreements

VI. POINTS OF MARKETING CONTACT
- Navy Contacts
- Shipbuilders
- Electronics and Ordnance Manufacturers
- Machinery and Ship Equipment Manufacturers
- Engineering and Design Firms

APPENDICES
- Navy Contract Awards for Electronics/Ordnance Systems 1983-1984
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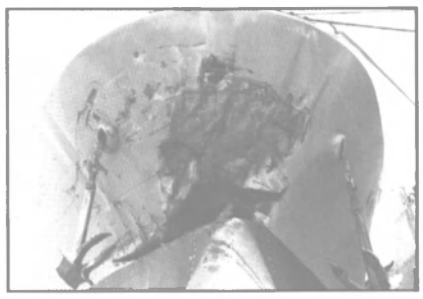
IMA

Rig to be rebuilt
moving ashore.



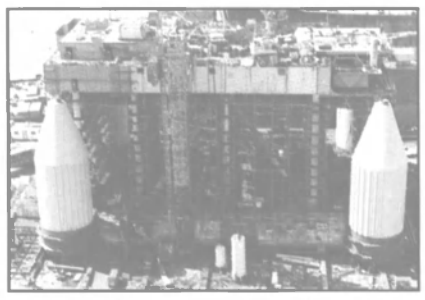
ASTROS before.

OOPS

Column removal,
deckhouse rebuilding.

ASTROS after.

What you lose on a rock
we replace in our dock.



Structure erected,
return to dock.

Avondale Shipyards

TOTAL REPAIR CAPABILITY

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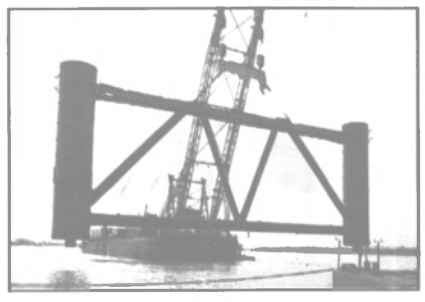
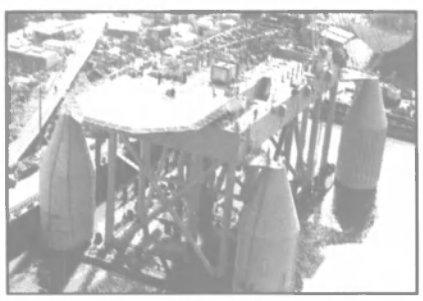


600-ton
heavy lift services.

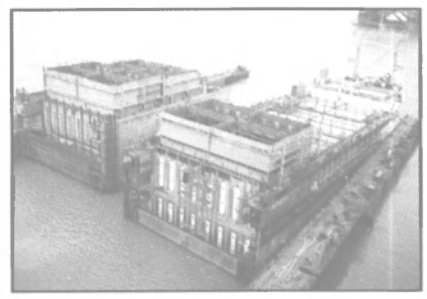


Completely refurbished rig.

Drill ship conversions.

2 rigs in 900-foot length,
220-foot width inside wing
walls of dock.

20,000-ton Panamax dock.
150-ton crane ashore.



Jumboizing and
major conversions.

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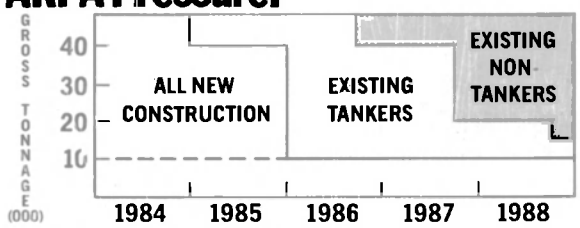
ARPA Pressure:



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