MARITIME
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AND
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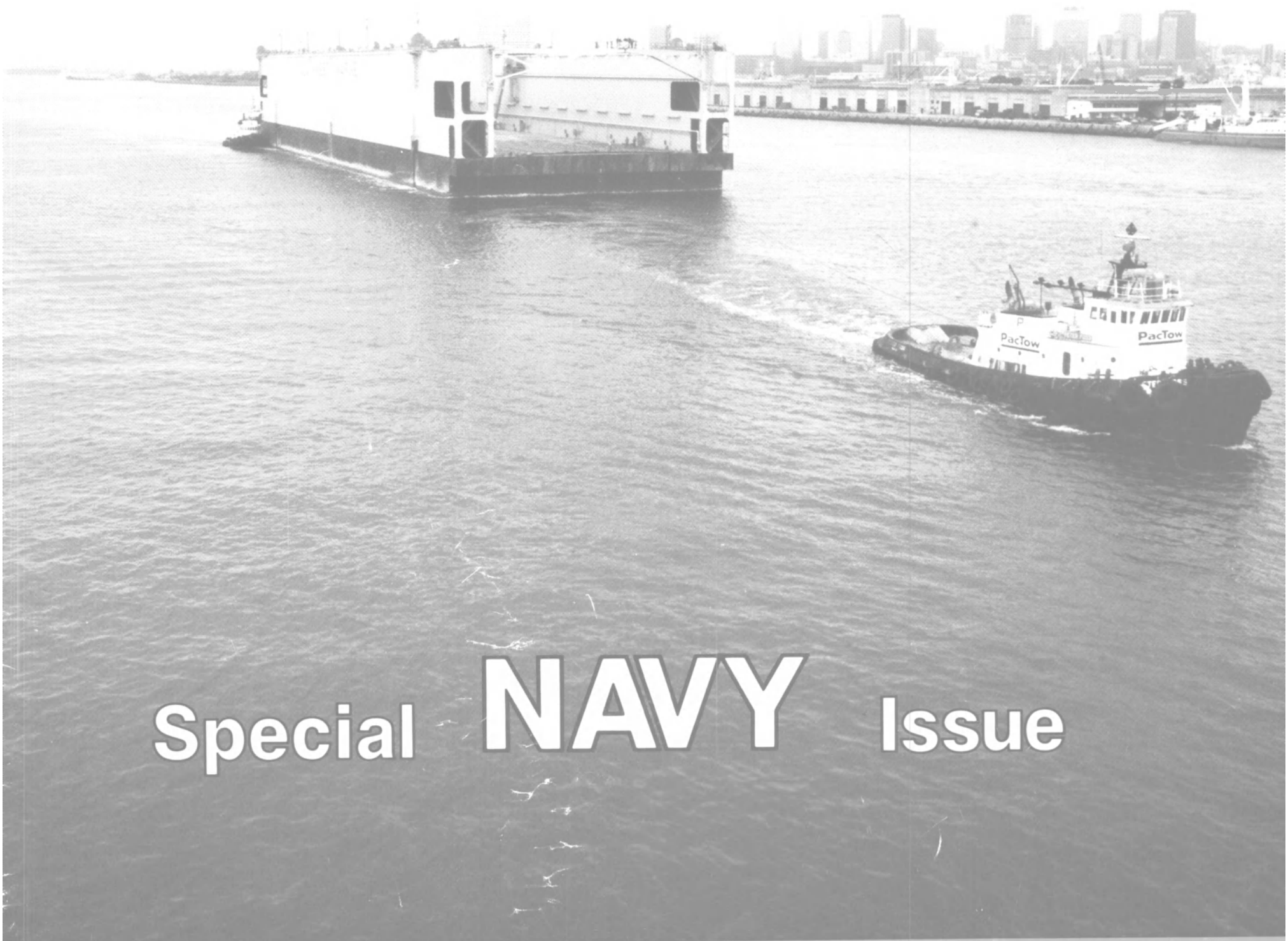

Special NAVY Issue

The New Dry Dock 'Pride Of San Diego'

New Computerized Dry Dock Delivered To Southwest Marine

(SEE PAGE 4)

NAVY

(SEE PAGE 4)

AUGUST 15, 1984

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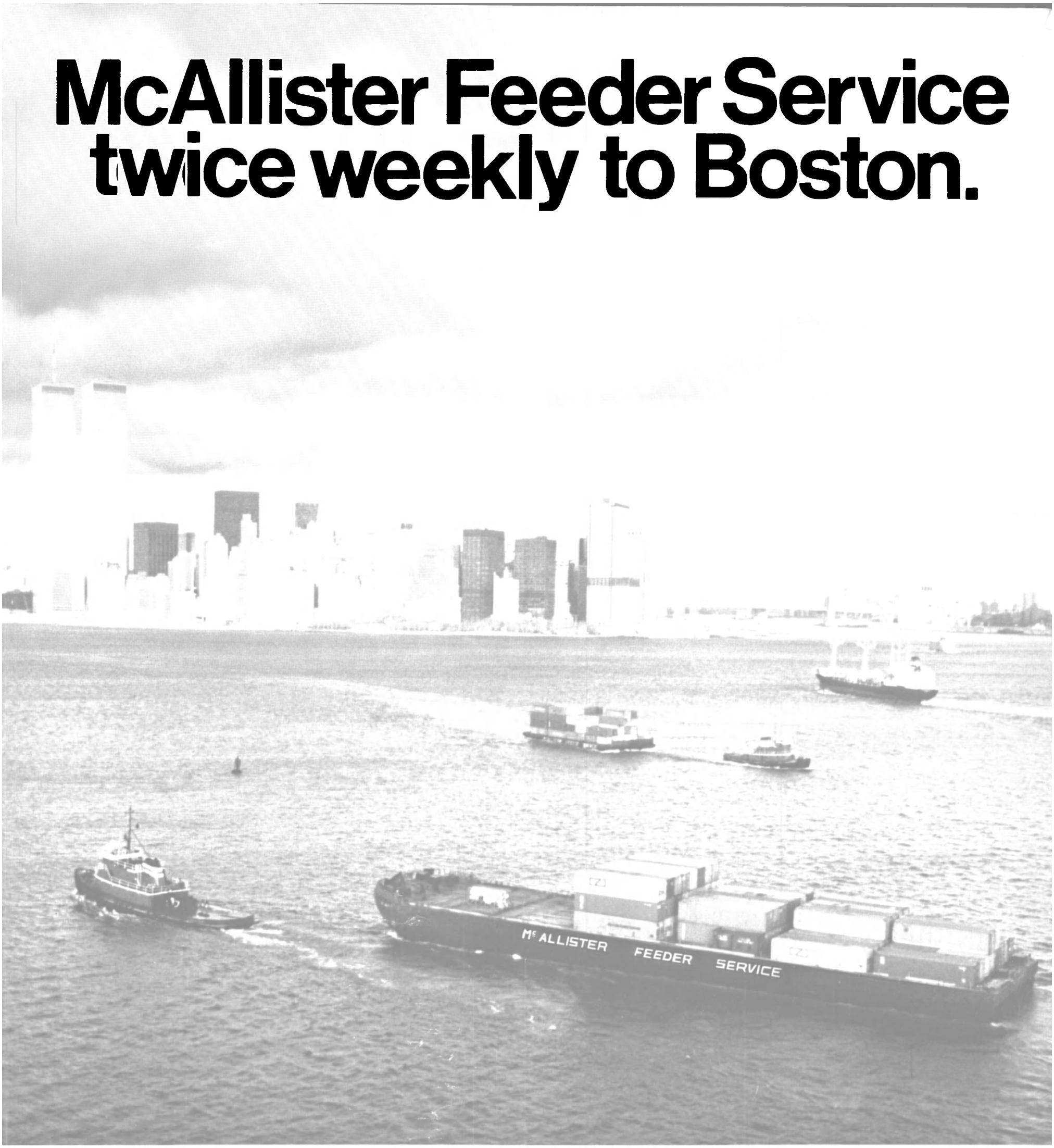

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ON THE COVER

NAVY

Raytheon Awarded $66.9-Million Increase To Previous Contract

Raytheon Company, Equipment Division, Wayland, Mass., is being awarded a $66,933,470 face-value increase to a previously awarded firm-fixed-price contract for exercising an FY-84 production buy for 15 AN/SPS-49(V) radars including installation and checkout spares, eight antennas, onboard repair parts, engineering services, data and support. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

Island Marine Requests Title XI To Refinance $6.4-Million Supply Boats

The Maritime Administration has received an application from Island Marine Operating Company of Lafayette, La., for a Title XI mortgage guarantee to aid in refinancing three 180-foot tug/supply vessels. Built in 1979 by Halter Marine, the diesel-powered boats operate in the Gulf of Mexico.

The requested guarantee is for $4.8 million, or 75 percent of the vessels' depreciated actual cost of $6.4 million.

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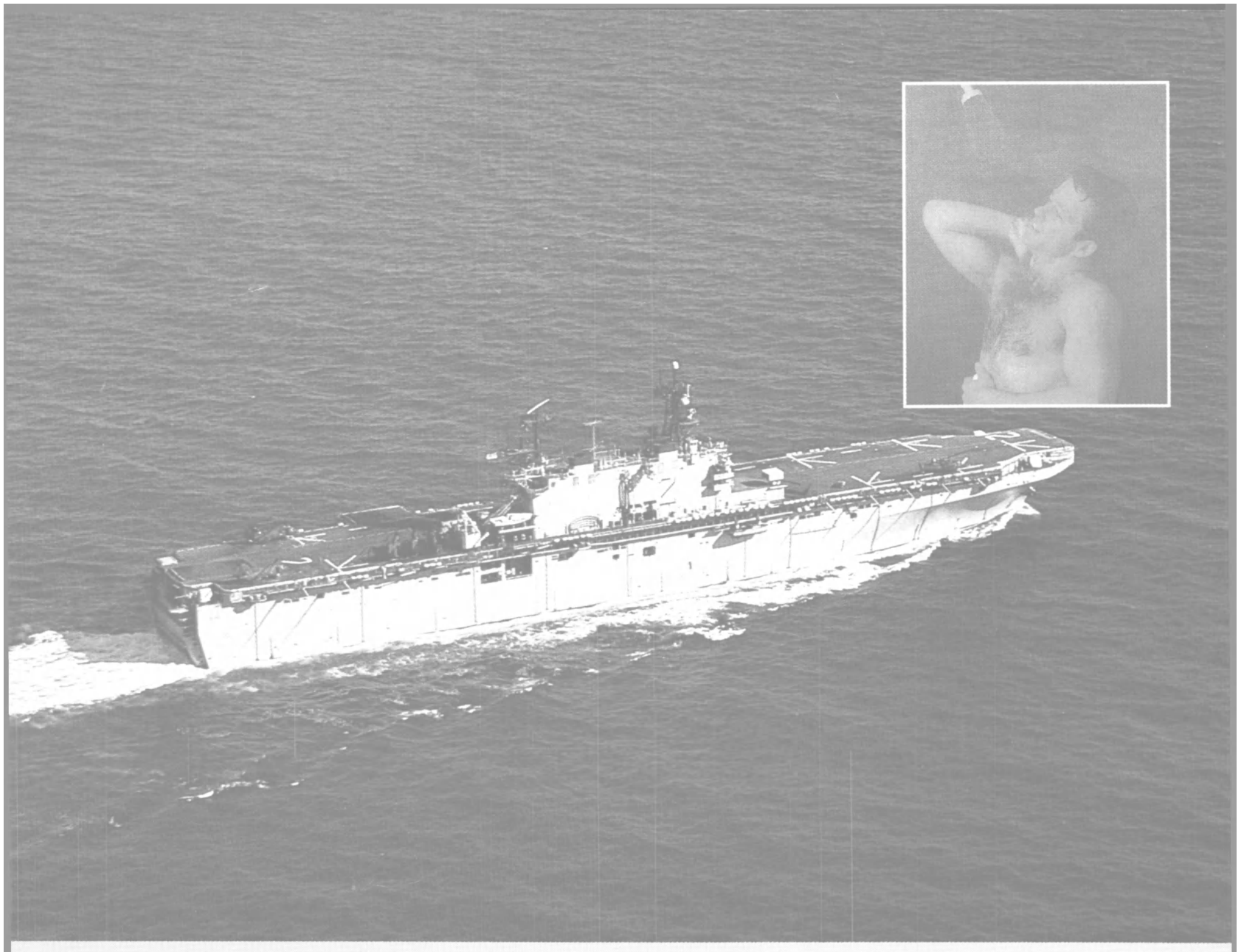

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Captain Osborne Joins Port of San Francisco

Capt. **Arthur M. Osborne** has joined the Port of San Francisco as director of engineering and maintenance according to an announcement by executive director **Eugene L. Gartland.**

Capt. **Osborne** served as Commanding Officer, Naval Station Treasure Island, and Chief of Staff for the Commander of the Naval Base San Francisco, from June 1980 until his retirement from the Navy in July 1984.

His sea duty has been on destroyers and carriers culminating in his command of a destroyer squadron during the Vietnam War.

Ashore, Capt. **Osborne** taught midshipmen at the U.S. Naval Academy and was head of the junior officer assignment section for the Office of Naval Personnel. In the Office of the Chief of Naval Operations in Washington, D.C., he held a number of positions in ship modernization and financial management.

In his new position, Capt. **Osborne** will be responsible for the maintenance of the facilities of the Port and for the planning and project management of the capital developments envisioned for the revitalization of the Port of San Francisco.

Capt. Arthur M. Osborne

Todd-Seattle Delivers Another FFG Frigate To Royal Australian Navy

Todd Pacific Shipyards Corporation, Seattle Division, recently delivered its 11th guided missile frigate of the Oliver Hazard Perry Class to the Royal Australian Navy, ahead of contract delivery date. The HMAS Darwin is the fourth of four FFGs being built for the RAN, and 11th of 13 frigates currently under contract.

The Darwin was commissioned into the Royal Australian Navy on July 21. Australian Navy officers and other dignataries attended the ceremony. The Darwin and her crew will remain on the West Coast for approximately 12 months for underway training before departing for Australia.

Todd's Seattle shipyard employs approximately 2,000 personnel, and is currently working on the construction of the two remaining FFGs, a Navy submarine drydock, and on-going commercial ship repair.

Consafe Gets Contract To Build Living Quarters Complex For Conoco

Consafe Inc. of Houston, a member of the Consafe Group, has been awarded a contract for engineering and manufacturing of a 28-person, two-story permanent living quarters complex with an elevated helideck for Conoco, to be installed in the West Delta, Block 54, Gulf of Mexico. This order follows the recent delivery of a 40-man living quarters project to Tenneco in South Timbalier 27E.

Consafe has also been awarded a contract by Core Laboratories International of Dallas for 14 mudlogging units designed for worldwide operation. These units will accommodate Core's new Datalogger design.

NMEA Names Gutman President, And Carney Executive Director

Gerald A. Gutman

Charles S. Carney

The National Marine Electronics Association (NMEA) has announced two key appointments. **Gerald A. Gutman** has been elected president of the organization and **Charles S. Carney** has been named executive director.

Mr. **Gutman** is president and co-founder of Nav-Com Incorporated, Deer Park, N.Y. Prior to establishing Nav-Com in 1976 he was vice president of marketing at Communications Associates. He studied electrical engineering at Worcester Polytechnic Institute and received a BBA from Hofstra University. He has been a member of the NMEA and the Radio-Technical Commission for Maritime Services (RTCM) for more than 15 years. He has written numerous articles and papers for both organizations.

Mr. **Carney** is the first full-time executive director for the NMEA. As editor of the bimonthly magazine NMEA News, and a director of the RTCM, he is well known throughout the marine electronics industry. He brings to his new position at the NMEA extensive experience in business management and government liaison. He earned a BSEE from Iowa State University and is the author of numerous articles and papers on marine electronics.

ASMAR Delivers Dona Eugenia — First Of New Seiner Design

ASMAR, Chile's leading shipbuilder and repairer, recently delivered a 60-foot fishing vessel that is the first of a new design built of fiberglass-reinforced plastic (GRP) to her owner, Sociedad Pesquera Palacios Ltd. of Chile. The vessel, designed as a purse seiner and named Dona Eugenia, was built at ASMAR's Valparaiso yard and was specially adapted for crabbing operations—her owners are one of Chile's largest exporters of shellfish.

A spokesman for Sociedad Pesquera Palacios said that the vessel was particularly well suited to the area of activity of the company. He added that further orders for this type of vessel were likely to be placed with ASMAR. The Dona Eugenia will operate in the crab and other shellfish beds south of Puerto Montt.

This particular design of vessel, the ASMAR 1800, is a multi-purpose fishing boat and was designed under a cooperation contract with Cygnus Marine Limited of Penryn in Cornwall, U.K. The mold was constructed entirely at ASMAR's Valparaiso yard.

The 60-foot Dona Eugenia has a beam of 20 feet, depth of 9.8 feet, and hold capacity of approximately 80 cubic meters. She is powered by a 222-bhp diesel engine giving a maximum speed of 10 knots. Accommodations are provided for a crew of eight.

It is expected that other Chilean owners will place orders with ASMAR for this particular design, and up to 12 vessels a year could be constructed at the Valparaiso yard.

Krupp MaK Diesel Opens New Offices In New Jersey

In a move to consolidate their position as the world's leading manufacturer of medium-speed diesel engines, Kupp MaK Diesel Inc. of Glenview, Ill. recently announced the opening of a new sales office to serve the U.S. East coast.

Based in Mahwah, N.J., the new office will handle the full range of fuel efficient MaK Diesel engines. With outputs ranging from 800 hp to 13,500 hp all the engines have been specifically designed to burn the heaviest grades of fuel available now or in the foreseeable future.

In charge of the Mahwah office, located at 37 Devine Drive, is **Brian Cook,** a marine engineer with extensive experience in medium speed diesel engine operation. He can be contacted at 201-529-4189.

Perry Beebe Jr. Joins Louisiana Dock

Louisiana Dock Company recently announced the hiring of **Perry Beebe Jr.** as the yard manager for its marine repair service operation in Harahan, La.

Mr. **Beebe** has nearly 20 years' experience in marine repairs and new construction and holds a degree in mechanical engineering from Delgado College.

He has been a member of the Marine Club of New Orleans for 17 years and is also a member of the Mark Twain Club, the American Waterways Operators and the Gulf Coast Towing Association.

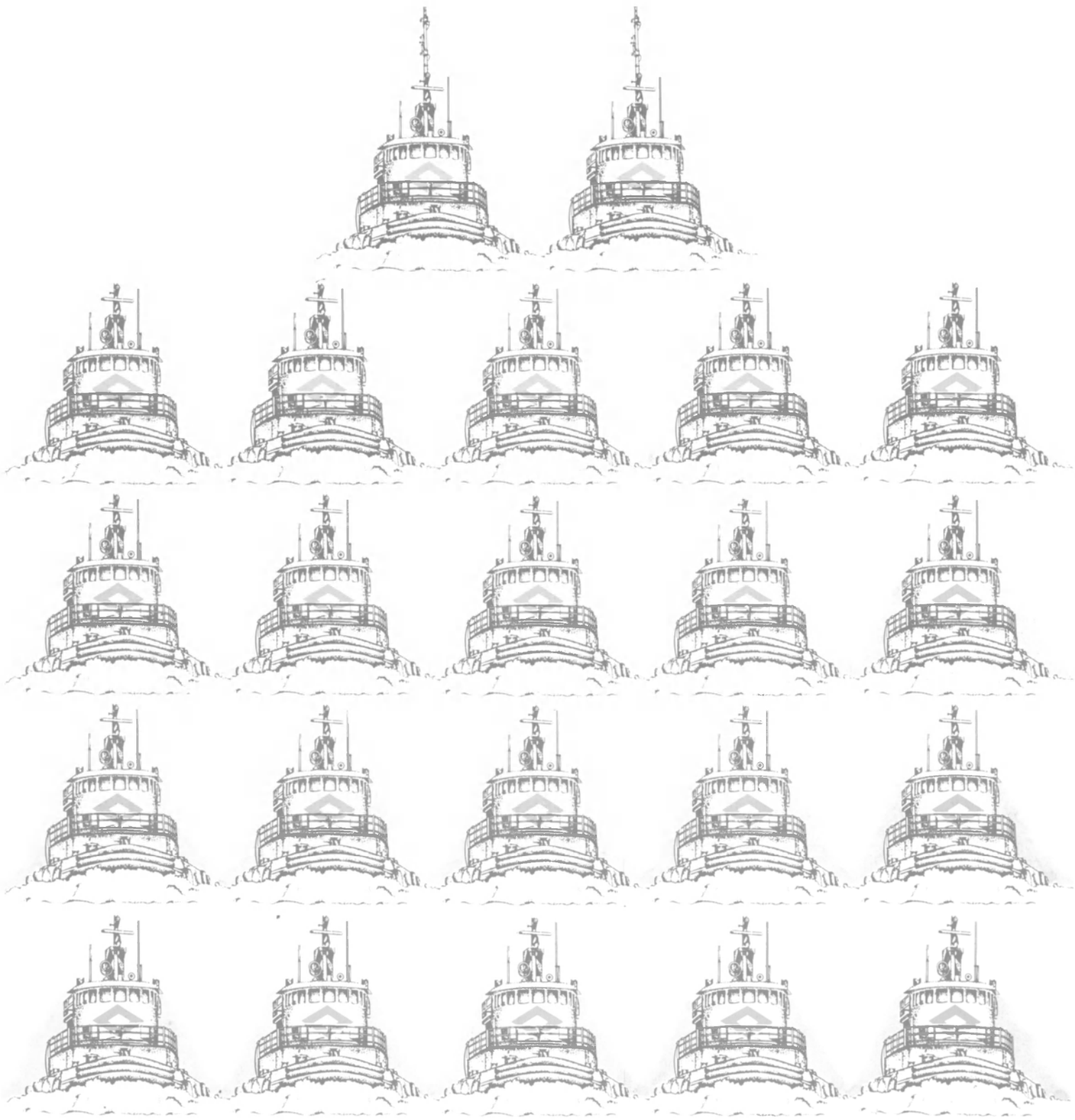
Designers & Planners Awarded $3.1 Million For Contract Designs

Designers and Planners Incorporated, Arlington, Va., is being awarded a $3,171,665 cost-plus-fixed-fee contract for providing preliminary and contract designs for noncombatant ships, new ship designs and the design of ship modifications, conversions, design integration and modernization for ship programs and projects. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

Wallenius Lines Purchases Tanker

Wallenius Lines Pte. Ltd., Singapore, has purchased the 230,000-dwt supertanker T/T Okeanos (VLCC) from Oljekonsumenterna, OK, subject to OK being granted an export license by the Swedish authorities.

Wallenius has been negotiating a project with an Indonesian company regarding oil storage in the oilfields outside Jakarta. In order to be able to provide a suitable tanker when the Indonesian project is landed, Wallenius has purchased the Okeanos.



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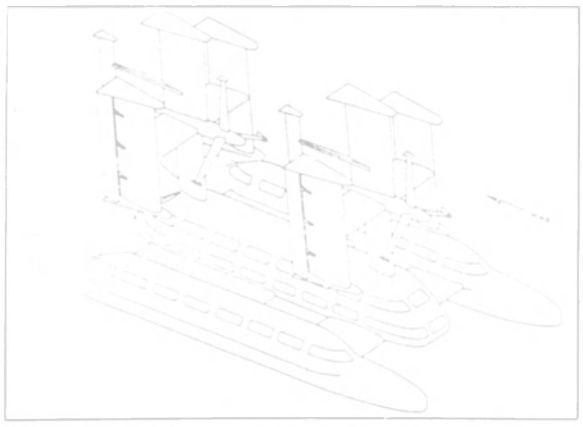
New Airfoil Design Makes Wind-Powered Ships Viable For Commercial Shipping

A 160-foot motor-assisted commercial windship using the principle of the airfoil has been designed by **Jeffrey Dunan** for a northern California corporation that plans to use the craft for marine research. The $7-million vessel is scheduled to be completed next year in Japan by Florida-based Sterling Yacht and Shipbuilders. Mr. **Dunan,** president of Los Angeles-based Research Developers, Inc., plans to build progressively larger vessels for commercial and even military use.

The windship is constructed from graphite, a lightweight substance used for a variety of recreational and aerospace equipment. Combining the features of a catamaran and a helicopter, the airfoil system always faces the wind, regardless of the ship's course. Since the movement of the airfoil is governed by the wind, the vessel, unlike a traditional sailing ship burdened by cumbersome rigging, is not likely to capsize in heavy winds, and this feature has attracted the U.S. Coast Guard which is interested in using the proposed craft as a patrol vessel.



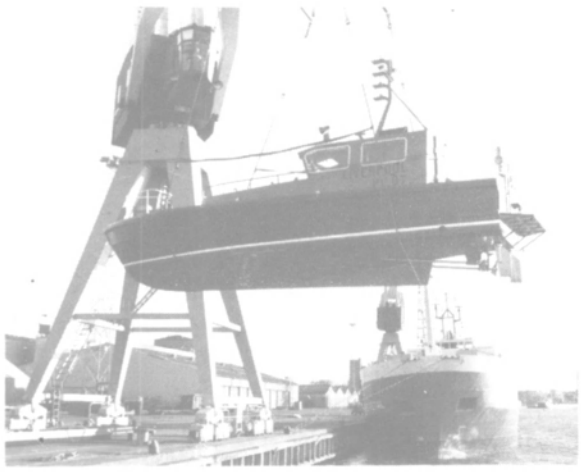
Ship designer **Jeffrey Dunan** says his new design will make wind-powered ships commercially viable once again.

In addition to the savings on fuel, high-technology sailing craft of the kind Mr. **Dunan** proposes don't employ traditional rigging, and no crew is necessary. In fact, he says, one person can operate a 60-foot vessel traveling at speeds of up to 35 knots and save up to 40 percent of the cost of fuel.

The new design calls for a craft capable of traveling at high speeds on the open seas. Unlike other commercial windships, including those developed by the Japanese, Mr. **Dunan's** airfoil system will operate without the necessary aid of a computer to dictate its movement in relation to the wind.

Ultimately, Mr. **Dunan** hopes to build a 650-foot craft with 200,000 square feet of storage space capable of transporting bulk and liquid bulk commodities as well as finished products such as electronics.

Boghammar Marine Delivers Light-Alloy Pilot Boat



Swedish-built light-alloy vessel Turnstone for Liverpool pilots is powered by Volvo Penta marine diesel.

The Swedish company Boghammar Marine AB of Lidingo, near Stockholm, recently delivered the new 40-foot light-alloy pilot boat Turnstone to the Mersey Dock & Harbour Company of Liverpool, England. The new Volvo-Penta-powered vessel has a beam of about 13 feet, draft of 29.5 feet, and an all-up weight of 10 tons. The two Volvo Penta TAMD 70E marine diesels are each rated at 198 kw (270 hp) for medium duty operation. During sea trials with six people onboard, the boat achieved a speed of over 20 knots.

The Turnstone's design differs from that of the earlier Swedish pilot boats in a number of aspects. To allow the vessel to better cope with the seas running off Liverpool, a second knuckle or chine was built into the hull. The interior layout was changed to meet customer specification, and a small cabin forward of the engines was equipped with pantry and toilet.

Designed to accommodate a coxswain, crewman and four pilots, the Turnstone was delivered from the builder fully equipped except for its radar set which will be fitted in Liverpool. The radar mounting support and cabling was already installed.

Boghammar Marine, formed in 1970, is a wholly owned manufacturing subsidiary of Gustafson & Anderssons Varv AB, a company that built its first light-alloy boat in 1928. The company compiled the first International Rules for Building Light-Alloy Boats, for the ICOMIA.

Klein Elected Chairman, Shipbuilders Council Ad Hoc Committee

Charles K. Klein, director of safety, Newport News Shipbuilding, Newport News, Va., has been elected chairman of the Ad Hoc Carcinogen Policy Committee for Shipbuilders Council of America located in Washington, D.C.

Mr. **Klein** will chair the committee made of representatives from shipyards throughout the United States for the next two years. The Ad Hoc Carcinogen Policy Committee was established to oversee the federal government's regulatory and legislative activities on carcinogen policy.

Lehman Appointed Plant Manager At General Motors

Theodore J. Lehman

Theodore J. Lehman has been appointed manager, Plant #103, of Electro-Motive Division, General Motors Corporation, it was announced by **Peter K. Hoglund,** general manager of Electro-Motive and a vice president of General Motors. The appointment was part of a major restructuring of the Division's manufacturing organization.

Beginning his career at Electro-Motive in 1967 as a project engineer, Mr. **Lehman** was named engineer in 1974, and in 1978 he became supervisor of sales engineering, followed by his appointment to district manager that same year. He became sales manager, marine sales in 1981, and in 1983 was named manager, marine and industrial sales, the position he held prior to his recent appointment.

Organizational Changes Are Announced By Newport News Shipbuilding

Newport News Shipbuilding recently made the following organizational changes to put proper priority on projects and to broaden responsibilities of key managers within the company.

The position of vice president-construction and repair, formerly held by **L.R. Sorenson Jr.,** has been eliminated. Mr. **Sorenson** is named vice president-labor relations, reporting directly to **E.J. Campbell,** president and chief executive officer. **D.T. Savas,** senior vice president-corporate relations, will retain his present title and continue to report to Mr. **Campbell**. He will continue to have responsibility for all personnel and health functions.

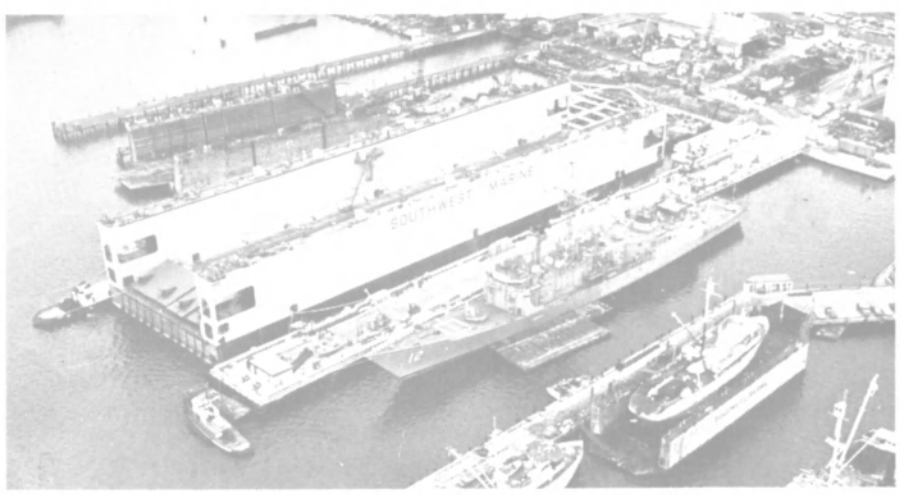
J.E. Turner Jr., former vice president-marketing, becomes senior vice president-overhaul and repair. Vice president-overhaul engineering **R. Broad** will report to Mr. **Turner.**

J.E. Graham, formerly director-manufacturing engineering, assumes the position of vice president-construction.

Production Control has been removed from the Technical Division. It is divided into two departments, Construction and Overhaul. Construction has been assigned to Mr. **Graham,** overhaul to Mr. **Turner**.

The position of vice president-marketing vacated by Mr. **Turner** has been assumed by **W.P. Fricks,** formerly vice president-technical. That position has been assumed by former director-production control **J.F. Cox Jr. W.R. Phillips,** formerly vice president-engineering, has been elected senior vice president-engineering.

ON THE COVER



New Dry Dock Delivered To Southwest Marine

Southwest Marine's San Diego, Calif., yard recently accepted delivery of the "Pride of San Diego," a new dry dock ordered as part of the yard's modernization plan.

Art Engel, president of Southwest Marine and **Roger Hedgecock,** mayor of San Diego, rode the new dock into the harbor to mark the special occasion.

The computer-operated, self maneuvering, land transfer dry dock is part of Southwest Marine's $35-million renovation program. The modernized facilities will exceed all Navy requirements and allow Southwest Marine to effectively and efficiently service all types of commercial and naval vessels.

Five years ago, the first steps were taken to provide new waterfront resources for the expanding facilities. Southwest Marine acquired the total assets of San Diego Marine Construction Company, including four small wooden piers, two floating dry docks and three marine railways.

In December 1982, Southwest Marine formulated final plans for the modernized facilities. A 22,000 ton capacity dry dock which included many innovative design specifications was ordered from Kawasaki Heavy Industries. The "Pride of San Diego" is capable of transferring 10,000 ton (destroyer cruiser) ships from dock to shore platforms using a new method of dry transfer. Another unique feature is its ability to transfer ships with its computerized system, regardless of tide changes.

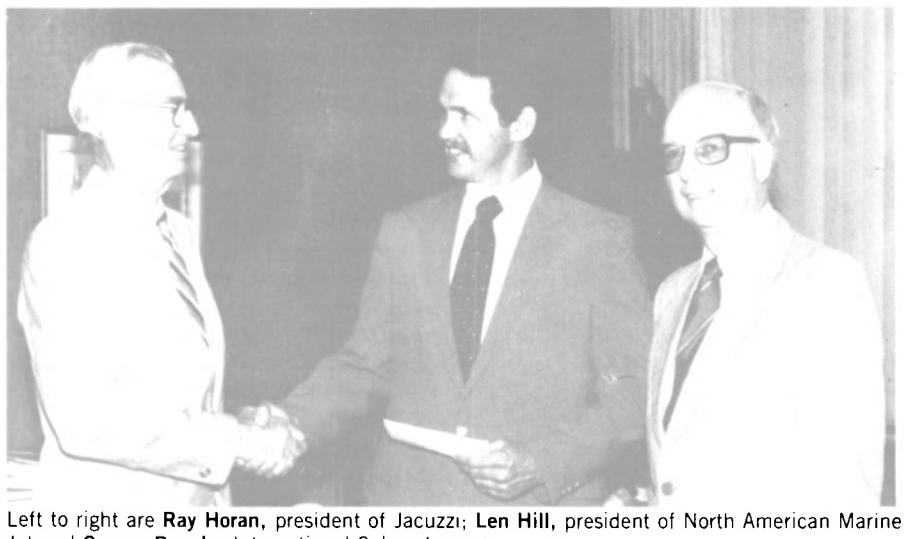
The "Pride of San Diego" is outfitted with remote control articulating dock arms, which, in most cases, will reduce the need for staging normally required for hull preservations.

Southwest Marine's new dry dock is electronically protected against corrosion, environmentally safe and completely energy self-sufficient. The "Pride of San Diego" is an example of what a management team with foresight can create with the new technological capabilities available today.

As part of the plan for modernization, a new 700 foot by 60 foot pier was built to service ships in water with drafts up to 35 feet. A new 65-ton gantry crane was designed and built for ships alongside the pier and in the dry docks.

The next stage of the project will include construction of a second large pier, and the construction and outfitting of a new shop production building. The new shop, which will increase the facility space by 30 percent, will be located between the two shore transfer platforms that are soon to be built. The location of the shop will aid in productivity, keeping repairs on time and under budget.

At the completion of the modernization project Southwest Marine will provide San Diego with the finest and most capable ship repair firm on the West Coast, as well as create 1,500 new jobs.



Left to right are **Ray Horan,** president of Jacuzzi; **Len Hill,** president of North American Marine Jet and **George Regula,** International Sales, Jacuzzi.

North American Marine Jet Purchases Jacuzzi Marine Jet Line — Seastrom Named Director

North American Marine Jet, Inc., of Little Rock, Ark., has purchased the entire product line of Jacuzzi Marine Jet, including all manufacturing rights, from the Jacuzzi Bros. Division, also of Little Rock.

North American Marine Jet will supply OEM parts for all Jacuzzi Marine Jets and is now the manufacturer of replacement parts for Jacuzzi Marine Jets as well. Parts are now available for immediate delivery.

The company will also supply new units of the 12YJ, Piranah, 12WJ, 14YJ and 20YJ as well as accessories for the units. The announcement was made by **Leonard Hill,** president of North American Marine Jet, who had been with Jacuzzi for the past 14 years.

"We have purchased the complete inventory of Jacuzzi jet products including tooling, engineering specifications, drawings, pattern equipment and manufacturing rights. We feel a small, quick reacting company such as ours is more closely tailored to the needs of today's water jet market," says Mr. **Hill**.

Jack Seastrom, formerly with Jacuzzi Marine Jet and Offshore Logistics, Inc., has been named director of marketing and product development. Together, Mr. **Hill** and Mr. **Seastrom** represent 35 years of experience in the production, installation, design and operation of marine propulsion drives for pleasure, commercial, military, racing and experimental craft.

In addition to Jacuzzi units and parts, the company is manufacturing parts for the OMC 140, 245 and 290 jet drives.

For further information,

Circle 33 on Reader Service Card

Principals at Exxon Baytown christening were (L to R): Adm. **Harold E. Shear,** maritime administrator, U.S. Dpeartment of Transportation; **Randall Meyer,** president of Exxon Company U.S.A.; Sir **Hector Laing,** director of Exxon Corporation; **Mrs. Richard Brunner; Richard Brunner,** senior vice president of Avondale; **Lady Laing** of Middlesex, England, sponsor; **Frank Iarossi**, president of Exxon Shipping; **Mrs. Frank Iarossi;** and Father **Robert Dodwell**, Episcopal port chaplin. Flower girl in foreground is **Miss Rachael Cognevich**.

The 57,000-dwt Exxon Baytown, built by Avondale for Exxon Shipping, was chistened and delivered recently. Crude oil carrier, built at cost of about $100 million, is powered by a slow-speed Mitsubishi/Sulzer diesel engine.

Crude Oil Tanker Exxon Baytown Christened At Avondale Shipyards

The 57,000-dwt Exxon Baytown was christened in recent ceremonies at Avondale Shipyards, Inc. near New Orleans. The crude oil carrier was built for Exxon Shipping Company of Houston, and will transport cargoes between U.S. West and East Coast ports and will also trade in the Caribbean area. Two similarly designed 42,000-dwt multi-product petroleum and chemical carriers, the Exxon Charleston and Exxon Wilmington, were delivered to Exxon Shipping by Avondale during the past year.

Lady Laing of Middlesex, England, wife of Sir **Hector Laing,** a director of Exxon Corporation, served as the vessel's sponsor. **Randall Meyer,** president of Exxon Company, U.S.A., Houston, delivered the principal address. Others in the christening party were: **F.J. Iarossi,** president of Exxon Shipping, and **Mrs. Iarossi; Richard Brunner,** senior vice president and senior operating officer of Avondale, and **Mrs. Brunner; William Harmeyer,** group vice president of production at Avondale, and **Mrs. Harmeyer;** Adm. **Harold E. Shear,** maritime administrator. **Miss Rachael Cognevich,** daughter of an Avondale safety inspector, served as flower girl, and Father **Robert Dodwell,** Episcopal port chaplin and Honorary Anglican Chaplin for the Port of New Orleans, gave the invocation.

The Exxon Baytown has an overall length of 779 feet 6 inches, beam of 105 feet 10 inches, and draft of 38 feet 5 inches. Main propulsion is provided by a 17,000-bhp Mitsubishi/Sulzer RL90 slow-speed diesel engine. The vessel is capable of carrying up to 459,312 barrels of crude oil in her 14 tanks, which are served by four main cargo pumps. Cargo piping is arranged to permit the carriage of two grades of crude oil simultaneously.

Avondale built the tanker utilizing state-of-the-art techniques for zone outfitting. Large structural modules were extensively outfitted with piping, ductwork, electrical wireways, and equipment prior to being erected at the building site. In addition, many machinery package units and pipe package units were assembled ashore and then lifted aboard.

The Exxon Baytown incorporates the latest safety and environmental protection standards, is heavily automated, has a bow thruster for docking control, and has the most modern satellite navigation and communications equipment available. Slow-speed diesel propulsion and a special hull coating to minimize water resistance are two of the energy-conserving features of the vessel's design.

Avondale Shipyards, located on the Mississippi a short distance upriver from New Orleans, is a wholly owned subsidiary of Ogden Corporation of New York.

EXXON BAYTOWN
Major Suppliers

Main engine	Mitsubishi/Sulzer
Generators	Reliance Electric
Generator engines	B&W Holeby
Emergency generator	Great Lakes Energy
IG generator	Holec Gas Generators
Cargo dehumidifiers	Cargocaire
Air conditioning	Carrier-Transicold
Anchor windlass	Lake Shore
Mooring winches	Lake Shore
Exhaust gas boiler	Green
Bow thruster	Bird-Johnson
Castings	Service Foundry
Compressors	Hamworthy
Distillers	Alfa-Laval
Control console	TANO
Ballast & cargo console	Megasystems
Joiner work	Hopeman
Cargo pumps	Worthington
Cargo pump motors	Reliance
Ballast pumps	Warren
Propeller & shafting	Avondale
Galley equipment	Alexander Industries
Steering gear	AEG-Telefunken
Radar	Sperry Marine
SatNav	Navidyne

Offshore Tugs Appoints Lewis Eaves Sales Rep

Lewis P. Eaves has been appointed sales representative of Offshore Tugs, Inc., Belle Chasse, La. He brings over 14 years of marine experience to the firm. Mr. **Eaves** will be expanding the company's marketing efforts in Florida, Alabama, Mississippi, Louisiana and Texas.

RFD-Elliot Offers Catalogs Describing Elliot Product Line

RFD-Elliot Inc. of Riviera Beach, Fla., is offering literature describing the entire range of products the company offers for safety and survival at sea. Included is a complete line of F.A.A.-approved liferafts and leisure craft rafts, as well as Elliot's highly acclaimed Coast Guard-approved marine liferaft line.

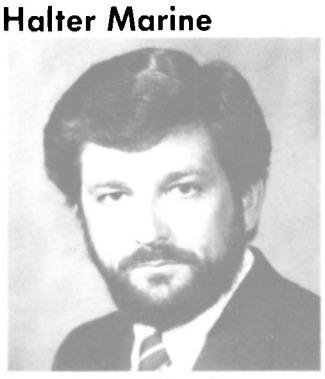
The Elliot liferaft was the first raft to be given USCG approval and it has maintained its reputation for highest quality over the years—many of the original Elliot rafts are still in active service.

RFD-Elliot purchased the manufacturing rights and complete inventory for the Elliot liferaft and all Elliot product lines last year. It has since gone into full production of the entire line at its headquarters in Riviera Beach, where the company stands ready to service any and all needs in the safety and survival field.

For literature containing full information on RFD-Elliot's product line,

Circle 50 on Reader Service Card

Edwards Will Succeed Stonebreaker As President Of Halter Marine



Jack Edwards

Steve Stonebreaker has resigned for health reasons as president of Halter Marine, Inc., and **Jack P. Edwards** has been named to succeed him. The announcement was made by **W. Ray Wallace,** president and CEO of Trinity Industries, Inc., which owns the New Orleans-based shipbuilding company.

Mr. **Stonebreaker** joined Halter in 1978, when he created and directed the Halter Incentive Program. He rose through progressively more important executive positions until his appointment as president in December 1983.

Mr. **Edwards** came to Halter from Ingalls Shipbuilding in 1970 as an estimator, and has served in several capacities including assistant general manager of the Moss Point, Miss., division, manager of that division, and eastern area production manager. He was promoted to vice president-production in February 1984, with overall responsibility for production at Halter's six shipyards, as well as the quality assurance and warranty programs.

Mirrlees Offers Brochure On Its K&KV Major Mk3 Diesel Engine Range

A 12-page brochure describing the most recently developed line of its diesel engines, the K&KV Major Mk3 Series, is available from Mirrlees Blackstone. The brochure contains full technical details on this series, and is illustrated with drawings and photographs.

The K Major Mark 3 is a four-stroke, direct injection, turbocharged and intercooled engine built in 6, 8, and 9 cylinders in-line models and 12 and 16 cylinders in 45-degree V-form. Like all engines in the K Major range, the Mark 3 is specifically designed to burn residual fuels reliably and efficiently. The engines conform to ISO 3046 Specifications and meet the requirements of all the classification societies.

Power outputs at bmep of 275 psi range from 3,650 bhp at 500 rpm for the 6-cylinder K6 to 11,680 bhp at 600 rpm for the 16-cylinder KV16.

For a free copy of the K&KV Major Mk3 brochure,

Circle 46 on Reader Service Card

Oglebay Norton Appoints Michael Madden Manager, Columbia Transportation

Michael M. Madden has been appointed manager, vessel administration and insurance at Columbia Transportation Division, Oglebay Norton Company.

Mr. **Madden** joined Columbia in 1980 as administrative assistant. His previous experience includes cost accounting and financial analysis for Cleveland area firms. He holds a Bachelor of Science degree in business administration from John Carroll University.

Mr. **Madden** is a member of the board of governors of the Propeller Club of the United States—Port of Cleveland.

SEACOR Wins Contracts Worth $8.4 Million

Systems Engineering Associates Corporation of Cherry Hill, N.J. (SEACOR) was recently awarded four contracts by the Navy and a private shipbuilder. The contracts are for a variety of engineering design and logistics projects, and total $8.4 million.

SEACOR was awarded a $3.6-million contract for engineering and technical services for the Naval Sea Support Center, Atlantic in Philadelphia. The contract is in support of installation design for Technical Training Equipment at the Navy's training centers. The three-year effort will be performed by SEACOR's Northern Division at Cherry Hill and will include projects for hull, mechanical and electrical systems for ships.

The Naval Sea Systems Command in Washington, D.C. has awarded SEACOR a $2.2-million contract for integrated logistics support of the battleship USS Missouri at the Long Beach Naval Ship Yard. SEACOR's personnel will provide provisioning, outfitting, automated data processing, management and liaison support services to the Navy during the overhaul, mostly through the Long Beach, Calif. office with a representative in Washington.

Ingalls Shipbuilding of Pascagoula, Miss., selected SEACOR as the winner of a $1.5-million contract for design and drafting support of the overhaul and modernization of Ticonderoga class guided missile cruisers. The one-year effort will be performed by SEACOR personnel in the Pascagoula, Miss., office.

A $1.5-million pollution abatement contract was awarded to SEACOR to support the Naval Ship Systems Engineering Station in Philadelphia. Personnel from SEACOR's San Diego, Calif., office will provide system design review, inspections and technical assistance for installations onboard surface ships for the three-year term of the contract.

Systems Engineering Associates is a nationwide corporation specializing in engineering, management and program support services to the government and private industry. The corporation has headquarters in Cherry Hill, and operates nine other offices.

Coast Marine Offers Brochure On New COMAR/ Debarkation Ladders

Coast Marine & Industrial Supply Inc., San Francisco., Calif., is offering a colorful brochure that describes, with illustrations, the special features and advantages of their new COMAR/Debarkation Ladder. The company says this is the first and only all-synthetic ladder in the world and that it is ideal for rugged marine and industrial use, including offshore drilling. The ladder meets or exceeds standards set by SOLAS (Safety of Life at Sea Convention), and is approved by the U.S. Coast Guard.

For a free copy of the brochure and more information on the COMAR/Debarkation Ladder,

Circle 53 on Reader Service Card

Seaworthy And Bethlehem Steel Offer An Innovative 1,500-TEU Class Convertible Container Carrier

Seaworthy Systems, Inc., of Essex, Connecticut, and Bethlehem Steel Corporation, Sparrows Point Yard have announced an innovative vessel design intended for Jones Act trade routes. The vessel's capacity is based on the carriage of 774 forty-foot equivalents using longitudinally movable cell guides. The flexibility to adjust to any mix of containers gives rise to the choice of the term "convertible" in naming the vessel class.

The design provides a continuous, unobstructed, weather-protected deck aft of the house with easy access to reefer receptacles at all levels. Elimination of the usual transverse bulkheads and hatches in combination with the use of longitudinal framing and repetitive structures provide economies in construction. Operational savings will be realized through the elimination of hatch covers and container lashing systems resulting in faster port turnaround times. The heavy-fuel-burning diesel-powered twin screws and bow thruster make it exceptionally well-suited to the frequent maneuvering required for the service intended.

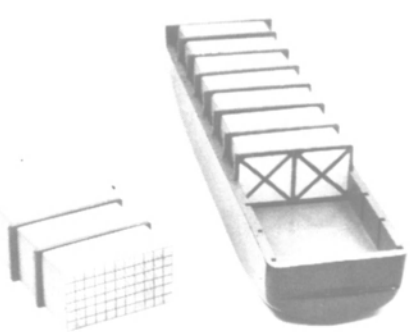
Alternate cargo designs for this multi-purpose vessel include variations of RO/RO, RO/LO, special products, heavy lift, and a variety of military configurations. The vessel's concept permits extremely low gross tonnage for its size.

Preliminary estimates place the vessel's price under $50 million.

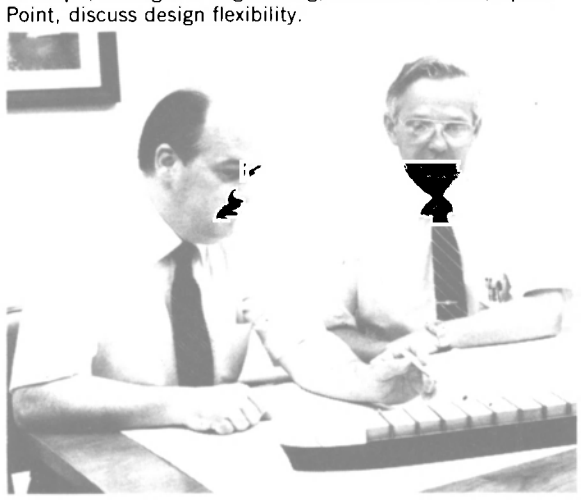
Ship's Particulars

Length overall	600 ft.
Length between perpendiculars	543 ft.
Beam	106 ft.
Depth to main deck	35 ft.
Draft	25 ft.
Dwt	20,000 tons
Crew	18
Powerplant	(2) M.A.N. B&W 8L55 GB low speed engines – ACCU
Speed	20 knots
Containers	774 FEU
Reefers	up to 100% (as desired)

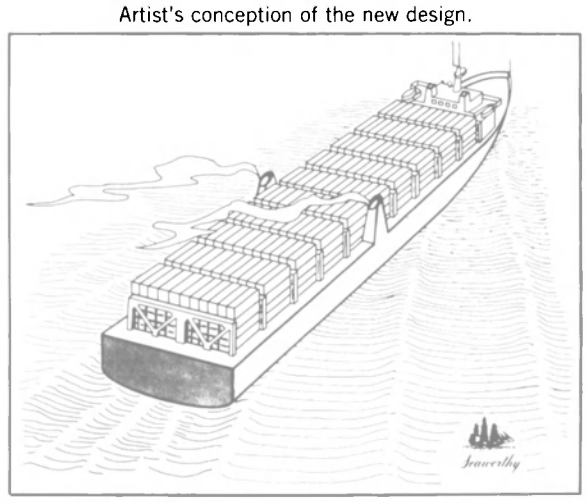
Model shows longitudinally movable cell guide.



John Boylston, vice president (left), Seaworthy, and **Richard B. Ralph,** manager of engineering, Bethlehem Steel, Sparrows Point, discuss design flexibility.



Artist's conception of the new design.



Tyne Shiprepair Wins Contract To Rebuild The Sir Tristram

Tyne Shiprepair Limited announced recently that it has been awarded a multimillion pound contract to rebuild the Sir Tristram—the Royal Fleet Auxiliary which was badly damaged during the Falklands' conflict and subsequently brought back to the U.K.

The Sir Tristram contract will require an average of some 250 employees through the contract period, which is likely to be around one year, and will represent about 20 percent of Tyne Shiprepair's total potential capacity. Employment will also be provided for up to 250 sub-contractors.

The job involves lengthening with a new 29-foot 3-inch, 120-ton mid-ships' section and completely rebuilding the vessel's superstructure including new accommodations and helicopter deck.

In addition to the contract to rebuild the Sir Tristram, it was also announced that Tyne Shiprepair has been awarded the MOD contract to carry our major rectification work on the RFA Reliant. This vessel will be repaired at TSL's Wallsend Drydocks yard.

$13.2-Million Chartering Contract Awarded Sealift

Sealift Incorporated, Oyster Bay, N.Y., is being awarded a $13,200,000 contract for the chartering of the tanker M/T Bravado. The tanker will deliver Department of Defense clean petroleum products worldwide. Bravado is presently a Norwegian-flag vessel, but will be reflagged United States prior to delivery. The Military Sealift Command, Washington, D.C., is the contracting activity.

Ingram Barge Company Names New President

E. Bronson Ingram, chairman of the board and chief executive officer of Nashville-based Ingram Barge Company, announced recently that **John M. Donnelly,** formerly president of the company, has been named vice chairman of the board, and **Peter J. Kopcsak** formerly executive vice president and chief operating officer, has been named president and chief operating officer.

Mr. **Donnelly** graduated from Vanderbilt University. He joined Ingram Oil and Refining Company in 1955 and became active in the company's barge business in 1963. He was subsequently named executive vice president and then president of Ingram Barge Company.

Mr. **Donnelly** currently serves as executive vice president and director of Ingram Industries Inc., the parent company of Ingram Barge Co. A well-known industry spokesman, he was elected chairman of the board of the American Waterways Operators in 1980 and has served as an officer and board member of several other industry organizations.

Mr. **Kopcsak** received a B.S. in General Engineering from the University of Tennessee, and an M.S. in Engineering Management from Vanderbilt University.

His career began with industrial and safety engineering positions with U.S. Steel in Pittsburgh. This was followed by 13 years' experience in the aerospace industry with Lockheed Missiles and Space Company, Chrysler Aerostructures, and Avco Aerostructures.

In 1973, he joined the Ingram Materials Company in Nashville as projects manager. Ingram Materials is a major producer and transporter of sand used in highway and other construction projects. After a variety of management assignments, he was named president of the company in 1981.

In 1982, Mr. **Kopcsak** was appointed executive vice president and chief operating officer, Ingram Barge Company. Since that time, he has overseen the re-staffing of several key positions within the firm, changes in its river operating pattern, and a successful expansion into the grain shipment business.

With a fleet of over 475 barges and 20 towboats, Ingram Barge Company is one of the nation's largest movers of bulk commodities on the Mississippi River and its tributaries.

McDermott Announces Transfer Of Two Senior Managers

McDermott International, Inc. announced recently that two senior managers have been cross-transferred between the company's Marine Construction and Babcock & Wilcox operating units.

H.R. Reeves, senior vice president and group executive of Marine Construction's North Sea and West Africa Operations, will become Babcock & Wilcox's senior vice president and group executive, construction and tubular products, a newly instituted position in the unit. **J.J. Stewart,** vice president and general manager of B&W International, will replace Mr. **Reeves** as McDermott Marine Construction's vice president and group executive, North Sea and West Africa operations. He will be headquartered in the Pennsylvania/Ohio area and Mr. **Stewart** in Brussels, Belgium.

Mr. **Reeves** joined McDermott in 1965 as a field engineer in the Marine Pipeline Division. He has been in charge of the North Sea operations since 1980 and became a senior vice president in 1981. He has a BS in civil engineering from Louisiana Polytechnic Institute.

Mr. **Stewart** joined Babcock & Wilcox's Nuclear Power Generation Division in 1972. He was named president in 1980 and since 1982 has served as president of B&W Industries, Ltd. also of Canada, and vice president and general manager of B&W International. He holds a B.S. in chemical engineering from Prudue, an M.S. in nuclear engineering from Kansas State University and a Ph.D. in nuclear engineering from North Carolina State University.

Replacing Mr. **Stewart** as vice president and general manager of B&W International will be **R.E. Donovan,** presently BWI's manager of international contracts. He will also become president of B&W Canada and Babcock & Wilcox Industries Ltd.

Westmont Awarded Navy Contract To Restore Giant Floating Crane

Westmont Industries of Santa Fe Springs (Los Angeles), Calif., recently received an order from the Long Beach Naval Shipyard to restore the YD-171 floating crane "Herman the German" to its original capacity of 350 metric tons. Said to be the largest self-propelled floating crane in the world, Herman was built in 1941 by Demag A.G. at Bremerhaven for an estimated cost of $3.5 million.

The crane's pontoon is 205 feet long and 110 feet wide; height from the waterline to the tip of the boom is 374 feet. Maximum hoisting capacity is 386 short tons, and Herman can lift 55 tons from 157 feet over the side. Total wire rope used is 11,681 lineal feet.

Tacoma Boat Awarded $1.7-Million Contract For APL Ship Conversion

American President Lines has awarded a $1.7-million contract to Tacoma Boatbuilding Company of Tacoma, Wash., for upgrading of the containership Neptune Garnet, one of two purchased recently from Neptune Orient Lines. When the conversion is completed in December this year, the vessel will be renamed President F.D. Roosevelt.

Work on the diesel-powered ship will include upgrading the accommodations and machinery spaces to meet Coast Guard fire, safety, and other requirements. Some cell configurations will be changed in order to carry more 40-foot containers. Total capacity will be increased slightly, to 2,556 TEUs, including 250 reefers.

The other ship acquired by APL, the Neptune Jade, is currently undergoing conversion in Japan. She will be renamed the President Eisenhower.

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NAVY WORK IN PRIVATE U.S. YARDS

With the virtual disappearance of the market for oceangoing merchant ships, most of the major private yards in the U.S. are heavily dependent upon Navy shipbuilding, conversion, and repair for the majority of their work, some as much as 100 percent. The contracts placed by the Navy during the past few years, including the several programs for the Military Sealift Command, have meant survival for some yards that otherwise may have been forced to cease operation.

The MR/EN editors asked the private U.S. shipyards that are engaged in Navy work to tell us about their current activities and their outlook for the next few years. The review that follows is based on the replies that we had received up to press time.

FOR MORE INFORMATION

If you wish to receive additional data on any of the shipyards included in this review, please circle the appropriate number(s) that follows each yard description, on the Reader Service Card in the back of this issue. If you wish to receive information on *all* of the companies included in this review,

Circle 10 on Reader Service Card

AVONDALE

Avondale Shipyards, Inc., a short distance up the Mississippi River from New Orleans, has historically targeted half of its new construction capacity to the building of naval ships and half to merchant vessels. The last merchant ship left the yard in July this year, and the balance has tilted to 90 percent navy work and a decreasing 10 percent of commercial work. The total reliance upon naval shipbuilding is expected to continue, and Avondale has adapted its design, management, and shipbuilding trade disciplines and skills accordingly.

The yard is currently converting

USS Doyle, (left) built by Bath Iron Works.

three SL-7 containerships to Navy Fast Sealift Ships (T-AKR) and has delivered the first vessel. Delivery of the second of these rapid deployment vessels is scheduled for late 1985, and the third in early 1986. The design for these extensive conversions—adding decks, RO/RO capability, cranes, and other systems for self-contained loading and unloading—was performed in-house by Avondale.

The construction of the first of a new class (T-AO-187) of fleet oilers has begun, and construction of the second ship will start shortly. Follow-on ships will be constructed at about six-month intervals. This design was also performed in-house. Additional T-AO-187 class ships will be bid as funded for up to a total of seven ships in Fiscal Years 85, 86, and 87.

The engineering for the landing ship dock LSD-44 is proceeding in preparation for construction, with keel laying scheduled for March 1985. Avondale has options for two additional LSDs in FY 85 and two in FY 86. Competition for a FY 87 variant of the LSD-41 class is anticipated.

In addition, Avondale is constructing the forebodies for five 30,000-dwt T-5 tankers for Tampa Ship that will be chartered by Ocean Carriers, Inc. to the Military Sealift Command. Delivery of the first forebody is scheduled for September this year, with the other four following at three-month intervals.

Circle 11 on Reader Service Card

BATH IRON WORKS

Bath Iron Works (BIW) in Maine is celebrating its 100th anniversary in 1984 and, like some other American shipyards, found itself in a key period of transition. BIW passed the century mark facing a phase-out of the Navy guided-missile frigate program, and bleak prospects for any new commercial ship construction contracts in the near future.

Since BIW built the lead ship of the FFG-7 class in the mid-1970s, it has received contracts for 23 follow-on ships. This steady flow of work enabled the yard's work force to swell to 8,400 in the fall of 1982, then level off to some 7,000 workers. However, BIW has only one more keel to lay in the FFG program, and the last ship of this class will be delivered to the Navy in 1986.

The situation has caused BIW management to term the summer of 1984 as one of the key periods in the shipyard's long and storied history. That assessment was given because BIW faced head-to-head with Ingalls Shipbuilding for three additional Aegis cruisers, with options for three additional vessels. BIW was also anticipating an opportunity to bid, along with several other yards, to become the lead yard designer and builder of the new Aegis destroyer. Prior to the summer of 84, the Maine yard had received contracts for only two of the Aegis cruisers, and saw a need to secure a significant number of this CG-47 class vessels in order to take up the slack that would be resulting from the phase-out of the FFG program.

As of July this year, BIW had six FFGs in various stages of construction. It also had contracts for two Aegis cruisers—CG-51 and CG-58. The keel laying for CG-51 is scheduled for August 31 to coincide with the shipyard's centennial launching of the Simpson (FFG-56), a guided-missile frigate.

Circle 12 on Reader Service Card

BIW-PORTLAND

Bath Iron Works' new ship repair facility in Portland, Maine, became operational in December 1983, and a three-ship overhaul package for three destroyers of the DD-963 class had been scheduled into that facility, which is equipped with an 80,000-ton-capacity drydock.

The USS Conolly arrived February 15 and is slated to depart in mid-December. The USS O'Bannon arrived in early August, to be followed by the USS Deyo in February of 1985. Additionally, BIW re-

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U.S. Yards

(continued from page 21)

cently received an $11.1-million contract to overhaul the USS Page; that work is slated to begin at the Bath yard in September this year. The Bath yard is also continuing to perform post shakedown availability work on a number of its FFGs, as well as a few built by Todd Shipyards.

The mix of work had maintained a total work force for both the Bath and Portland yards of some 7,000 at midyear, but BIW officials continue to cast a cautious eye toward the future.

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BETHLEHEM STEEL

The Marine Construction Group of Bethlehem Steel Corporation is currently reconstructing five vessels for the U.S. Navy's new Maritime Prepositioning Ship Program (T-AKX). Three of the ships are being converted at the Sparrows Point yard near Baltimore, and the other two at the Beaumont, Texas, facility. Total value of the contracts for the five vessels is more than $600 million.

The first T-AKX ship to be delivered is the Cpl. Louis J. Hauge Jr., formerly the Estelle Maersk, which was reconstructed at Sparrows Point. That vessel was delivered in July of this year, one month ahead of schedule. The ship's name became official on July 14 when **Mrs. Catherine Braunschweig** of Kent, Wash., sister of the World War II Medal of Honor winner for whom the vessel is named, performed the christening ceremony.

The Estelle Maersk, along with the four other Maersk RO/RO vessels, was selected in 1982 to be reconstructed by Bethlehem Steel because, with her redesign, she would be well suited to the prepositioning ship mission. Each ship will be used for the mobile, long-term storage of vehicles, helicopters, weapons, ammunition, fuel, and other material to supply a Marine Corps Amphibious Brigade.

To meet these mission requirements, Bethlehem separated the vessel amidships, added a 157-foot-long midsection that extended her length to 755 feet. Her depth was changed with the addition of two new dock levels, increasing the keel-to-dock depth by nearly 16 feet, from 54 to 70 feet. This required the alteration of three decks—first, main, and upper.

These expansions provided more cargo hold, space for a third set of twin 36-ton-capacity cranes, and an additional 80-person deckhouse for "surge" crews during periodic loading and unloading. The normal crew complement will be about 65. Other major additions included new ramps, fuel tanks, repair shops, and an aft helicopter landing platform.

Circle 14 on Reader Service Card

COASTAL DRY DOCK

Coastal Dry Dock & Repair Corporation, located in New York at the former Brooklyn Naval Shipyard, is currently overhauling two U.S. Navy ships—the frigate USS Pharris (FF-1094) and the destroyer USS Nicholson (DD-982). In addition to these two combatants, the yard is working on the Military Sealift Command's stores ship USNS Rigel (T-AF-58).

Within the past year Coastal has completed the regular overhaul of two frigates and one destroyer. These overhauls have included extensive electronics/ordinance upgrades and considerable machinery work.

The Brooklyn yard is expecting the USS Thorn (DD-988) in February 1985, which will complete the three-destroyer overhaul contract awarded in April 1983.

Coastal Dry Dock has established a reputation for the efficient overhaul of Naval combatants, and is currently soliciting additional Navy work. With the arrival of the Surface Action Group in the late 1980s, the yard is looking forward to working with the Port of New York and the Navy to bring additional employment to the area.

Circle 28 on Reader Service Card

GENERAL DYNAMICS

The General Dynamics Electric Boat Division in Groton, Conn., is the nation's only shipyard dedicated solely to the design, construction, and support of nuclear-powered submarines for the U.S. Navy. The yard builds two classes of submarines—Ohio Class missile-firing Tridents and Los Angeles Class (SSN-688) fast attack boats.

Solid construction performance during the first half of 1984 has culminated in ahead-of-schedule delivery of two attack subs, the Minneapolis-St. Paul (SSN-708) and the Hyman G. Rickover (SSN-709), and one Trident, the Georgia (SSBN-729), making a total of eight consecutive submarines delivered ahead of schedule. This performance reflects the Division's commitment to innovative construction and engineering techniques such as modular construction and computer-aided design/computer aided manufacturing (CAD/CAM), which have improved productivity and reduced construction times.

Submarine hull cylinders are produced in an automated welding facility at Quonset, R.I., where they are end-loaded with foundations, decks, wiring, piping, and large components. The completed cylinders are then joined to form complete hulls at the land-level submarine construction facility at Groton.

Recently, the Quonset Point facility has taken on even more submarine fabrication work. A $9-million waterfront improvement project that began full operation early this year has doubled the capacity, to 600 tons. Three basic components comprise the system: a 700-ton-capacity, multi-wheeled ground transporter; a new 195-foot barge with jackup legs; and underwater concrete pads at both plants to receive the legs for docking.

At present, Electric Boat has 16 ships under construction—seven Tridents and nine SSN-688s. Among the Tridents, the Henry M. Jackson (SSBN-730) is undergoing sea trials prior to a scheduled delivery this fall; the Alabama (SSBN-731) was launched in May this year and will be delivered in the spring of 1985; and SSBN-732-736 are in various earlier stages of construction. (General Dynamics recently received a Navy contract to accelerate fitting the ships with even longer range Trident II missiles).

Among the ships in the yard's attack submarine program, the Augusta (SSN-710 is being prepared for sea trials; the Providence (SSN-719) was launched on August 4 this year and is scheduled to be delivered in the spring of 1985; and the remaining seven ships are in various earlier stages of construction. Of special significance are SSN-791 and SSN-720, first in their class to feature the Tomahawk cruise missile vertical launch capability.

The U.S. Navy has authorized Electric Boat to accomplish preliminary design work on a new class of attack submarine that is planned to counter the growing threat posed by advanced Soviet submarine designs. This design work was completed in June this year, and it is expected that the Navy will shortly initiate the next phase of competition, which will ultimately be geared toward selecting a contractor to serve as design agent for this all-new submarine.

The Quincy Shipbuilding Division of General Dynamics in Massachusetts is participating in the Navy's Maritime Prepositioning Ship (T-AKX) program under a $775-million contract for the construction of five ships.

The only newly built vessels in the T-AKX program, the 645-foot ships will displace 40,800 tons fully loaded, and be powered by Stork-Werkspoor diesel engines with a total output of 26,000 bhp.

Each of these ships will be capable of carrying 25 percent of the equipment needed to support a Marine Corps brigade. In addition, each will carry 1.6 million gallons of petroleum products in bulk and 81,000 gallons of potable water.

The Quincy yard has laid the

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U.S. Yards

(continued from page 23)

keels for the first two ships, and 2nd Lt. John P. Bobo and the Pfc. Dewayne T. Williams. All of the MPS vessels will be named for servicemen who earned the Medal of Honor.

Circle 15 on Reader Service Card

INGALLS SHIPBUILDING

On July 4 this year the U.S. Navy placed in commission a second Aegis guided-missile cruiser, the USS Yorktown (CG-48). The new ship is one of 11 contracted by the Navy to Ingalls Shipbuilding division of Litton in Pascagoula, Miss. Ingalls delivered the lead ship, USS Ticonderoga (CG-47) ahead of schedule in 1982, and that ship has now completed a highly successful first deployment to the eastern Mediterranean. Yorktown was also delivered ahead of schedule, and has reported for duty with the Atlantic Fleet.

Nine additional Aegis cruisers are under construction or in planning at Ingalls including the Vincennes (CG-49), which will be commissioned in July 1985, and Valley Forge (CG-50), which will be christened September 29 this year. These ships will bring to the Navy the same high quality workmanship as exemplified by the outstanding performance of the first two Aegis cruisers to join the Fleet.

Ingalls is also building the lead ship in a new class of multi-purpose amphibious assault ships, the Wasp (LHD-1). Similar in many respects to five Tarawa (LHA-1) Class assault ships built by Ingalls in the 1970s, this new class will significantly improve and revitalize the Navy/Marine Corps team's sealift capability. Designed to accommodate the Navy's new LCAC air cushion landing craft and Harrier jet aircraft, LHD-1 will have as a primary mission the embarkation, deployment, landing, and support of a Marine landing force. At 844 feet long with a beam of 106 feet, the 40,500-ton Wasp will be the third largest ship type in the U.S. Fleet. The lead ship of the new class is scheduled for delivery in early 1989.

In April this year Ingalls completed a complex modernization and reactivation work package aboard the battleship Iowa (BB-61), and redelivered the ship ahead of a schedule that was twice accelerated by the Navy. Ingalls' job was to bring this great ship into the missile era with modern weapons and electronics, including Tomahawk and Harpoon cruise missiles and Phalanx rapid-fire guns.

Living quarters for her 1,500 officers and crewmen were updated, and her engines and boilers were overhauled and modernized to burn the Navy's standard distillate fuel. Her nine 16-inch guns were refurbished, as were 12 five-inch guns. Modern communications, air and surface search radar, and electronic countermeasures systems were installed as well. USS Iowa was recommissioned on April 28 this year and has reported for duty with the Atlantic Fleet.

Ingalls is also continuing to build on a well-deserved reputation in the overhaul of surface ships. The yard has completed overhauls of six Spruance (DD-963) Class destroyers an average of four weeks ahead of schedule, and all within budget. Two additional overhauls are under way, the Spruance ships USS John Rodgers (DD-983) and USS Moosbrugger (DD-980). These ships will rejoin the Fleet in May and August 1985, respectively.

Leading the industry in the development and application of computer technology for ship design and construction, Ingalls maintains a 1,500-member engineering and design staff, which includes an ongoing independent R&D program. This engineering staff has assisted the Navy in the design of its next destroyer class, the Arleigh Burke (DDG-51) Class of Aegis destroyers. This new ship represents an important aspect of Ingalls' future shipbuilding activity.

Circle 16 on Reader Service Card

LOCKHEED SHIPBUILDING

Lockheed Shipbuilding Company (LSC) of Seattle (formerly Lockheed Shipbuilding & Construction), a wholly owned subsidiary of Lockheed Corporation of Burbank, Calif., presently has $1 billion of new shipbuilding construction work under way for the U.S. Navy. The yard is building three dock landing ships (LSD) that were designed by Lockheed. These ships are 609 feet long overall, with an 84-foot beam and 20-foot fully loaded draft.

The LSDs are amphibious assault ships designed to carry U.S. Marine Corps troops, their equipment, and their supplies to points around the world. The assault ships will lay to "over the horizon" and will carry four 87-foot by 50-foot air cushion landing craft (LCAC) in their floodable wet wells. (Note: the LCACs currently under construction for the Navy are being built by Bell Aerospace-Textron in New Orleans).

The three LSDs under construction at LSC are: the Whidbey Island (LSD-41), approximately 95 percent complete and scheduled for delivery in November this year, built at a contract cost of $338.6 million; the Germantown (LSD-42), approximately 80 percent complete, with a delivery date of October 1985 and contract cost of $304 million; and the yet unnamed LSD-43, approximately 22 percent complete and scheduled for delivery in June of 1987, contract cost $271.

On June 29 this year Navy Sec-

(continued on page 26)

The S.S. Chemical Pioneer was conceived and built as a state-of-the-art vessel integrating over 150 years of shipbuilding experience.

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U.S. Yards

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retary **John F. Lehman Jr.** announced that Lockheed Shipbuilding had won one of the two design and production feasibility contracts for production planning of additional LCACs for second-source procurement. Congress had directed the Naval Sea Systems Command to secure a second source (other than Bell Aerospace-Textron) to build this class of craft. The construction contract will be announced in April 1985.

Circle 17 on Reader Service Card

MARINETTE MARINE

Marinette Marine Corporation (MMC) in Northern Wisconsin is in its 28th year as a builder of defense-related marine equipment, and is well known for its versatility in the design and construction of Navy ships and craft of all types.

MMC, under contract to the Naval Sea Systems Command, is producing a new generation of Mine Countermeasure (MCM) vessels in its 70,000-square-foot MCM ship erection building, which was specifically designed and constructed to accommodate the construction of these vessels. This new facility enables MMC to build, in an environmentally controlled area, two MCMs simultaneously.

The keel was laid for the second vessel of this class, the Champion (MCM-4) in June this year, while construction of the first, the Defender (MCM-2), is well under way. The 224-foot laminated wood hull, sheathed in glass-reinforced plastic, represents one of the most sophisticated and capable mine countermeasure ship classes ever built in the U.S. or the world.

Under another Navy contract, MCM has completed and submitted its Minesweeper Hunter (MSH) contract design for evaluation, and looks forward to contract award for lead ship construction later this year. The company's MSH design proposes the hull and superstructure to be constructed of monocoque glass-reinforced plastic, which is advantageous to the mission requirements of this vessel. The MSH is capable of conducting operations against surface and subsurface targets, either independently or as a part of a larger force to support the naval and coastline defense of the U.S.

Delivery of the first of eight Torpedo Weapon Retrievers (TWR) will begin in October this year, with final delivery in September of 1985. The Navy awarded a contract for five TWRs to MMC in July 1983, and a three-vessel option was exercised in October. The 120-foot, 2,000-bhp steel vessel, a totally new design developed by MMC, is capable of staying on station for one week recovering spent missiles and torpedoes fired during weapons system tests on Naval combatant submarines and surface ships.

In February this year, Marinette was awarded a contract by NAVSEA for the construction of twenty-eight 50-foot, steel-hull workboats, with an option for 24 additional vessels. Delivery of the workboats to both the East and West Coasts will be two per month starting later this year. In previous years, MMC has been awarded contracts by the Navy for more than 50 of this type craft.

Circle 18 on Reader Service Card

NATIONAL STEEL

Navy work at National Steel and Shipbuilding Company (NASSCO) in San Diego is progressing on schedule toward completion of two major contracts: the conversion of three Waterman RO/RO vessels into T-AKX Maritime Prepositioning Ships to be time-chartered to the Military Sealift Command; and the conversion of three SL-7 former Sea-Land containerships to T-AKR Rapid Deployment Ships, also for the MSC.

Conversion of the RO/RO ships has involved the construction of 126-foot midbodies to provide additional cargo capacity. The overall length of the converted ships will be 821 feet. The original deckhouses are being modified to in-

crease personnel accommodations from 41 to 183. Two twin pedestal cranes are being installed on each ship's main deck to handle off-loading of cargo, including amphibious landing support craft.

When converted these ships will provide the capacity to rapidly transport to any desired location 25 percent of the vehicles and initial supply of ammunition, fuel, and rations for a Marine Corps amphibious brigade.

NASSCO has been involved with the T-AKR program since its inception in the fall of 1981, when the Navy surveyed the industry to determine which shipyards would be interested and could qualify for design and conversion of these ships. Subsequent to its successful performance during the competition/design phases, NASSCO was in September 1982 awarded a contract to provide the detail design and conversion work for two ships with an option for a third. The option for the third ship has been exercised.

The T-AKR ships will be stationed in the U.S. and, if an emergency arises, will be loaded with military cargo to provide rapid second-wave support to deployed combat troops. These 946-foot ships have speed of up to 33 knots. Conversion will include removal and rebuilding of internal structures used in carrying containers, as well as installation of new internal and external ramps for loading, storing, and unloading military vehicles. Additional decks, cargo cranes, and a helicopter hangar are also being added.

NASSCO is awaiting arrival in September this year of the 87,000-dwt NASSCO-built tanker Worth, which will be converted into a T-AH hospital ship. This is the first of a two-ship contract worth a total of $336.2 million. The second T-AH conversion will be the 87,000-dwt tanker Rose City, also built by the San Diego shipyard.

Circle 19 on Reader Service Card

NEWPORT NEWS

Newport News Shipbuilding (NNS) in Virginia, the country's largest privately owned shipyard, has designed, built, overhauled, and repaired a wide variety of ships for the U.S. Navy. Today it is the only yard in the U.S. capable of building and servicing a full range of surface and submersible vessels.

NNS currently has 10 Navy ships under construction or contract—three aircraft carriers and seven high-speed attack submarines. The 688 Class submarine Chicago (SSN-625) will be launched on October 13 this year, the 209th birthday of the U.S. Navy. The carrier Theodore Roosevelt (CVN-71) will be launched on October 27, the birthday of the president for whom she is named and Navy Day.

Newport News is also overhauling and refueling five submarines, and has contracts to plan for similar work on two additional subs. The yard recently completed the overhaul of the aircraft carrier Nimitz (CVN-68) and returned her to the fleet in a period of 13 months.

A leader in application of high technology to shipbuilding, Newport News Shipbuilding provides a variety of engineering services to the Navy. It has been awarded several contracts to modify and improve existing ship designs, and to develop designs for new classes of submarines and surface ships.

The yard currently employs some 29,000 people, many of whom are fourth generation shipbuilders.

Circle 20 on Reader Service Card

NORSHIPCO

A Phased Maintenance contract with the U.S. Navy's Naval Sea Systems Command has provided the Norshipco yard in Norfolk with repair work for three T-AO-177 class oilers over a 54-month period. The three ships that will undergo repairs—the USS Merrimack, USS Monongahela, and USS

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Platte—will require a total of eight major repairs. Work on the Merrimack is scheduled to be completed by August 31 this year, and the Monongahela will arrive at the yard September 3.

Norshipco has also been responding to Selected Repair Availability (SRA) work of 60- and 90-day durations. Of the many Navy ships repaired by the Norfolk yard on this basis, recent contracts have been obtained on two such vessels—the USS Kidd that departed the yard recently, and the USS Caron that is scheduled to arrive August 21.

In addition, Norshipco is benefiting from the significant level of repair work being done at Naval Base-Norfolk and Amphibious Base-Little Creek, Va. The yard is providing support in this area on a contract basis. Work was also completed recently on the USS Newport and the USS Sustain.

Circle 21 on Reader Service Card

PENNSYLVANIA SHIPBUILDING

In common with most other major U.S. shipyards, Pennsylvania Shipbuilding Company's current workload is heavily dependent on work for the U.S. Navy, a condition that is expected to continue for some time.

The principal activity in the yard at Chester, Pa., is the conversion of the USNS Denebola (T-AKR-289) from an SL-7 cellular containership (ex Sea-Land Resource) to a fast supply ship. This is the second such ship to be converted at Penn Ship; the first, USNS Capella (T-AKR-293), was delivered to the Navy in June this year. Work on the Denebola has just started, with delivery scheduled for October 1985. During that period, this $60-million contract is providing an average of about 500 jobs.

In addition to work on the Denebola, the Chester yard is actively supporting the Philadelphia Naval Shipyard on a number of programs, most notably the Ship Life Extension Program (SLEP) of the aircraft carrier USS Forrestal (CVA-59).

Penn Ship recently submitted a proposal for the Phased Maintenance Program of the USS Patterson (FF-1061), the first of four Naval Reserve Force frigates to be based in Philadelphia. This program, which involves four overhauls plus around-the-clock repair, maintenance, and spare parts service over the next five years, is expected to be awarded shortly to a contractor in the Philadelphia area.

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PETERSON BUILDERS

Peterson Builders, Inc. (PBI) of Sturgeon Bay, Wisc., is well known as the Great Lakes shipyard that has always maintained its reputation for quality, diversification, and ingenuity. Contracts won for the 14 vessels now under construction for the U.S. Navy are testimony to PBI's experience and competitive edge. Keels have been laid for 10 of these vessels, and since November 1983 five have been launched.

Wood construction, a special area of expertise at PBI, is the material being used for the Mine Countermeasures Ships (MCM) and patrol boats (YP). Peterson is the only Navy-approved shipyard in the U.S. with the capabilities and experience to perform certified wood lamination work. The Navy contract for the rugged Salvage Ships (ARS) calls for steel construction.

PBI's development plans have resulted in an outstanding solution for current world needs in multi-mission patrol craft—the 66-foot PBI MK-1 that the yard is now marketing. This aluminum inshore patrol boat is capable of a speed of more than 38 knots, and can be tailored to meet a wide range of simultaneous operational missions at affordable prices.

The 224-foot MCMs represent a new concept in defensive mine warfare, combining the functions of both the conventional minesweeper and the more recent design of the mine hunter. As the lead yard for this proposed 14-ship Navy program, PBI has contracts for three MCMs and is working closely with the Navy in the design and development of the series, as well as providing drawings, purchasing, planning, scheduling information, and other data to the follow-on yard.

The four 225-foot ARS auxiliary rescue/salvage vessels also represent a new class of ships that PBI is building for the Navy. These Safeguard ARS-50 Class ships will replace the Navy's aged and diminished rescue/salvage vessels. Mission duties of the ARS are to provide salvage, towing, and firefighting services at advanced bases and U.S. ports. The ships are also capable of lifting submerged objects as well as extensive diving support operations. They will possess the finest diver life support air system in the Navy. The salvage holds of the ship are fitted with portable equipment to effect assistance to other vessels in dewatering, patching, and providing electrical power and other essential services required to return a disabled ship to operating condition.

The 108-foot YP yard patrol craft is an expanded and refined version of the highly successful 80-foot YPs built by PBI for the Navy in the recent past. These seven new vessels will be equipped to provide trainees at the U.S. Naval Academy at Annapolis with "hands-on" experience in ship maneuvering, communications, and navigation.

Circle 23 on Reader Service Card

SOUTHWEST MARINE

Southwest Marine Inc. (SWM), San Pedro Division, currently has several U.S. Navy contracts in progress. Major repair work is being accomplished on the destroyer USS Ingersoll (DD-990). During drydocking of this ship, repairs are being made to the sonar dome and the starboard controllable-pitch propeller. The scope of the work includes replacement of all blades, hub, and the OD box, along with flushing and cleaning of all internal piping of the starboard propulsion system. Work being performed on the sonar dome includes determination of the extent of damage, repair of any damage found, and the resurfacing and repairing of the internal and external dome structure.

Aboard the amphibious assault ship USS Peleliu, SWM is in the process of converting a compartment into a computer operations area. This alteration entails the removal of existing structures within the compartment and the installation of new alterations as required. The yard is also installing new foundation and bulkhead structures to accommodate the installation of computer components and associated hardware.

In conjunction with SWM of San Francisco, the San Pedro Division is in the final phase of structural modifications to the winch decks of the replenishment oiler USS Wichita (AOR-1). San Pedro's work included construction of new winch deck platforms, which consisted of layout, surface preparation, coating, preassembly, final assembly, and installation aboard the ship.

SWM of San Francisco has a 2,800-ton drydock that is 389 feet long, 84 feet wide, and can dock ships with drafts up to 16 feet. Presently in the drydock is a Navy oceangoing tug that is undergoing a complete overhaul of her Fairbanks-Morse diesel engine. The vessel's hull and superstructure is being blasted to bare metal from the keel to the top of the wheelhouse. The preservation system being applied by SWM's crew is inspected daily by quality assurance inspectors to insure high-quality workmanship. General repairs to the tug's shafts, propellers, and electronics are also being accomplished during the drydocking period.

Southwest Marine's San Diego yard currently is performing repairs and hull preservation on the Navy's auxiliary repair dock USS San Onofre (ARD-30). This contract is valued at $2 million; repairs are expected to take 50 days.

The destroyer USS David R. Day (DD-971) entered the San Diego yard in July for an eight-week restricted availability. The repairs and modifications affect the vessel's machinery and power distribution systems.

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TACOMA BOAT

Tacoma Boatbuilding Company

in Washington is constructing 12 ocean surveillance vessels—224-foot ships that will tow sophisticated acoustical listening devices at slow speeds and at various depths throughout the world's oceans.

The USNS Stalwart (T-AGOS-1) was launched in July 1983 and delivered to the Navy in the spring of 1984. USNS Contender (T-AGOS-2) was launched in December 1983, and USNS Vindicator (T-AGOS-3) was launched in June this year.

After delivery of Vindicator in late September, the classified acoustical equipment, termed Surveillance Towed Array Sensor (SURTASS), will be installed aboard the vessel at the Military Sealift Command's West Coast base in Oakland, Calif., by the Navy's Electronic Systems Command.

The fourth T-AGOS is now under construction and scheduled for launching in September. The remainder of the ships of this class will be launched and completed at intervals of approximately three months, with the last of the 12 ships in the program to be launched in October 1986.

Propulsion for the T-AGOS is provided by a diesel-electric system, comprising four Caterpillar/Kato 600-kw diesel generators driving two General Electric 1,600-hp dc motors. Power is transmitted directly through two 50-foot shaft to twin 4-bladed, 97-inch propellers.

Each T-AGOS ship will have a complement of 19 to operate the vessel and 10 SURTASS technicians, all licensed civilian employees of the MSC.

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TODD SHIPYARDS

Todd Shipyards Corporation's operations on the Pacific and Gulf Coasts form an important segment of the U.S. Navy's shipbuilding mobilization base, and provide geographically dispersed fleet support capabilities essential to national security.

The company's Los Angeles and Seattle Divisions are the only shipyards on the West Coast fully qualified to build today's sophisticated surface combatants of the frigate/destroyer/cruiser types. Both yards are presently engaged in the construction of FFG guided-missile frigates, with 24 already delivered and six still under construction.

The Los Angeles Division is a top contender for participation in the upcoming DDG-51 destroyer construction program. The expertise of its Naval Technology Division, advanced "group technology" construction techniques, CAD/CAM production system and automated operations, and skilled work force are ideally suited and in place for a project of this magnitude. Completion of the Division's new $47-million ship lift and land level transfer facility (Syncrolift) has expanded its ship construction capacity by 100 percent, and its fleet life-style support capabilities by 250 percent.

The Seattle Division is competing, with one other shipyard, for the lead yard construction contract for the Air Cushion Landing Craft (ACLC). This division has broad experience in the type of lightweight construction required by this vessel design.

In addition to its shipbuilding strength, Todd has the most complete and extensive overhaul/repair capabilities for naval ships on the West Coast at its Seattle, Los Angeles, and San Francisco Divisions. The latter operation, with a 65,000 displacement ton drydock and full-service skills, can handle virtually all naval combatants and auxiliaries, including aircraft carriers. With this facility, the Seattle Division's new 40,000-ton drydock, and the ability of Los Angeles' Syncrolift system to service vessels up to 48,000 dwt, Todd's overall capacity to service the Navy's Pacific Fleet is unmatched. Overhaul/repair contracts recently completed or now under way at these operations include guided-missile destroyers and frigates, other combatant classes, and a variety of auxiliary ships.

This West Coast expertise has recently been transferred to Todd's Galveston Division that is working on its first Navy contract, a $55-million award for conversion

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U.S. Yards

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of two aviation logistic support vessels (T-AVBS). The transfusion of program management experience, technology, and operational expertise from the West Coast to the Gulf Coast allows Todd to serve the fleet assigned to the Caribbean Basin. Galveston's 40,000 displacement ton drydock and full-service repair capabilities insures high quality and rapid response to the Navy's future needs.

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WATERCRAFT AMERICA

Watercraft America, Inc., with plants in Edgewater and Oakhill, Fla., is currently engaged in the construction of 98 Landing Craft Personnel (Large) LCP (L). These craft have an overall length of 36 feet, beam of 12 feet 2 inches, full-load draft of about 3 feet 4 inches, and full-load displacement of approximately 21,900 pounds. The 425-bhp Detroit Diesel Allison engines for these vessels are being supplied by Stewart & Stevenson.

With a capacity for 20 persons plus three crew, the primary mission of the LCP (L) is to act as an assault echelon group commander's boat. Secondary missions include use as a barge, gig, liberty boat, safety boat, and utility craft.

The contract to build these boats was awarded to Watercraft in June 1983; since then the company has been involved in pre-build work, tooling, and other preparatory work. The first completed boat is due in August this year.

Watercraft America has heretofore been involved solely in the manufacture of its survival systems. The need to diversify into other fields was seen after the decline in merchant shipbuilding and construction of offshore drilling rigs. The Florida company hopes to receive further contracts from the Navy. In order to accomplish this, it has set up a separate engineering department to deal with government work. It also hopes to obtain orders for other types of workboats for which designs are available.

The company has expanded its facilities to provide floor space needed to build the boats for the Navy and to meet current demand for enclosed lifeboats. When the current phase of plant expansion is completed in August this year, the company will have a total manufacturing space of 66,000 square feet at both plant locations. Watercraft currently employs 160 persons in Florida and at its refurbishment and service station in New Iberia, La.

Circle 27 on Reader Service Card

ATLANTIC MARINE

Atlantic Marine's Mayport Div., located at the Mayport Naval Station near Jacksonville, Fla., is currently involved in several Navy contracts, including voyage repairs on the frigate USS McDonald.

Several vessels are also scheduled for SRA (selective restrictive availability) work at the Mayport yard this summer, including the USS Jack Williams, the USS Paul and the USS Antrim.

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BENDER SHIPBUILDING

Bender Shipbuilding & Repair, Mobile, Ala., is currently upgrading all ABS/USCG certificates as well as surveying and repairing internal steel on the SS Maine, a heavy lift ship on lease to MarAd.

Earlier this year, the SS Hudson was at the yard for drydocking and general overhaul.

Bender also has been contracted to perform repairs and general maintenance to U.S. Coast Guard vessels. Most recently, Bender drydocked and repaired major damage to the topside and hull of the USCG icebreaker Westwind.

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NOIA

"UNITED WE STAND" — A Call To Membership In The National Ocean Industries Association

Charles P. Siess, Jr.*

A tour of any offshore drilling rig or production platform illustrates how many U.S. companies, representing different industries from all parts of the country, participate in offshore energy exploration and production. From the bridge to the engine room, you see one manufacturer's nameplate after another.

Diesel engines manufactured near the Great Lakes provide horsepower. Electronics gear from California and Massachusetts provides guidance and controls. High-pressure hoses made in Kansas safely carry fluids that are the rig's life blood. Wire ropes from factories in New England lift supplies aboard. Not as visible are the many specialized lubricants, seals and bearings that play vital roles. Equally invisible, but just as vital, are the many products and components from upstream suppliers and vendors that are already incorporated as components in each system or piece of equipment on board.

Even before a rig or platform is launched, welding machines and welding supplies from the Midwest are used in large quantities during fabrication. So are thousands of tons of fabricated steel and hundreds of thousands of fasteners of all types.

Once on location, literally hundreds of companies support each offshore installation: crew and supply boats from shore basis . . . helicopter services . . . environmental controls . . . safety equipment. Every offshore location is concrete proof of American industry's broad involvement in offshore oil and gas.

The same far-reaching and diverse participation can be seen on commercial fishing vessels, towboats and tankers, on cargo ships and throughout the many industries that service these operations.

This country's involvement in ocean-related industry reaches far beyond coastal regions where much of the population has traditionally depended directly on the ocean for employment. For illustration, the electronic components, light bulbs, batteries and innumerable small component manufacturers, and even the banking industry which finances them and their consultants participate in the offshore industry.

The National Ocean Industries Association was founded in 1972 on this awareness of the broad extent of industry's direct and indirect participation in ocean-related activity. NOIA's current membership, made up of more than 400 companies, understands even more urgently the current and future economic impact ocean-related activity on all geographic and industrial segments of our country. This grasp of the offshore industry's importance to our total economy, and to the nation's goal of energy independence, is NOIA's catalyst. The National Ocean Industries Association is the **only** trade association that represents all facets of offshore and ocean-related activity. This makes the association a unique forum.

NOIA's objective is to preserve and advance the vital role private enterprise plays in developing our offshore resources for all Americans while being consistent with sound environmental safeguards and practices. NOIA's membership confirms this broad charter. Member industries are as diversified as commercial diving and telecommunications. Commercial and sport fishing, financial institutions and geophysical exploration companies are NOIA members. The entire offshore energy industry, from marine construction to exploratory drilling through production and transportation, is committed to NOIA's objectives.

Still, NOIA's diversified, commited membership is not large enough to withstand opposition from anti-business groups and environmental extremists.

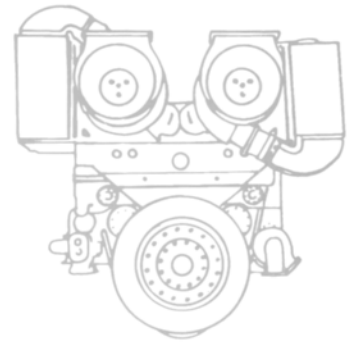
The collective voice of all American companies directly and indirectly involved in ocean-related industry, especially offshore energy, must be broadened for this voice to become stronger in Washington and in our state capitols. Here is where the crucial decisions are being made about the development of our offshore resources. The need is greatest for a stronger voice and increased participation from those many inland-based companies who are involved in offshore energy development. For without this stronger voice, legislation and regulation will further needlessly limit development of one of America's most important ocean resources—our vast Outer Continental Shelf energy potential.

(continued on page 34)

*Charles P. Siess, Jr., president and chief executive officer of Marathon Manufacturing Companies, Inc., Houston, Texas, is a member of the National Ocean Industries Association's board of directors and is currently chairman of NOIA's Membership Committee.

COME TO WHERE COLT-PIELSTICK*

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



Colt-Pielstick Diesels
Big horsepower in less space.
Ratings to 29,700 bhp.

THE POWER IS

When it comes to dependable, economical marine POWER, you can't beat Colt-Pielstick diesel engines. The PC-4 Series is now available with a horsepower range to 29,700 bhp. PC-2 Series to 13,266 bhp. Their reliability has been proven in many millions of hours of operation with over 70% on heavy and residual fuels.

Colt-Pielstick engines are compact, too. Their power is packed into much less space than a 2-cycle engine and they weigh less. Initial costs are also less because Pielstick engines can be installed completely assembled resulting in a substantial savings in shipyard labor cost.

Fairbanks Morse has built the Pielstick PC-2 Series diesels in ratings to 13,266 bhp since 1970 and during that time has built engines for a wide range of commercial and naval applications including the current Navy LSD program. In addition to the Pielstick, the Fairbanks Morse O-P engine, with ratings of 700 to 4200 bhp, meets many Navy applications and has long played an important propulsion and ship service role in the fleet.

Get the complete Colt-Pielstick marine POWER story, today. Write or call Colt Industries, Fairbanks Morse Engine Division, Beloit, Wisconsin 53511. 608/364-4411.

Colt Industries

Circle 296 on Reader Service Card

Fairbanks Morse
Engine Division

NOIA

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The same legislation and regulation that would limit development of those energy resources will just as surely restrict participation by many companies based inland as it will those located along the coastal margin.

NOIA's response to those aspects of legislation which needlessly restrict development of OCS energy has been its Pro-Leasing Program. The thrust of this effort is to mobilize NOIA's members in Congressional districts across the United States to counter unreasonable Congressional limitations on the orderly leasing of OCS acreage for energy exploration. The Pro-Leasing initiative is based on factual evidence proving our need for new, secure supplies of domestic energy. America's offshore energy industry has long since proved its ability to find and produce that energy, in harmony with the ocean's environment. This record of achievement and performance stands in support of NOIA's Pro-Leasing Program.

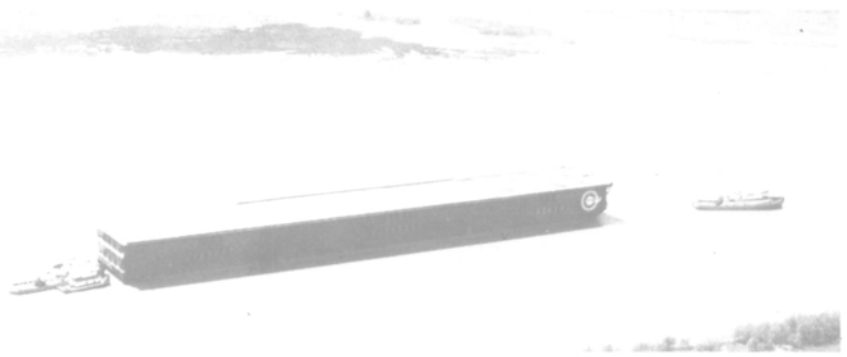
However, to be truly effective this program urgently needs broader active involvement by the American companies, large and small, who share in the offshore energy search in so many ways. It is therefore especially imperative and appropriate for all segments of American business and industry to become more aware of how profoundly our country is economically tied to the ocean and to development of what may be our last, large reserves of domestic energy.

For those reasons, I strongly urge all American firms that participate in offshore energy or any ocean-related business to join NOIA and become actively involved in the Pro-Leasing Program. For it will be only through our united voice, speaking for all these segments of American business, that Congress can better understand the nationwide benefits of ocean-related activity, especially offshore energy, for its constituents.

To join your voice with so many others, please contact me personally at (713) 659-7444 or write for more information to NOIA's membership committee at the National Ocean Industries Association, 1050 Seventeenth Street NW, Suite 700, Washington, DC 20036.

The direct benefits of membership in NOIA for your company will include effective representation at the national level, excellent communication to you of developments in Washington that affect your company through NOIA's newsletter, and professional analysis of the potential effect of proposed legislation and regulation on your company's business activities.

The indirect advantages of NOIA membership are too numerous to list here. However, I do assure you that your personal involvement in NOIA will benefit your company and your employees.



McDermott delivers the first of five roll-on/roll-off barges to Crowley Maritime Corporation.

McDermott Delivers First Jumboized Crowley Barge — Gets Contract To "Stretch" Three Additional Units

Crowley Maritime Corporation of San Francisco, which last year awarded McDermott Shipyards a contract to lengthen two roll-on/roll-off barges, has ordered midbody extensions of three additional barges. Each barge, designed to transport wheeled vehicles and cargo containers, will be extended from 400 to 730 feet by insertion of a 330-foot midbody section. Upon completion, they will be the longest barges operating in the U.S.

The first barge of the earlier contract (photo) was delivered recently, and is now in service between the U.S. and San Juan, Puerto Rico. The second barge of the first order is scheduled for delivery this summer. With the delivery of these barges, McDermott joins the ocean barge construction market and plans to build and enlarge more barges in the future.

Work on the barges is performed at all three of McDermott's shipyards, enabling the company to meet the desired delivery dates. Two of the midbody sections will be built at the Gulfport, Miss., yard and three at the Morgan City, La., yard. Wing tanks for four barges will be built at the New Iberia, La., yard. Joining operations for all five barges will be performed at Morgan City.

The McDermott shipyards specialize in the construction and repair of large tugs, supply boats, barges, drill rigs, living quarters, and a wide variety of oceangoing work vessels.

The parent company, McDermott International, Inc., is a leading energy services company. The company and its subsidiaries provide worldwide engineering and construction services for the oil and gas industry offshore and for industrial and commercial facilities ashore. They also manufacture steam generating equipment, tubular products, insulating products, and process control systems.

John Crane Offers New Packing Selection Guide

A completely new Rite-Pak™ packing selection guide has just been published by John Crane-Houdaille, Inc., worldwide manufacturer of seals and packing.

The full-color, 16-page guide matches Rite-Pak non-asbestos and asbestos braided packings to specific applications. A complete recommendation chart is included, as are details on composition, services, and temperature and pH ranges for each of 21 styles of packings.

"Rite-Pak is an exclusive approach to a broad spectrum of universally used packings that are always in stock and ready for immediate delivery from John Crane service centers," according to packing manager **George McKillop**.

For a free copy of the new guide,

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Lister Diesels Appoints James Kolinski President

James A. Kolinski

James A. Kolinski has been appointed president of Lister Diesels Inc., manufacturer of air-cooled diesel and natural gas industrial engines located in Olathe, Kan. The announcement was made by the company's board of directors.

Mr. **Kolinski** comes to Lister from Allis-Chalmers Corporation in Milwaukee where he served as director of corporate planning and marketing services. He replaces **Peter S. Y. Jessop,** who has been assigned new responsibilities with Lister's parent company in the U.K.

Prior to his Allis-Chalmers affiliation, he held corporate and strategic planning positions with McGraw-Edison and with International Harvester. He holds an MBA degree from Western Michigan University.

Todd Seattle Awarded $500,000 Phase I Contract For LCAC Program

It was announced by **John T. Gilbride Jr.,** vice president and general manager, that Todd Seattle has been awarded a Phase I DATA REVIEW AND PRODUCTION PLANNING contract for the air cushion landing craft (LCAC) follow-on construction program. The LCAC is a high speed air cushion landing craft that will provide transport of personnel and equipment to shore positions from amphibious assault ships stationed offshore.

The Phase I award is a fixed price contract totaling $500,000 for review of detail design and construction feasibility for the LCAC follow on construction program. A preproduction prototype of this craft is currently under construction on the Gulf Coast by the LCAC program's lead contractor.

Early in 1985 there will be a Phase II contract based on cost effectiveness and production techniques. The fixed price award will be for the construction of one or two vessels with subsequent awards for up to nine vessels per year. U.S. Navy planners foresee up to 90 vessels of this class by 1995.

Todd Seattle's expertise in this type of aluminum fabrication was developed during construction of the experimental Hovercraft JEFF-A (a prototype for the current LCAC).

Lykes Awards $150-Million Contract To Build Four Containerships In Japan

Lykes Bros. Steamship Company of New Orleans last month signed contracts worth more than $150 million for construction of four 2,500-TEU containerships by a joint venture of two Japanese shipyards—Mitsui Engineering and Shipbuilding, and Mitsubishi Heavy Industries.

The 36,762-dwt ships will fly the American flag but will be built and operated without U.S. Government subsidy. According to Lykes president **W. James Amoss,** this was made possible by the cooperation of the four seagoing unions involved, which have agreed to lower manning requirements that compare favorably with foreign-flag containerships in the trans-Pacific trade where the new Lykes ships will operate.

Lykes is also negotiating with the Harland & Wolff yard in Belfast for construction of two similar containerships. If that deal falls through, Mr. **Amoss** has an option to build two additional ships at the Japanese yards.

Triple A Shipyard Gets $2-Million Contract For Work On Matson's Lurline

Triple A Shipyard of San Francisco has been awarded a $2-million contract by Matson Navigation Company for alterations and repairs to the 826-foot combination containership/roll-on/roll-off vessel Lurline. Built by Sun Shipbuilding in 1973 as a RO/RO ship, she returned to Sun in 1981 for conversion into a combo carrier.

The work, which is expected to take six weeks to complete, includes modifications to her 30,000-shp General Electric/Babcock & Wilcox steam propulsion plant to improve fuel efficiency, and deck alterations aft to provide room for 39 additional 40-foot containers. Matson operates the Lurline between Oakland and Honolulu.

KSM Fastening Systems Offers New Brochure On Stud Welding Technology

KSM Fastening Systems, Inc. of Moorestown, N.J., has made available an attractive and informative brochure describing its arc stud-welding technology. Arc stud welding was developed as a means of speeding up ship production. In addition to speed, KSM stud-welding systems add a new dimension of precision and strength.

KSM offers a complete fastening service—special pins and studs—plus the most advanced system of arc and CD welding equipment. With every major project, KSM engineers will assist with an advanced study to be sure their phase of the work meets the customer's highest standards, in the most cost-effective way.

For a free copy of the brochure and more detailed information on KSM Fastening Systems,

Circle 38 on Reader Service Card

Transamerica Delaval Names Sparra As General Manager

Richard A. Sparra has been named general manager of the turbine and compressor division of Transamerica Delaval, Inc. As general manager he will oversee activities of the entire division.

Mr. **Sparra** joined the turbine and compressor division in 1968 as a sales engineer. He has held a variety of sales and marketing positions within the division. He also spent a year as assistant general sales manager at Netherlands-based Delaval Stork V.O.F.

He is a graduate of the U.S. Merchant Marine Academy at Kings Point, N.Y. and spent four years in the Merchant Marines.

ASTECH Offers Literature On Lightweight Steel Honeycomb Structures

ASTECH®'s Marine Products Division of Santa Ana, Calif. is offering new literature on its lightweight structure for the marine industry: NAVSTEEL™ all-welded honeycomb, and NAVTRUSS™ all-welded steel sandwich panel.

Presented in an attractive media-folder, the publications use text, color illustrations, photos, drawings and graphs to fully describe advantages and the weight-saving potential of NAVSTEEL honeycomb panel, a sandwich that has three discrete structural elements—two thin face sheets and a flanged and corrugated honeycomb core. Ease of repairability and maintainability of NAVSTEEL are well illustrated in the literature to show the simplicity of the procedure.

NAVTRUSS, an all-welded steel sandwich panel with two face sheets and a truss-shaped core, is also thoroughly discussed, along with a description of ASTECH's facilities located on 33 acres in Santa Ana, its design and engineering capability, manufacturing capability, quality control procedure, etc.

For copies of the literature on NAVSTEEL and NAVTRUSS and further full information on ASTECH Marine Products,

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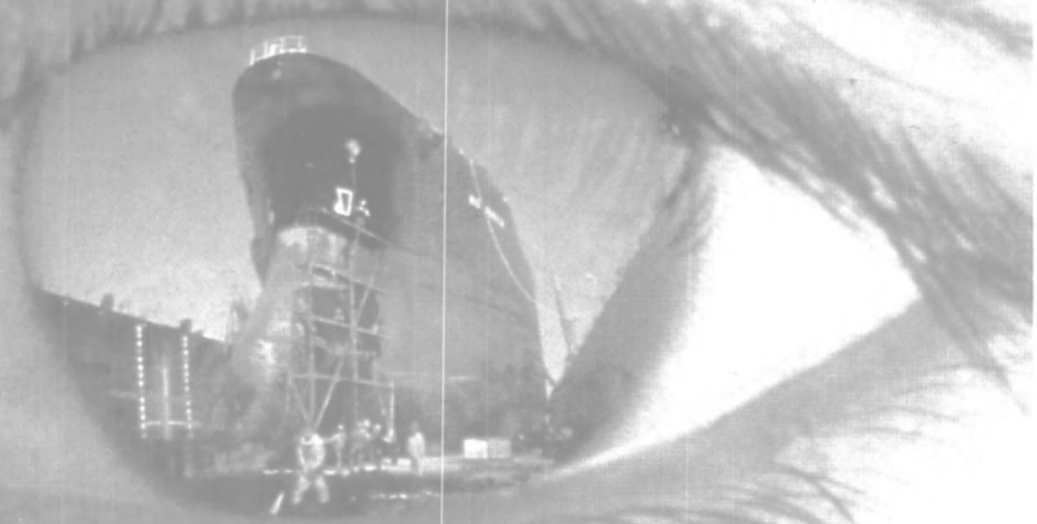

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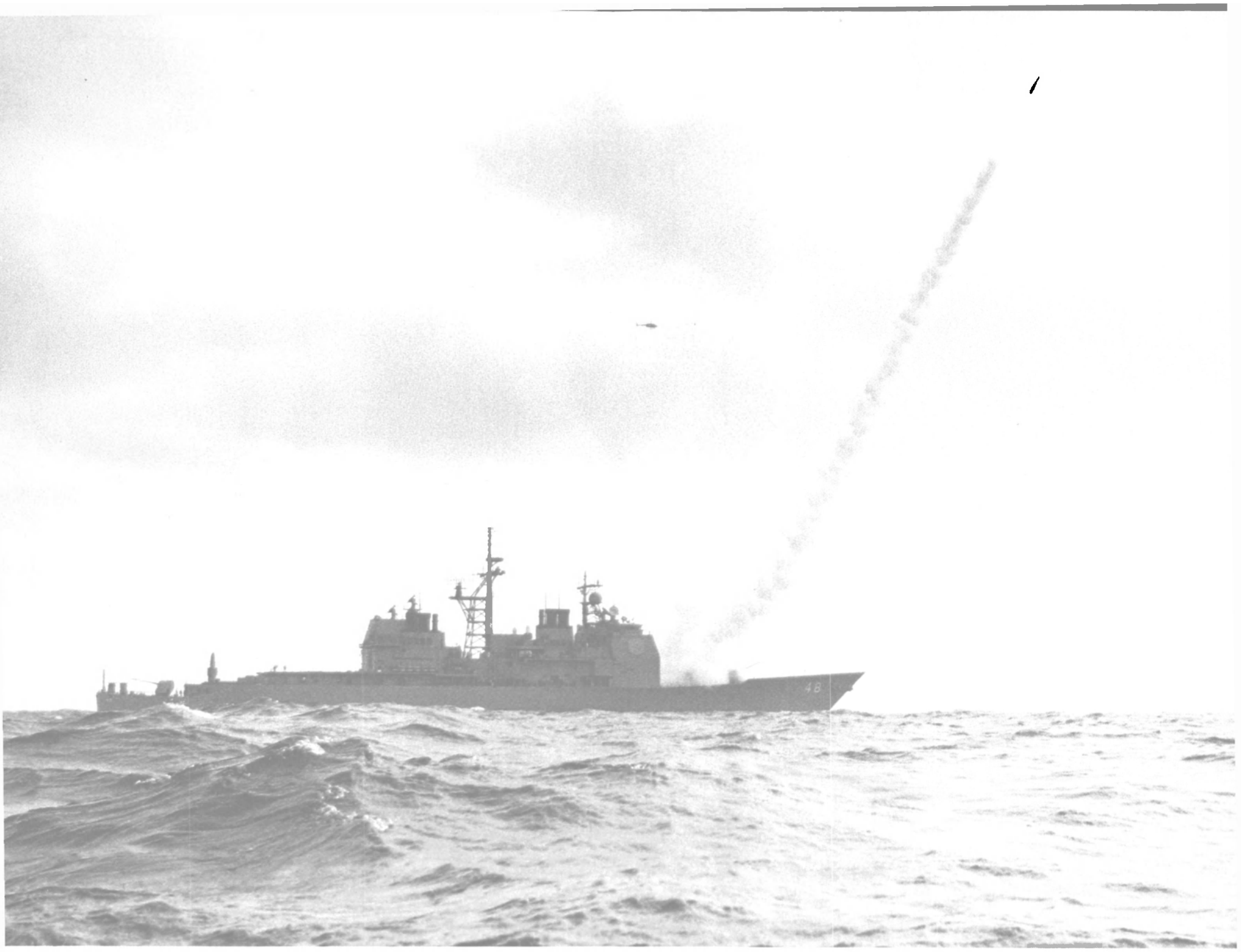

The U.S. Navy's second Aegis cruiser, USS Yorktown (CG 48) during sea trials

OUTSTANDING WARSHIP DESIGNS

With the most technologically advanced combatant ships in the world, some of the U.S. Navy's most recent ship designs are worth noting. These include the guided-missile destroyer, guided-missile cruiser, and high-speed attack submarine.

Arleigh Burke Class

For years the U.S. Navy has been looking for a successor to the versatile destroyer of World War II—a general-purpose vessel to provide anti-submarine and anti-aircraft protection, but at a price that would permit large numbers to be built.

The first attempt, the Spruance (DD-963) Class, built entirely by Ingalls, was followed by the Oliver Hazard Perry (FFG-7) Class guided-missile frigate, constructed by Bath Iron Works and Todd Shipyards. The latest design is the Arleigh Burke (DDG-51) Class of guided-missile destroyers, the lead ship of which will be funded in the Fiscal Year 85 budget, with award of a contract in the area of $1.1 billion (in 1983 dollars) expected in the fall of this year.

Three shipyards are in competition for the DDG-51 award—Bath, Ingalls, and Todd. Bath was the lead yard for the FFG-7 class frigate, with Todd's Los Angeles and Seattle Divisions the follow-on builders. In addition to the entire Spruance Class destroyer, Ingalls has delivered the USS Ticonderoga (CG-47) and USS Yorktown (CG-48), and has nine additional ships of this latest guided-missile cruiser class under construction or on order. Bath is the follow-on yard for the CG-47 class.

For the DD-51 destroyers, therefore, recent experience favors Bath and Ingalls, but political considerations and almost desperate need for work would seem to favor Todd for the lead ship.

With full-load displacement of 8,500 tons, overall length of 479 feet, and beam of 60 feet, the DD-51 will have twin-screw propulsion comprising four General Electric LM2500 gas turbines with a total output of 80,000 shp—the same power plant as the Spruance Class. Speed is expected to be 30 knots.

Although intended as a general-purpose ship, the Arleigh Burke Class will incorporate many unusual features. The most unusual is a broad-waterplane hull that gives more internal volume and greater seaworthiness. It was adopted partly to allow for a fuller section forward, as there will be a conformal sonar array in the bow and, immediately aft of the bow, a large box magazine for 32 vertically launched missiles.

The armament will be heavy, including Standard SM-2 medium-range SAM missiles; Tomahawk cruise missiles, Harpoon anti-ship missiles, light-weight 5-inch guns, 20-mm Phalanx close-in weapons systems, and 324-mm anti-submarine torpedo tubes. There will be a helicopter deck and provisions for fueling and arming these aircraft but no hangar, as the ships will normally be operating with carriers.

Ticonderoga Class

The U.S. Navy's Aegis cruiser, formally named the Ticonderoga Class, is a guided-missile design based on the hull form and propulsion plant of the Spruance (DD-963) Class destroyer. The Aegis is an air defense system designed to cope with multiple missile attacks.

Designed and built by Ingalls Shipbuilding Division of Litton Industries, the first ship of the class, the USS Ticonderoga (CG-47), was commissioned in January 1983. The second, USS Yorktown (CG-48), was commisioned on July 4 this year. USS Vincennes (CG-49) was christened at the Ingalls yard on April 14. Including the Vincennes, Ingalls has nine Aegis cruisers on order and Bath Iron Works has two. Three more will be ordered in Fiscal Year 85; the current Navy five-year shipbuilding plan calls for three each in FY 86 and 87, and two each in FY 88 and 89.

USS Ticonderoga has an overall length of 563 feet, beam of 55 feet, and displacement of 9,600 tons. She is powered by four General Electric LM2500 gas turbines, each with an output of 20,000 shp, driving twin Bird-Johnson controllable-pitch propellers. Speed is 30+ knots. Her complement includes 23 officers, 39 CPOs, and 284 enlisted men.

The Aegis combat system, developed and tested by the Navy and RCA Corporation, is a computer-controlled system capable of detecting, tracking, and engaging hundreds of air, surface, and subsurface contacts while continually searching for new targets. A multifunction array radar enables the ships to "see" in all directions simultaneously.

The visible part of the Aegis system is a quartet of planar SPY-1A radars positioned on the forward face and starboard side of the bridge, and on the aft face and port side of the after superstructure, giving 360-degree coverage. Accommodating these radars and their massive processing equipment meant enlarging the Spruance superstructure. In addition, the power output of the four gas turbine-powered generators had to be boosted to a staggering 10,000 kw.

Forward and aft there are twin FMC Mk 26 launchers for Standard SM-2 missiles, as well as single FMC Mk 45 5-inch/54-caliber guns. Other armament includes two McDonnell-Douglas canisters for launching Harpoon missiles, six 324-mm torpedo tubes, and two General Dynamics Phalanx close-in weapons systems.

Los Angeles Class

The U.S. Navy's Los Angeles (SSN-688) Class are probably the most advanced nuclear-powered, hunter-killer attack submarines in the world. With a planned total of 45 units, they will continue as the standard SSN for the remainder of this decade.

The configuration of the latest SSNs differs little from previous classes, but a considerable increase in size was necessary to insure quietness. This is achieved principally by isolating the main steam turbines, the gearings, and the reactor from the hull by mounting all machinery on a "raft."

The SSN-688 has a full-load displacement of 6,900 tons, overall length of 360 feet, beam of 33 feet, and depth of 32 feet. Her 35,000-shp geared steam turbine produces a submerged speed of 30+ knots. Range is limited only by the endurance of her complement of 12 officers and 115 men.

On paper the weaponry for such a large hull is meagre—four 21-inch torpedo tubes angled out amidships, with a mix of 24 Mk 48 guided torpedoes or sub-Harpoon SSM and Tomahawk anti-ship missiles. The later boats, from SSN-724 onward, will have an additional 12 vertical tubes installed at the forward end of the hull, allowing them to fire additional Tomahawk cruise missiles. This will give them a very powerful long-range punch.

Great care has been taken in building the hull, for the SSN-688s are designed for safe diving down to almost 1,500 feet, which implies a considerable allowance for safety beyond that depth. The

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pressure hull is made up of circular sections of HY 120 steel, which is totally X-rayed for hairline cracks. The core of the S6G nuclear reactor is expected to last 10–13 years.

The Los Angeles Class is constructed by two private U.S. shipyards—the Electric Boat Division of General Dynamics in Groton, Conn., and Newport News Shipbuilding and Dry Dock Company in Virginia. Currently, Electric Boat has nine under contract and Newport News has seven. The Navy's shipbuilding program for Fiscal Years 85 through 89 calls for four SSN-688s to be ordered in each year.

British Frigates

The Royal Navy announced in late 1982 that it would be ordering four new frigates to replace the two destroyers and two frigates sunk in the Falklands fighting.

The Coventry Class is an improved version (Batch 3) of the Boxer (Type 22) Class, completely redesigned to incorporate lessons from the Falkland experience. The most obvious change is the reintroduction of the Vickers 114-mm gun, which proved far more useful than most experts had predicted, not only for gunfire support but for firing infrared decoys and chaff against Exocet anti-ship missiles. The lead ship of the class will be built by Yarrow (Shipbuilders) Ltd. in Scotstoun, Scotland, with delivery scheduled for 1987.

The Sea Wolf point defense missile system is retained, with two six-cell launchers at either end of the superstructure, but the anti-ship missiles are moved from their previous position forward to an athwartships arrangement of two quadruple canisters, as in USN ships. Just what the new SSMs will be has not been announced, but hot contenders are the Sea Eagle, Otomat or MM-40 version of Exocet.

A direct result of Falklands experience is the provision for no fewer than three close-in weapon systems (CIWS), one on the centerline immediately abaft the SSM canisters and one on either side of the foremast. As with the SSMs, no choice has been announced, but known favorites are the Dutch Goalkeeper system, which uses the GAU-8 30 mm 'Gatling', the Swiss Sea Guard, which uses four 25mm guns, and a British equivalent to the Goalkeeper called GBG-30.

The new ships will have the Rolls-Royce Marine Spey gas turbine for main drive, with the Tyne for cruising. Although experience has shown that four identical gas turbines make a better arrangement, the original Type 22 hull was designed to take a pair of Olympus and a pair of Tynes, and finding space for the bulkier Spey module would involve too much re-design. The manufacturers and the Royal Navy have high hopes that the greater efficiency of the Spey will provide significant fuel economy, bridging the present gap between diesels and gas turbines.

The Batch 2 and Batch 3 ships are 17 metres longer than the original Batch 1 Broadsword class, and it is significant that the extra length is in the area of the forward superstructure. The entire class is fitted to operate the new Type 2031 tactical towed array sonar, and experience has shown that the new sonars gather so much data that the data-handling facilities have to be expanded in Batch 2 in order to handle the data efficiently. The antisubmarine weapons include triple 324mm homing torpedoes, launched from triple tubes abreast of the funnel or from the helicopter. The helicopter could be the current lightweight Lynx (in which case two will be embarked in a double hangar) or one of the new Anglo-Italian EH-101 Sea King Replacement types. The helicopter(s) will provide an additional strike element, with eight Sea Skua anti-ship missiles apiece, as an alternative to ASW torpedoes, depth charges or sonobuoys.

Displacement: 5000 tons (full load)
Dimensions: 148m (oa) × 14.75m × 4.3m (mean)
Machinery: 2-shaft COGOG gas turbines (2 × Spey/2 × Tyne), 56,000hp
Speed: 30 knots
Armament: 8 SSMs
2 Sea Wolf GWS.25 SAM systems
1 4.5-inch/55 cal. Mk 8
3 CIWS
6 324mm ASW torpedo tubes
Aircraft: 1 or 2 helicopters
Range: 4500nm @ 18 knots
Sensors: Type 1006, Type 967, Type 968 and Type 910 radars
Type 2016, Type 2008 and Type 2031 sonars
Complement: approx. 20 officers 270 men

Canadian Frigates

The Royal Canadian Navy's latest shipbuilding program comprises six gas-turbine-powered

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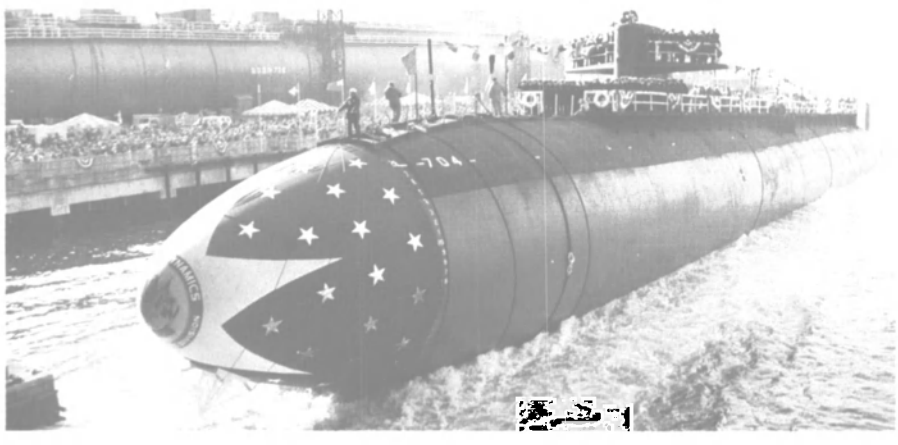
The Los Angeles class submarine USS Baltimore (SSN-704) during launching ceremonies at General Dynamics Boat yard.



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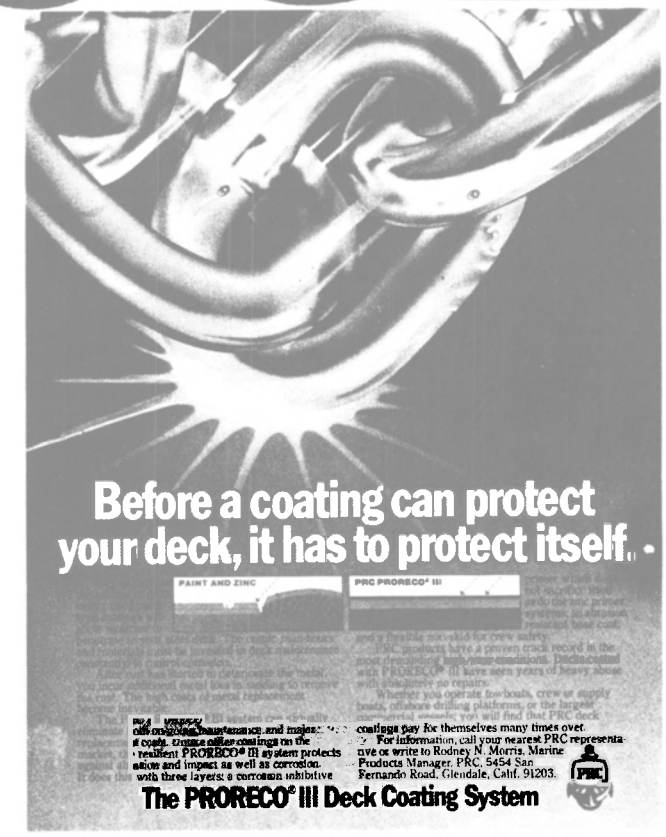

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frigates of the Halifax Class. Three will be built by St. John Shipbuilding & Dry Dock Company (prime contractor with Sperry) in St. John, New Brunswick, with three subcontracted to Marine Industree Ltd. in Sorel, Quebec. The other five ships will be named Vancouver, Ville de Quebec, Toronto, Regina, and Calgary. The lead ship Halifax is scheduled for commissioning in 1989.

The Halifax Class will have a displacement of 4,200 tons, overall length of about 440 feet, beam of 48 feet, and hull depth of 14 feet. They will be powered by two General Electric LM2500 20,000-shp gas turbines driving twin controllable-pitch propellers. Contract speed is 29.2 knots; range is 4,500 nautical miles at 20 knots. They will have a total complement of 226.

Armament will include eight Harpoon SSM missile launchers, a Sea Sparrow SAM system, a 76-mm OTO Melera gun, four 324-mm MK 32 torpedo tubes, and two Sea King helicopters.

French Corvettes

The French Navy, like the other two armed services, has pursued a policy of using indigenous equipment wherever possible, and this shows to good effect in the latest air defense ships. The hull of the successful anti-submarine destroyers of the Georges Leygues class, or C70 type corvette, has been adapted into the C70AA design, but with several major changes.

The ships are unusual among large warships in having an all-diesel propulsion system. Instead of the CODOG system in the C70 design, the C70AA has four SEMT-Pieltick 18PA6 diesels, in which double-supercharging has been introduced to give an unusually high power:weight ratio. This also dispenses with the massive air intakes and exhaust trunking needed for gas turbines, and permits an economical use of deck space.

Although an American missile has been bought, the medium-range Standard SM-1, with US Navy SPG-51C tracker radars, the ship will use the French SENIT 6 data-processing system and a new French DRBJ-11 phased-array surveillance radar. This radar is mounted in a spherical weather-proof dome on a short lattice tower positioned over the diesel exhausts, another unusual feature.

Four ships are planned, two to escort each of the two new nuclear-powered carriers building, and the first destroyer is planned to come into service by late 1987. The first two are building at the Lorient navy yard in Brittany, and two more have been authorized.

Displacement: 4340 tons (full load)
Dimensions: 139.0m (oa) × 14.0m × 5.5m
Machinery: 2-shaft diesel (4 18PA6 BTC), 42,300hp
Speed: 30 knots
Armament: 1 Standard SM-1 SAM (40 missiles carried)
8 MM-40 Exocet SSMs
2 100mm Model '68 guns
2 20mm guns
2 torpedo-launchers for L5 ASW torpedoes
Aircraft: refuelling facilities for Lynx helicopter
Range: 8200nm @ 17 knots
Sensors: DRBJ-11, DRBV-26, SPG51C, DRBC-32D and Type 1226 radars
DUBA-25 sonar
Complement: 12 officers, 229 men

German Frigates

The Federal Republic of Germany's Bremen (F-207) Class (Type 122) frigate is an outstanding example of the pitfalls of international collaboration. Conceived originally as a NATO cooperative project for a joint European escort vessel, it ended up as a German adaptation of the Dutch Kortenaer Class frigate.

Unfortunately, the Federal German Navy's role in protecting the Baltic Approaches differs considerably from the Royal Netherlands Navy's task of providing ocean escort in the Eastern Atlantic, and reconciling the 'Brown Water' requirements of one with the 'Blue Water' role of the other proved very difficult. A great deal of time and money has been spent on redesigning the Dutch ship's CO-

The French C70 type corvette Georges Leygues.

GOG propulsion as CODOG, as a result of a German decision to buy the General Electric LM-2500 gas turbine and the MTU diesel, in place of the Olympus and Tyne gas turbines. Then the command and control system had to be changed from the Dutch DAISY to the German SATIR system to enable the ships to work with FGN destroyers, and the LW-08 surveillance radar was changed to a DA-08 set to provide better low-level cover.

The changes to the propulsion system involved considerable internal rearrangement as the sizes of the different units did not correspond. There was even talk of redesigning the hangar and flight deck to accommodate the LAMPS III SeaHawk helicopter, but this was vetoed as the entire after part of the hull would have to be redesigned, and cost was already excessively high. In fact the cost was so high that plans to build twelve were cut to six. The leadship Bremen was built by Bremer Vulkan, Niedersachsen by AG Weser of Bremen, Rheinland-Pfalz and Koln by Blohm & Voss of Hamburg, Emden by Nordseewerke of Emden, and Karlsruhe by Howaldtswerke of Kiel.

Apart from electronics and propulsion the Bremen class have considerable commonality with weapons of the Dutch Kortenaer class: Harpoon anti-ship missiles, NATO Sea Sparrow SAMs, an OTO-Melara 76mm gun and Lynx helicopters, but the German ships will have Ram short-range missiles in place of the Goalkeeper gun system
Displacement: 3750 tons (full load)
Dimensions: 130.0m (oa) × 14.4m × 4.26m (mean)
Machinery: 2-shaft CODOG (2 × LM-2500, 2 MTU 20V956 diesels) 51,600hp + 10,400hp
Speed: 30 knots
Armament: 8 Harpoon SSMs
1 NATO Sea Sparrow SAM (24 missiles)
1 76mm OTO-Melara 76mm/62 cal. gun
4 324mm ASW torpedo-tubes
2 quadruple RAM missile launchers to be added
Aircraft: 2 WG13 Lynx helicopters
Range: 4000nm @ 18 knots
Complement: 27 officers, 176 men

Italian Carrier

The new helicopter carrier Garibaldi, under construction at the Monfalcone shipyard of Italcantieri, demonstrates the Italian Navy's intention of adopting the U.S. Navy concept of Sea Control Ship—a formula similar to that of the British Royal Navy's successful Invincible Class and the Spanish Navy's carrier Principe de Asturias.

The Garibaldi is essentially an anti-submarine (ASW) ship for helicopters although the design will permit handling vertical or short take-off (V/STOL) as well particularly with the addition of an inclined ramp. The flight deck is 173m long, covering over 4,000 sq m, with six take-off and landing points for helicopters and a 165m strip for STOL aircraft. The hangar (110 × 15 × 6m) can accommodate 12 Agusta SH-3D helicopters (or 10 Sea Harriers and one Sea King helicopter).

There are 14 watertight compartments within the hull, with a 3-compartment flooding standard. There are also five decks up to the superstructure including flight deck and main (hangar) deck, with elevators forward and abaft the island. Much attention has been given to stability for operating helicopters in heavy weather and there are two pairs of fin stabilizers provided.

The propulsion system comprises four Fiat/GE LM 2500 gas turbines (similar to those of the 'Spruance' class destroyers and the Italian 'Lupo' class frigates) with a maximum output of 20,000hp each. They are coupled in pairs to two shafts driving fixed pitch propellers. With this Tosi coupling and reduction gearing it is claimed that the Garibaldi can stop from 'full ahead' in 750 meters.

The weapons system comprises the anti-submarine torpedoes and air-to-surface missiles of the helicopters, also Oto-Melara surface-to-air missiles, Otomat surface-to-surface missiles and three Breda 4 Omm twin guns in a Dardo point-defense system. Thus despite the lack, at present, of a fixed wing element, the Garibaldi still provides a formidable combat system.
Displacement: 13,370t (full load)
Dimensions: 180.2m (oa) × 30.04m × 6.7m
Machinery: 4 × GE/Fiat LM 2500 gas turbines, 80,000hp
Crew: 825
Speed: 29 knots
Range: 7,000 miles @ 18 knots.
Armament: 4 Otomat SSMs
2 8-cell AA Albatross missiles
3 Breda twin 40mm guns
2 Triple ILAS-3 torpedo launchers
Aircraft: 12 Agusta SH-3D helicopters fitted with AS torpedoes and air-to-surface missiles

Spanish Carrier

An interesting comparison with the Garibaldi is provided by the Spanish Navy's Principe de Asturias launched at the El Ferrol yard of Empresa Nacional Bazan, The Spanish national shipyard group, in mid-1982.

This 14,500 ton carrier has been developed from the U.S. Navy's Sea Control ship concept with assistance from the naval design consultants Gibbs & Cox.

With superstructure well aft, the flight deck, measuring 175m × 30m, and served by two elevators, is unusually angled for take-off to starboard and a 12° ski-jump is incorporated forward for the Matador fixed wing aircraft. This ramp is moulded into a bow form which should reduce turbulence over the deck and improve seaworthiness.

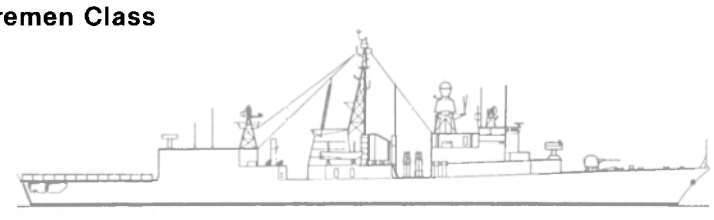
The Principe de Asturias will carry six to eight Matador V/STOL aircraft (eventually AV-8B) and six to eight anti-submarine helicopters of the Sikorsky Sea Hawk type.

Surprisingly the propulsion system comprises only two LM 2500 gas turbines driving a single shaft with a Lips c.p. propeller, which appears to be a somewhat vulnerable arrangement, although there is a low-powered emergency electrical propulsion system.

A close-in weapon system is provided by four sets of Bazan-Meroka 20mm guns.

The Principe de Asturias should provide the Spanish Navy with a powerful unit around which to base its Task Force.
Displacement: 14,500/ 15,000 ton
Dimensions: 196m × 24.4m × 6.6m
Machinery: 2 × LM 2500 gas turbines, 46,000hp
Crew: 780
Speed: 24–26 knots
Range 7,500 nm @ 20 knots
Armament: Missiles optional
4 Meroka 20mm guns
Aircraft: 6–8 Matador fixed wing
6–8 Sea Hawk or Sea King helicopters (or other combinations).

Bremen Class



From 'Combat Fleets of the World 1982-83' by J.L. Couhat Copyright 1982, U.S. Naval Institute, Annapolis, Md

The battleship, USS Iowa (BB 61) on sea trials. Ingalls Shipbuilding photo

U.S. NAVY SHIPBUILDING PROGRAM

Fourth Update — Changes As Of July 1984

Excerpted from a report published by International Maritime Associates, Inc.

This is the fourth in a series of reports detailing the latest changes in the United States Navy shipbuilding program. The first report appeared in the November 15, 1983 issue of MARITIME REPORTER, the second in the February 1, 1984 issue, and the third in the June 1, 1984 issue. The following reflects changes which have occurred since the publication of the third article.

International Maritime Associates, Inc. (IMA) is a management consulting firm. IMA provides market and financial analyses, assists in developing marketing strategy, and works with firms to implement specific programs in the maritime and naval markets. Assignments have been performed for shipbuilding and ship repair firms, equipment manufacturers and shipowners in the United States and fifteen foreign countries. Clients include M.A.N.-B&W Diesel, Grumman Aerospace, Todd Shipyards, National Intergroup, Allis-Chalmers, Lips Propellers, and several Scandinavian shipowners. For additional information contact ***James R. McCaul,*** *International Maritime Associates, Inc., 1800 K Street, N.W., Washington, D.C. 20006. Telephone (202) 296-4615 or telex 64325.*

This final update to our report on the Navy shipbuilding program is divided into four sections: legislative action, developments in the shipbuilding program, changes in procurement rules, and Navy contracts awarded since January. It includes information available as of 27 June 1984.

I. LEGISLATIVE ACTION

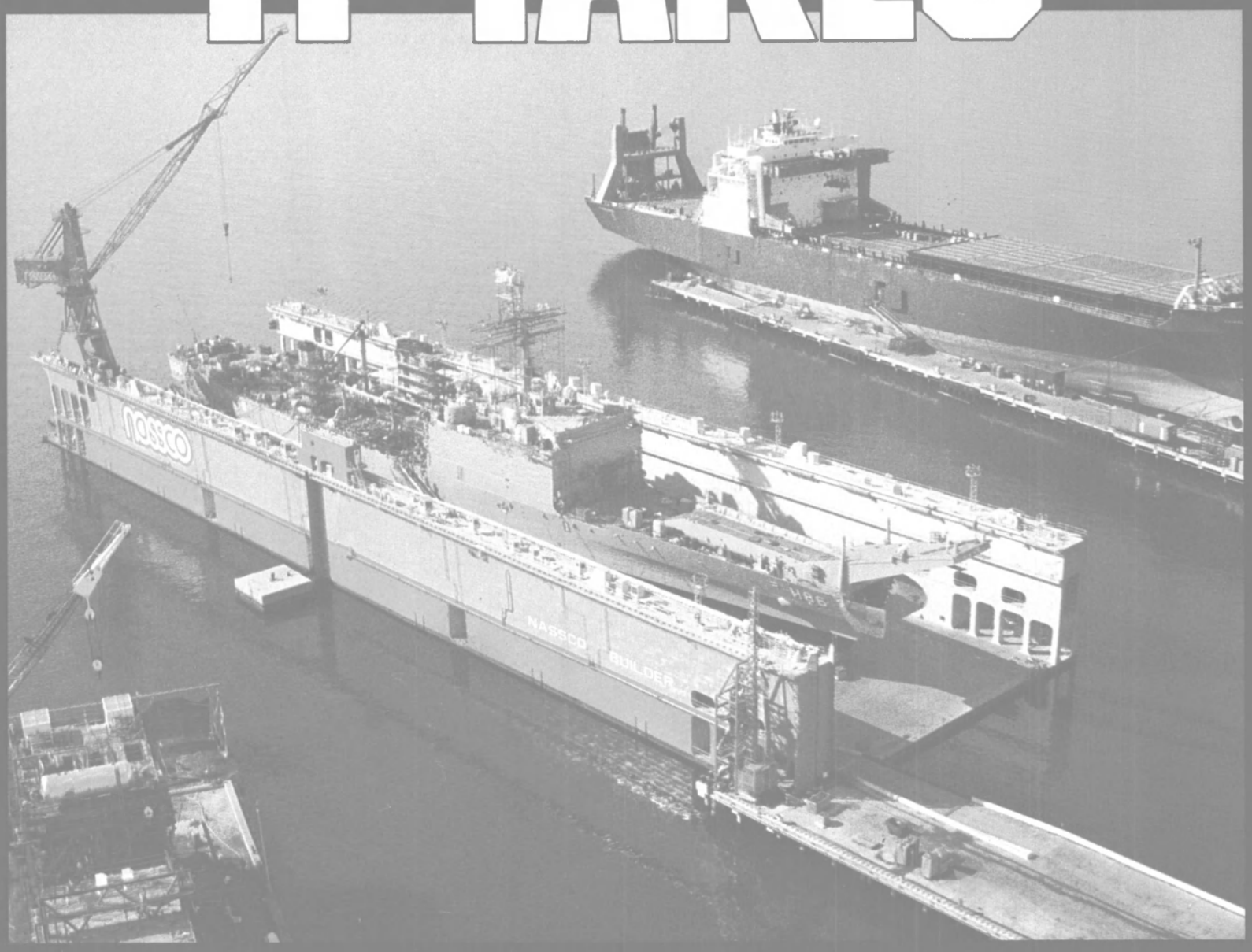
Congress has been reviewing the FY 1985 defense budget request over the past three months. Most attention has focused on the MX missile, troop positioning in Europe, testing of antisatellite weapons and deployment of nuclear armed cruise missiles at sea. The ship procurement budget has passed through Congress with relatively little debate.

FY 1985 Budget To Provide For Procurement Of 27 New Ships Or Conversions

On 19 April the House Armed Services Committee submitted its report (H.R. 98-691) on FY 1985 defense authorizations. It recom-

(continued on page 46)

WHATEVER IT TAKES



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Navy Shipbuilding—Update

(continued from page 44)

mended authorization for defense programs totalling $294.8 billion—$18.6 billion below the $313.4 requested by the Administration. The Committee cut $10 billion from the proposed defense procurement budget. Program authorization was passed by the House on 31 May (298 to 98).

In response to the budget deficit, the Administration sent a revised defense budget request to Congress at the beginning of May. It contained $14.4 billion in reductions—lowering the defense budget request to $299.0 billion. The revised budget request cut $811 million from Navy ship procurement. This reduction was achieved by eliminating an attack submarine and the T-AK resupply ship from the FY 1985 budget.

The Senate Armed Services Committee on 31 May submitted its defense authorization report (S.98-500). It recommended authorizing programs totalling $299.0 billion—$14.4 billion below the original budget request. While the same total as the Administration's amended budget request, the composition is different. The Senate Committee recommended authorization for four attack submarines (as originally requested) but removed the T-AK and one T-AGOS from the program. Program authorization was passed by the Senate on 20 June (82 to 6).

Exhibit I summarizes the Navy ship procurement program as requested by the Administration and passed by House and Senate.

Senate Armed Services Committee Recommended That Army Restrict Procurement Of Four Logistics Support Vessels (LSV) To Domestic Sources

The LSV is to be a 12 knot, 2,000 ton capacity vessel used by the Army to haul cargo to remote locations and be used in the over-the-shore operations. Army had received $28.5 billion appropriation in FY 1984 to initiate this program. As there is no domestic source restriction imposed on Army procurement, the program was to be open to worldwide competition. The standard buy American test (see IMA's June 83 report, pp. 92–94) would apply, except to sources in countries having memoranda of understanding with the U.S.

On 6 March the LSV solicitation was made available to interested firms. Various foreign yards were interested in bidding. Under pressure from U.S. shipyards, Army decided to withdraw the solicitation until the procurement sourcing regulation is clarified.

In recommending the $18.8 million authorization for FY 1985 the committee stated:

> "The committee does not believe that procurement of LSV's from foreign sources is consistent with the intent of Section 7309 of Title 10, United States Code, enacted by the Congress during consideration of the Department of Defense Authorization Act, 1983. In an effort to preserve adequate U.S. shipbuilding capacity, this section bars the Navy from buying ships from foreign shipyards unless the President determines that it is in the interest of the national security to do so. The committee believes that the Congress intended that all military vessels, not just "naval vessels," be covered by the restriction. To clarify this issue, the committee recommends bill language that expands the scope of Section 7309 of Title 10 to cover all military vessels."

(continued on page 48)

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Navy Update

Exhibit 1
Navy Shipbuilding And Conversion Budget FY 1985
(in millions of dollars)

	Original Budget Request		Amended Budget Request		House Authorization		Senate Authorization	
	Qty	Amt	Qty	Amt	Qty	Amt	Qty	Amt
Trident[2]	1	1755.0	1	1775.0	1	1755.0[1]	1	1755.0
TAK	1	91.1						
SSN-688[2]	4	2880.0	3	2160.0	4	2880.0	4	2880.0
BB	1	422.6	1	422.6[1]	1	336.2[1]	1	422.6[1]
CV SLEP[2]	1	764.5	1	764.5	1	764.5	1	764.5
CG-47[2]	3	3150.0	3	3150.0	3	3150.0	3	3150.0
DDG-51	1	1173.4	1	1173.4	1	1173.9	1	1173.4
LSD-41[2]	2	489.5	2	489.5	2	489.5	2	489.5
LHD-1[2]		39.2		39.2		39.2		39.2
LPD-4[2]		15.0		15.0		15.0		15.0
MCM	4	349.5	4	349.5	4	349.5	4	349.5
TAO	3	562.6	3	562.6	3	562.6	3	562.6
TAGOS	3	192.9	3	192.9	2	129.9	2	128.4
TAGS	2	245.0	2	245.0	2	245.0	2	245.0
TAVB[2]	1	42.8	1	42.8	1	42.8	1	42.8
TACS	2	44.0	2	44.0	2	44.0	2	44.0
LCAC[2]	9	230.1	9	230.1	9	230.1	9	230.1
Landing Craft[3]		11.9		11.9		11.9		11.9
Service Craft[4]		81.2		81.2		81.2		81.2
Strategic Craft[5]		31.0		31.0		31.0		31.0
Outfitting		204.4		204.4		204.4		204.4
Post Delivery		179.2		179.2		179.2		179.2
Potential Cost Growth		187.0						
Repricing[6]				(150.0)		(150.0)		(175.0)
Contract Supp.				(3.5)				(3.5)
Total		13,141.9		12,010.3		12,564.9		12,620.8
Number of Ships[7]		29		27		27		27

1. Includes transfer of funds from prior year programs
2. Includes advanced procurement
3. Includes 3 LCM-8's, 2 LCM-6's and 2 LCU's
4. Includes 10 open lighters (YC), 3 floating cranes (YD), 6 covered lighters (YFN), 7 patrol craft (YP) and 6 harbor tugs (YTB)
5. Provides for purchase of commercial ships to be placed in reserve fleet
6. Reductions based on favorable contract awards, particularly GFE for the CG-47 class cruiser
7. LCAC's not included in quantity total

Source: House and Senate Defense Authorization Reports (H.R. 98-691 and S. 98-500)

Exhibit 2
Navy Ships on Order or Authorized
(as of 15 June 1984)

		Dates				Dates	
Ship	Yard	Construction Start	Delivery	Ship	Yard	Construction Start	Delivery
TAGOS 2	Tacoma	8 82	7 84	FFG 61	*		9 88
TAGOS 3	Tacoma	11 82	11 84	LHD 1	Ingalls	8 84	3 89
TAGOS 4	Tacoma	2 83	3 85	LSD 41	Lockheed	4 81	11 84
TAGOS 5	Tacoma	5/83	6/85	LSD 42	Lockheed	4 82	10/85
TAGOS 6	Tacoma	5/84	10 85	LSD 43	Lockheed	2 83	6 87
TAGOS 7	Tacoma	7 84	11 85	LSD 44	Avondale	7 85	2 88
TAGOS 8	Tacoma	9 84	1 86	MCM 1	Peterson	1 83	9 85
TAGOS 9	Tacoma	11 84	4 86	MCM 2	Marinette	10 83	8 86
TAGOS 10	Tacoma	2 85	6 86	MCM 3	Peterson	4 84	6 86
TAGOS 11	Tacoma	4 85	8 86	MCM 4	Marinette	4 84	7 86
TAGOS 12	Tacoma	7 85	11 86	MCM 5	Peterson	9 84	10 86
TAO 187	Avondale	4 84	9 86	MSH 1	*		8 87
TAO 188	Avondale	8 84	1 87	SSBN 730	GD-Elec. Boat	2 78	9 84
TAO 189	Avondale	2 85	5 87	SSBN 731	GD-Elec. Boat	4 79	6 85
TAO 190	Avondale	7 85	9 87	SSBN 732	GD-Elec. Boat	10 79	2 86
ARS 50	Peterson	5/82	2 85	SSBN 733	GD-Elec. Boat	2 81	10 86
ARS 51	Peterson	11 82	6 85	SSBN 734	GD-Elec. Boat	1 82	12 88
ARS 52	Peterson	1 83	8 85	SSBN 735	GD-Elec. Boat	12 82	8/89
ARS 53	Peterson	10 83	11 85	SSBN 736	GD-Elec. Boat	11 83	4/90
CG 48	Ingalls	7 81	7 84	SSN 709	GD-Elec. Boat	5 78	6 84
CG 49	Ingalls	4 82	7 85	SSN 710	GD-Elec. Boat	3 79	2 85
CG 50	Ingalls	9 82	1 86	SSN 717	Newport News	4 79	8 84
CG 51	Bath	11 83	1 87	SSN 718	Newport News	2 80	12 84
CG 52	Ingalls	7 83	7 86	SSN 719	GD-Elec. Boat	1 80	6 85
CG 53	Ingalls	2 84	2 87	SSN 720	GD-Elec. Boat	7 80	11 85
CG 54	Ingalls	7 84	6 87	SSN 721	Newport News	9 81	3 86
CG 55	Ingalls	11 84	10 87	SSN 722	Newport News	11 81	9 86
CG 56	Ingalls	3 85	2 88	SSN 723	Newport News	11 81	3 87
CG 57	Ingalls	7 85	5 88	SSN 724	GD-Elec. Boat	3 82	5 87
CG 58	Bath	9 85	9 89	SSN 725	GD-Elec. Boat	12 82	10 87
CG 59	Ingalls	12 85	11 88	SSN 750	Newport News	8 82	5 87
CVN 71	Newport News	10/80	12 86	SSN 751	GD-Elec. Boat	6 83	11 87
CVN 72	Newport News	2/83	12 89	SSN 752	GD-Elec. Boat	9 83	3 88
CVN 73	Newport News	2 83	12 91	SSN 753	Newport News	9 83	5 88
FFG 46	Todd	10 81	6 84	SSN 754	GD-Elec. Boat		7 88
FFG 48	Todd	3 81	11 84	SSN 755	GD-Elec. Boat		12 88
FFG 49	Bath	5 82	6 84	TAH 19	NASSCO	10 84	10 86
FFG 50	Bath	10/82	10 84	TAH 20	NASSCO	7 85	7 87
FFG 51	Todd	5/82	10 84	TAKR 287	NASSCO	1 83	6 84
FFG 52	Todd	12/81	7 85	TAKR 288	NASSCO	5 83	10 84
FFG 53	Bath	2/83	1 85	TAKR 289	PennShip	5/83	10 85
FFG 54	Todd	9/82	4 85	TAKR 290	Avondale	10/84	3 86
FFG 55	Bath	4/83	4 85	TAKR 291	Avondale	7/84	11 85
FFG 56	Bath	8/83	8 85	TAKR 292	NASSCO	6 84	10 85
FFG 57	Todd	1 83	12 85	TAKR 293	PennShip	10 82	6 84
FFG 58	Bath	11 83	11 85	TAKR 294	Avondale	10 82	7 84
FFG 59	Bath	3 84	12 86	CV 59	Phila. N S.	1 83	5 85
FFG 60	Todd	3 84	10 86				

*Authorized but not on contract
Source: Navy

(continued from page 46)

Senate Recommended T-AO 187 Program Be Opened To Second Source Competition

Senate Armed Services Committee recommended that the Navy seriously consider establishing a second source for the TAO fleet oiler program. Avondale has received contracts for four of these ships. Three are authorized for FY 1985. According to NAVSEA, Navy's plan is to open the next flight of T-AO's to industrywide competition.

Senate Recommended Engines Be Competed In Future T-AO's

Colt-Pielstick was chosen to supply diesel prime movers for the first four T-AO fleet oilers. The Senate Armed Services Committee has recommended that Navy seek to compete the engine contract for follow-on requirements. This competition is to be held within "the funding constraints that exist within current Navy planning for follow-on engines." Allis-Chalmers—M.A.N./B&W diesel and DeLaval-Stork Werkspoor were the two competitors to Colt-Pielstick in the original T-AO engine competition.

According to NAVSEA, Navy will require that competing engines be manufactured in this country. This will present difficulty to diesel manufacturers wishing to compete—as Colt has already received a sizable technology transfer grant to tool up for domestic manufacture. Other companies will need to make an investment in facilities. Seems unfair!

House Cancelled FFG Funded Last Year And Reprogrammed Funds For FY 1985 Trident Procurement

The House Committee recommended cancellation of the FFG frigate placed in the SCN procurement program by Congress last year (see IMA's first update—excerpted November 15, 1983 MR/EN). Funds previously appropriated ($300 million) would be transferred to the FY 1985 Trident program. Navy had advised the Committee that the FFG with improvements specified for the FY 1984 ship would cost $473 million—$173 million over the original estimate.

This action was not taken by Senate and the subject will be taken up by conferees.

Todd in its 1 April 1984 Annual Report states "the Los Angeles Division expects to receive a contract shortly for an additional FFG . . ." This contract is projected to add $100 million to Todd's backlog. Cancellation of the ship will hurt!

Provision For Cost Growth In FY 1985 Procurement Has Been Eliminated

The original Administration budget request provided $187 for potential cost growth to offset program cost increases beyond Navy control. Both House and Senate eliminated this budget item. The Administration also eliminated it from the amended request in May. Reason given for this action is the continuing success in staying within budget.

House And Senate Conferees Have Been Meeting To Work Out Differences Between The Two Bills

For ship procurement the difference between the House and Senate authorization bills are relatively minor:

- Senate has authorized more funds than House for BB 63 **Missouri** reactivation
- There is a small difference in funding level for the 2 T-AGOS's
- Senate added $25 million to repricing and deleted $3.5 million in contractor support
- House has cancelled FFG authorized in FY 1984 and transferred funds to Trident program; Senate has not taken this action

The conference report will be sent to both House and Senate for vote, presumably before Congress adjourns for July recess.

2. DEVELOPMENTS IN SHIPBUILDING PROGRAM

As of June 1984 only two FY

Exhibit 3
Contractors For FY 1985 Ships

Program	Contractor
Trident	GD-Electric Boat
SSN-688	GD-Electric Boat, Newport News will share awards
BB	Long Beach Naval Yard
CV SLEP	Philadelphia Naval Yard
CG-47	Ingalls, Bath will share awards
DDG-51	Ingalls, Bath, Todd-L.A. are competing for lead ship
LSD-41	Avondale
LHD-1	Ingalls
LPD-4	Will be competed
MCM	Peterson, Marinette will share awards
T-AO	Avondale current builder, but next flight will be competed
T-AGOS	Tacoma current builder, but next flight will be competed
T-AGS	Will be competed
T-AVB	Todd-Galveston
T-ACS	Bay Shipbuilding did first conversion, but next contract will be competed
LCAC	Bell Halter lead yard, but one boat in FY 1985 program will probably be second sourced

1984 shipbuilding contracts are still to be awarded: the lead MSH and one FFG. The former is scheduled to be awarded to either Bell-Halter or Marinette Marine around mid-August. The latter will be awarded to either Todd-Los Angeles or Bath, provided it is not cancelled.

95 SCN-Funded Navy Ships Are On Order As Of Mid-June

Exhibit 2 lists current Navy new construction or conversions, by shipyard. The dates for starting construction and scheduled delivery are shown. Ships being procured via long term charter (5 T-5 tankers and 13 T-AKX RO-RO ships) are not included in this list.

About One Third Of The FY 1985 Programs Will Be Open To Industrywide Competition

Five of the 16 programs (LPD-4, T-AGOS, T-AO T-AGS, T-ACS) will be open to industrywide competition. One program (LCAC) will probably be opened to second source competition. Competition in these programs (SSN, CG-47, MCM) will be limited to current players. Contractors for four programs (TRIDENT, LSD-41, LHD-1, T-AVB) are already known. Two programs (BB, CV-SLEP) are to be accomplished in naval shipyards.

Exhibit 3 summarizes the procurement picture for next year.

Greatest uncertainty surrounds the DDG-51 award. Three yards are competing for the lead ship contract. Ingalls has probably the greatest recent experience building surface combatants, being lead yard for the DD-963 class destroyer and the CG-47 class cruiser. Bath has been lead yard for the FFG-7 class frigate and follow yard for the CG-47 class cruiser. Todd-L.A. has been follow yard for the FFG-7 frigate. Recent experience favors Ingalls and Bath. Political considerations and need for work favor Todd-L.A.

Schedule for award of DDG-51 follows:

- issue formal solicitation
  July 1984
- proposals due
  September 1984
- award
  December 1984
- ship commissioning
  July 1989

A draft solicitation was sent to the shipyards on 30 March.

Design Proposals For New Attack Submarine Due By Year End

Navy plans to receive proposals from Newport News and GD-Electric Boat for the new attack submarine intended to replace the Los Angeles-class submarine. Proposals are scheduled around the end of the year. Award is planned about mid-1985 and production is to start in 1989. The lead submarine is projected to cost $1.6 billion, with follow submarines costing about $1 billion each.

3. CHANGES IN PROCUREMENT RULES

Several significant developments have occurred over the past several months.

FAR and DOD FAR Supplement Has Been Published

The Defense Acquisition Regulation (DAR) has been superseded by the Federal Acquisition Regulation (FAR) in an effort to coordinate and simplify federal procurement rules. A special DOD supplement to the FAR contains regulations which apply only to defense procurement.

Many forms used in DOD contracting have been changed or eliminated. A cross reference guide for old vs. new forms is contained in Part 53 of the DOD FAR supplement.

A Federal Acquisition Circular will be periodically issued to publicize revisions to the FAR.

Each Of The Services Has Been Ordered To Coordinate Purchasing Of Parts

As a result of the continuing issue of spare parts overcharges, Secretary **Weinberger** has ordered Navy, Army and Air Force to work together to buy parts

(continued on page 50)

Exhibit 4
Major Navy Contract Awards
April 1–June 26, 1984

Award Date	Awarded To	Contract Value (million $)	Description
Ship and Craft Construction			
None in this category.			
Ship Spares and Equipment			
6/18/84	Solar Turbines Inc.	14.6	gas turbine compressor equipment
5/3/84	Onan Corp.	13.6	diesel generator sets
Ship Overhauls and Repair			
6/22/84	Bath Iron Works Corp.	11.2	overhaul a frigate
5/22/84	Control Data Corp.	10.7	overhaul supply ship
5/21/84	Todd Shipyards Corp.	55.0	conversion of two container ships to aviation logistic support vessels
4/30/84	Newport News Shipbuilding	104.2	overhaul, repair & refuel nuclear powered submarine Tecumseh
Ship Navigation			
5/11/84	Westinghouse Electric Corp.	26.5	channel finder systems
Radar			
6/8/84	Ford Motor Co.	12.1	spare parts for radar systems (price includes Army contract)
6/7/84	IBM Corp.	18.2	signal processing equipment
5/31/84	Ford Motor Co.	40.0	optics equipment for forward looking infrared radar
5/3/84	General Electric Co.	11.5	electronic spare parts for aircraft radar
4/23/84	Raytheon Co.	18.5	prototype of mobile over-the-horizon radar system
4/5/84	Vitro Corp.	20.1	engineering & technical work on radar related to Aegis cruiser project
Sonar			
6/25/84	General Electric Co.	10.9	automatic anticraft guns & sonar equipment (price includes Army contract)
5/11/84	Hughes Aircraft Co.	77.1	sonar display equipment
5/7/84	General Electric Co.	139.1	sonar detecting equipment
5/3/84	AT&T Technologies Inc.	28.1	sonar equipment
4/9/84	Edo Corp.	11.4	sonar related equipment and services
Electronic Countermeasures			
5/11/84	Aerojet Electro Systems	13.5	torpedo countermeasure sets
Communications Equipment			
6/26/84	RCA Corp.	23.5	communications equipment
6/26/84	Hughes Aircraft Co.	18.8	ship radio system spare parts
6/19/84	Science Applications Inc.	22.8	command control & communications support
6/4/84	Rockwell Int'l. Corp.	11.8	radio components
6/1/84	GTE Corp.	15.0	development work on system for communicating with submarines
Computers			
6/8/84	IBM Corp.	19.4	automatic data processing equipment and services
5/29/84	Systems Mgmt. American Corp.	12.0	automatic data processing systems
5/21/84	Harris Corp.	10.6	design and development work on data management system
Anti Aircraft Warfare (AAW) Systems			
4/11/84	Hercules Inc.	16.4	Sparrow rocket motors
Long Range Missiles			
6/6/84	General Dynamics Corp.	10.9	materials for use in Trident missile firing submarine
5/25/84	General Dynamics Corp.	107.9	Standard Missile II sections
5/24/84	Texas Instruments Inc.	301.6	Harm anti-radar guided missiles
5/22/84	Hughes Aircraft Co.	30.8	spare parts for naval data systems equipment and bombing sets (includes Army contracts)
4/12/84	Lockheed Corp.	141.6	British naval ballistic missile program & repair of materials
4/12/84	Boeing Co.	95.9	antisubmarine missile development
4/6/84	RCA Corp.	129.6	work on Aegis fleet air-defense cruisers
4/6/84	Lockheed Corp.	35.0	engineering services for British naval ballistic missile system
Gun Fire and Control Systems			
5/3/84	Hughes Aircraft Co.	10.0	five fire control system traveling wave tubes
Submarine Warfare Systems			
4/27/84	EG&G Inc.	10.0	systems engineering & other work on advanced combat systems for submarines
Other Weapons Systems and Equipment			
4/5/84	Hughes Aircraft Co.	20.0	Phoenix missile control systems & changes in test equipment
4/4/84	Sperry Corp.	39.1	material and services for development of a combat system for the Spanish Navy
4/2/84	General Dynamics Corp.	4.0	strategic systems support equipment and parts
Other			
6/14/84	Westinghouse Electric Corp.	15.8	machinery studies
6/1/84	SeaLand Service Inc.	19.7	staff, operate & maintain four cargo ships
5/31/84	General Electric Co.	90.4	armored vehicle trainers
5/29/84	General Dynamics Corp.	25.5	technical publications and parts for the Standard missile
5/29/84	American President Lines	11.3	operate two tankers
5/21/84	Hannah Marine Corp.	14.1	charter a tug and barge
5/14/84	J.J. McMullen Assoc. Inc.	12.8	ship design
4/25/84	Martin Marietta Corp.	225.0	automated personnel & payroll data system
4/12/84	Lykes Bros. Steamship Co.	68.9	charter of two cargo ships
4/12/84	Central Gulf Lines, Inc.	31.8	charter of one cargo ship
4/6/84	Litton Industries Inc.	23.0	liquid gas mobile generation systems
4/4/84	Boeing Co.	8.8	tactical information and distribution system

(continued from page 49)

jointly in large lots. The order also requires that companies sell parts to DOD at prices equal to or below prices charged their best customers.

The General Accounting Office (GAO) Has Issued Policy Review Of Military Sales Offsets

DOD has estimated that about $30 billion in potential arms sales over the next five years will involve offset arrangements. (See IMA June 83 report, pp. 103–108 for description of offsets). At request of House Committee on Banking, Finance and Urban Affairs, GAO has reviewed current policy on offset arrangements. It concluded no overall policy exists, there is little coordination among federal agencies, and no agency has taken the lead to protect U.S. economic interests. GAO specifically recommended that Congress consider directing that offset demands by foreign governments be resisted when FMS credits or grants are involved in the sale.

This report "Trade Offsets in Foreign Military Sales," GAO/NSIAD-84-102 can be obtained by contacting U.S. General Accounting Office, Document Handling and Information Service Facility, P.O. Box 6015, Gaithersburg, MD 20760, Telephone (202) 275-6241.

4. CONTRACTS

Exhibit 4 lists major Navy contracts awarded between 1 April and 27 June as announced by the Department of Defense and published in the *Wall Street Journal*. The list is not comprehensive, but has been arranged to include contracts for ships, systems, weapons, and services. Aircraft related contracts are not included.

MacGregor-Navire President Hanson Dies Suddenly

The MacGregor-Navire organization has announced with deep regret that **Per-Ake Hanson,** president and chief executive officer, died suddenly at the age of 48 on July 17 at Kungsbacka, Sweden, as a result of a heart attack. Following the purchase of the MacGregor organization by the Kone Group in May 1983, he was appointed president and CEO of the new MacGregor-Navire organization.

Mr. **Hanson** took his master of science degree in mechanics at Chalmers University of Technology in Gothenburg, and in 1960 joined Kockums Shipyard as a group leader in machinery design. Following appointments in various Swedish companies, he became technical director of H.B. Maynard in Gothenburg, and was responsible for development programs involving shipbuilding, ports, and industry. In 1973 he was named president of Navire Cargo Gear International A.B., and was instrumental in developing it into one of the leading cargo access equipment designers.

Navidyne Study Shows New Satcom Antennas Save Shipowners Money

The new generation of lightweight marine satcom antennas are achieving large savings for shipowners, according to a study recently completed by Navidyne Corporation. Navidyne's vice president of marketing, **Jerry N. Wilson,** stated that as much as $8,000 could be saved in a typical satcom installation, chiefly in reduced shipping and installation costs. Navidyne's study compared the total costs of fitting the new ESZ-10000 vs. a typical older satcom system on a ship in various U.S. and overseas ports.

The ESZ-10000, which was type approved in May by INMARSAT, uses a unique phased-array antenna that is less than one-third the weight of earlier satcom models. This lightweight antenna achieves the same high level of system performance and reliability as the far larger dish antennas.

Navidyne's new satcom system is small enough that it can be shipped via air freight at low cost, said Mr. **Wilson**. The equipment can be easily installed in any port in the world during a brief stopover for loading, unloading or bunkering. The lightweight antenna can be easily installed using tools already on board.

For further informtion on the antennas,

Circle 56 on Reader Service Card

Ferrous Offers Literature On Catalyst Proportioning Pump And Depulsing Unit

Ferrous Corporation, Bellevue, Wash., manufacturer of FE-4 Marine Grade Combustion Catalyst, has announced the availability of the Ferrous Marine System (FMS) Catalyst Proportioning Pump and Depulsing Unit. The FMS Catalyst Proportioning Pump and Depulsing Unit is designed to work as part of a complete system including catalyst, storage tank and day tank.

The FMS proportioning pump allows accurate proportioning of FE-4 from the daytank into the fuel line. The proportioning pump is powered by a variable stroke, oil-driven, diaphragm pump. The standard pump operates on 115 VAC. DC and multiphase pump motors are available on special order. The pump comes in various output capacities, measured in gallons per minute or hour, to meet virtually any fuel oil flow requirement.

The FMS Depulsing Unit is designed to smooth out the pumping pulses in the flow from the catalyst proportioning pump to the fuel oil line.

For more information,

Circle 51 on Reader Service Card

ELECTRONICS UPDATE

Bowditch Introduces New Navigation And Piloting Aid

Bowditch Navigation Systems recently announced the introduction of a new integrated navigation and piloting system, the Bowditch Navigator MK-II. The MK-II combines a powerful integrated navigation computer and a unique viewing screen that gives a "real time" display of position, projected directly onto a standard nautical chart.

The MK-II accepts inputs from all available navigational sources, including radio navigation aids (Loran, Satnav, Decca and Omega) and dead reckoning sensors (speed log and compass). Visual compass bearings and radar ranges can also be entered. The MK-II is designed to accept GPS (Global Positioning System) inputs when GPS becomes available in the late 1980s. The MK-II computer compares and analyzes data from different sources and calculates best possible position.

The Bowditch system can be interfaced with most commercial radio navigation receivers, including Loran C, Satnav, Decca and Omega using a standard RS-232 cable. An internal high resolution Loran C receiver is available as an option.

The MK-II's unique chart display derives from a projection of an actual nautical chart, photographically reproduced in the form of a convenient Microchart. The charts are available for any Mercator charts in the DMA and NOAA inventories.

In addition to presenting a visual display of position, the MK-II Microchart greatly simplifies entry and retrieval of vital navigation information. Waypoints, hazard points and other 'event marks' can be entered quickly and easily by positioning the cursor over any point on the chart.

A two-line LED readout gives the operator instant access to data such as present position, course and speed made good, course-to-steer and distance to waypoint, time to turn, cross track error, set and drift, Loran signal geometry and other information. All operating and initialization procedures are automatically prompted with a series of simple "yes-or-no" questions on the LED readout with "cueing" lights on the keys.

For further information on the MK-II,

Circle 55 on Reader Service Card

Waukesha Bearings Names Charles F. Reed VP-Sales

Charles F. Reed

Charles F. Reed has been appointed vice president of sales of Waukesha Bearings Corporation, a wholly owned subsidiary of Dover Corporation. Mr. **Reed** will be responsible for the sales function of all product lines including babbitted bearings, marine seals and Thordon self-lubricating plastic alloy bearings. His background includes executive sales positions with JLG Industries and Fiat-Allis.

NMEA Annual Meeting Set For Oct. 14–16 In Boston —Issues Call For Papers

The annual meeting of the National Marine Electronics Association (NMEA) has been scheduled for October 14–16, 1984 in Boston, Mass.; the association has issued a Call for Papers to be presented at the conference.

The NMEA annual meeting will take place immediately prior to Fish Expo at the Back Bay Hilton which is adjacent to the exhibition hall. The program will include technical developments in marine electronics, regulatory affairs, industry problems, business management and other topics of interest to the membership. In addition, examinations will be administered for the NMEA technician certification program.

Abstracts for papers should be submitted by the end of August to **Charles S. Carney,** executive director, P.O. Box 57, Oronoco, Minn. 55960. Papers may be presented by NMEA members and non-members. They should be non-commercial in nature.

Danny Blair Promoted At Ashland Petroleum

Danny J. Blair has been named harbor master in the Inland Waterways Division of Ashland Petroleum Company, according to **Robert B. Keifer Jr.,** vice president, marine/surface transportation and facilities.

In his new position, Mr. **Blair** is responsible for the movement of all company boats and barges in the local harbor area extending from Huntington, W. Va. to Portsmouth, Ohio.

Mr. **Blair** joined Ashland Oil in 1973 as an engineering deckhand and most recently was traffic coordinator in the Marine Traffic Department.

Danos & Curole Christen Jackup Barge Alyce Danos

Alyce Danos, daughter of Danos & Curole principal **Allen Danos,** is shown christening the new $1.7-million Alyce Danos jackup barge. She is assisted by her mother, **Mary Danos.**

Christening ceremonies were held recently for the Alyce Danos, a class 130 jackup barge that will service the entire Gulf of Mexico coast.

The Alyce Danos represents a $1.7-million investment by Danos & Curole, marine contractors of Larose, La., and brings to their fleet state-of-the-art capabilities and features that are of particular interest to oil companies throughout the entire Danos & Curole service area.

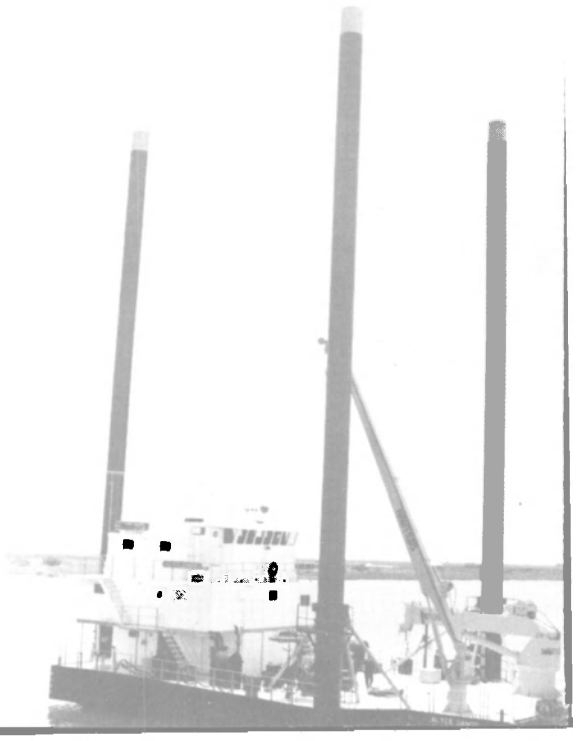
Featuring a closed loop hydraulic system, the very latest of its kind, the barge is capable of working in depths of up to 90 feet.

Overall length of the self-elevating vessel is 94 feet, with a beam of 63 feet and a draft design of 6 feet 6 inches. Potable water storage capacity is 9,000 gallons and fuel storage capacity is 4,000 gallons.

Propelled by two 12V-71-N Detroit Diesel engines, the Alyce Danos is capable of carrying 150,000 pounds of deck cargo. The barge is equipped with two hydraulic cranes offering 40-ton and 10-ton capacities with 70-foot and 50-foot boom lengths, respectively. Special conveniences and comforts are built into the galley and relaxation and recreation areas for the crew members.

The Alyce Danos will now join the transportation services division of Danos & Curole which consists of deck barges, water barges and other jackup barges.

Founded in 1945, Danos & Curole is a full-service contractor, capable of serving the oil and marine industries with a variety of personnel, equipment and special fabrication and sandblasting services.



The jackup barge Alyce Danos will service the entire Gulf of Mexico coast.

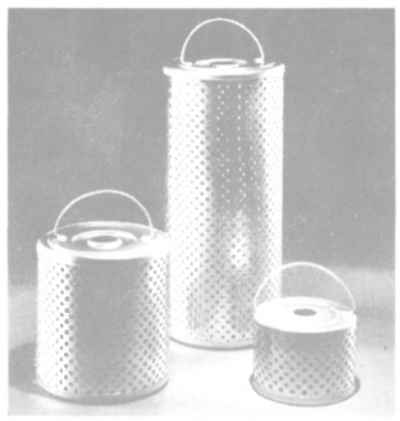
Dahl To Market New Improved Racor Replacement Elements — Literature Available

Dahl Manufacturing, Inc. plans to market new, improved Racor diesel fuel filter/water separator replacement elements in addition to their standard product lines.

Headquartered in Ceres, Calif., Dahl manufactures Dahl Fuel Filter/Water Separators for diesel engines. The units are recognized in the industry for their excellent performance and high quality construction.

Dahl announced that the Racor replacement elements will have the same rigid quality control that is applied to the Dahl filter cartridges. Both Dahl and Racor replacement elements will have special filtration media that is scientifically formualted, and resin impregnated. Less mechanical resistance is achieved by large holes in the metal casing and uniform pore size in the paper media. To assure perfect end seal, high quality non-cracking, non-hardening Buna-N gaskets are used; two and 10 micron elements are available to suit your operating conditions.

The Dahl replacement elements for Racor filter/separators will be sold at the lowest competitive price. Normal shipment in 24



hours from receipt of order. Distributorship as well as dealerships are available. For free literature containing information regarding products, prices or delivery schedules,

Circle 57 on Reader Service Card

Baatservice Building Big Catamaran Survey Vessel

Baatservice Verft A/S of Mandal, Norway, is currently fitting out a new and larger version of the JKL twin-hulled survey vessel design for J.K. Lindberg of Harstad. The new vessel, with an overall length of about 125 feet and beam of 33 feet, represents a scaling up of the 78-foot Blom Surveyor, which has been in service since March of this year with Bloms Oppmaaling.

In common with the Blom Surveyor, the new vessel, designated the JKL 3800 Type, is being built using Kevlar reinforced sandwich construction—a technique that the Mandal yard has pioneered for building large workboats and survey vessels. In addition to the very high tensile strength of the Kevlar fiber, the use of this material is said to contribute to reduction in radiated hull noise, which is especially relevant for any seismic survey operation.

The twin keels of the JKL 3800 design permit wide spacing of the main propellers, which contributes to high levels of maneuverability even in strong winds, and their long thin straight runs aft provide excellent directional stability.

When completed, the new vessel, which is powered by two GM Detroit Diesel 800-bhp engines driving controllable-pitch, highly skewed propellers, will incorporate Burnvoll bow and stern thrusters, Kongsberg Albatross dynamic positioning, a moonpool, and a wide range of survey-related deck handling equipment.

PRC Reports On Navy Use Of PRORECO III Deck System — Brochure Available

Products Research and Chemical Corp. (PRC) of Glendale, Calif., recently released data confirming the extensive use by the U.S. Navy of the firm's PRORECO® III weather deck system.

PRC reports that the PRORECO III system is now utilized on more than 100 U.S. Navy ships of all types including the newest guided missile cruisers, the famous Battleship New Jersey and aircraft carriers. In addition, for years PRORECO III has been used aboard hundreds of commercial vessels of all types worldwide.

The system has a 15 year service history of providing deck maintenance cost savings on all types of high wear deck surfaces including aircraft carrier flight decks, helicopter landing platforms on military ships and on offshore drilling rigs, cruise ships, cable laying ships, icebreakers, fishing vessels and ocean-going vessels of all types.

"PRC coatings protect your decks because they protect themselves" is the attention-getting head over the first of four sections in an eight-page color brochure from Products Research & Chemical Corporation. This heading leads into a discussion of PRC PRORECO deck coating systems designed to resist the heaviest abrasion, impact, vibration, or movement. The company says that once durable PRC coatings are applied, surface touch-up and renewal is all that is needed, virtually eliminating maintenance costs for 10 years or more.

The second section in the publication explores the advantages of PRC PRORECO Marine Rubber Caulk™ sealants as truly all-purpose caulk; and the third section points up the fact that PRC technology and its broad base of protective products can solve unique problems in the marine, aerospace, railroad, telecommunications, automotive and construction industries.

The attractive brochure features a breaking ocean wave on the cover as a reminder of the powerful forces of nature coatings and sealants must protect against. Color illustrations and photos are used throughout, and a partial listing of some of the PRC products available, with a description of each, is given on the back cover.

For a free marine catalog of PRC products and a copy of the brochure,

Circle 30 on Reader Service Card

McDermott-Built Barge Uses Markey Machinery Windlass And Capstans

Markey Machinery Co., Inc. of Seattle, designer and builder of auxiliary marine deck equipment, recently delivered a Type WESD-28S Drum Windlass for a 350-foot barge built by McDermott Shipyards, for Matson Navigation Co. The 10 hp electric windlass has a narrow width drum to ease spooling, and has a capacity of 720 feet of 1¾ inch wire. Of particular interest is the radio-controlled anchor lowering system, which allows it to pay out its wire on command from the tug. The amount of wire out is monitored on the tug via the signal sent by the windlass' drum counter. Local line payout is achieved by use of the manual drum brake and the main pinion clutch.

Accompanying the drum windlass on the Matson barge are four Markey 24-inch type CET-80 capstans. Each 30-hp ac electric capstan has its motor and gearcase mounted on the deck below to conserve deck space.

For further information,

Circle 32 on Reader Service Card

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Width Overall	36.800 M (120.75 Feet)
Width Inside Wingwalls	29.100 M (95.47 Feet)
Overall Height	13.335 M (43.97 Feet)
Pontoon Height	3.500 M. (11.50 Feet)
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Bethlehem

Coflexip Flexible Pipe Riser Used In Test Program By Navy — Literature Available

The U.S. Navy has just completed a test program using a Coflexip flexible pipe riser for its Amphibious Tanker Facility (ATTF). The first priority of the ATTF, developed by the Naval Civil Engineering Laboratory (NCEL), Port Hueneme, Calif., is to reduce the logistic burden on the installation teams by decreasing the time required for the installation. Installing a conventional pipeline end manifold (PLEM) and associated connecting hoses takes several days.

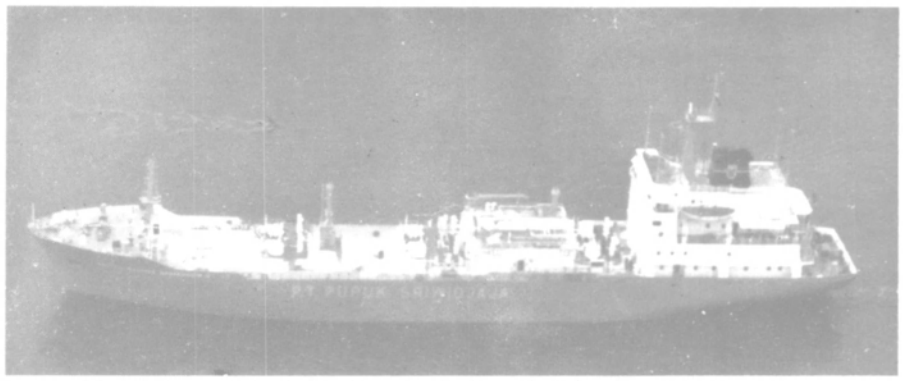
Coflexip offered the alternative of using flexible pipe to replace the PLEM and underbuoy hoses. This eliminated the time and manpower-consuming operations, such as PLEM anchoring and adjustment of underbuoy hoses.

The Navy used an 8-inch by 250-foot flexible riser pipe to tow the pipeline and connected the free end of the Coflexip pipe directly to the underside of the previously installed mooring buoy. Straightforward handling and hookup operations were demonstrated successfully.

The Coflexip pipe used for these tests was selected by the Laboratory for its timely availability and affordable lease price. The section used has 720 psi W.P. and is suitable for petroleum/oil/lubricant products.

For further information on Coflexip flexible pipe riser,

Circle 31 on Reader Service Card



Liquefied gas carrier Sultan Mahmud Badaruddin II is powered by MaK diesel

Meyer Werft Delivers Gas Carrier And Gets Contract For Cruise Liner

The liquefied gas carrier Sultan Mahmud Badaruddin II was delivered recently by Jos. L. Meyer GmbH & Company in Papenburg, West Germany, to P.T. Pupuk Sriwidjaja (Pusri) of Indonesia. Pusri is a state-owned fertilizer manufacturer and distributor, with responsibility for distribution of all fertilizer and fertilizer-related products in Indonesia.

The vessel is the first semi-refrigerated liquefied gas carrier in Indonesia and in Pusri's fleet of modern self-unloading urea carriers. It is designed to transport ammonia from a new ammonia/urea production facility in Kalimantan on the island of Borneo to domestic and foreign ports in Southeast Asia.

The gas carrier is 372 feet long overall, with a beam of 53.5 feet and depth of 35.75 feet; cargo tank capacity is 5,683 cubic meters. Cargo is carried in three independent bi-lobe tanks at a temperature of −48 C and pressure up to 4.5 bar. It is capable of transporting ammonia, propane, butane, butadiene, propylene, and vinyl chloride monomer. Cargo is cooled by a reliquefaction plant that includes two Sulzer compressors. Six deepwell pumps discharge cargo at a combined rate of 540 cubic meters per hour.

Propulsion power is provided by a MaK 8M 552 diesel engine that produces 6,200 bhp at 500 rpm, and a speed of about 15.7 knots.

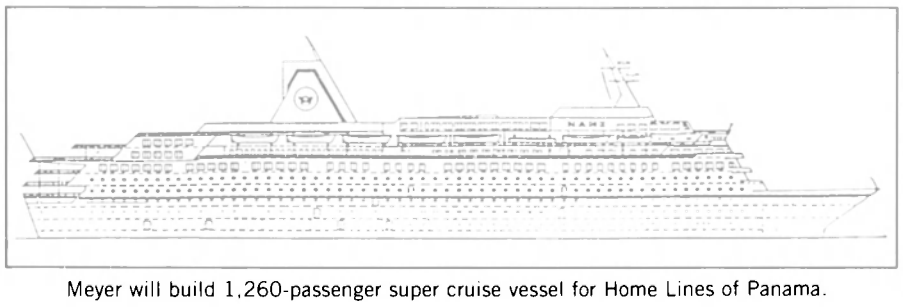
The vessel has a dual classification, with Lloyd's Register of Shipping and Biro Klasifikasi Indonesia as a Type IIC Liquefied Gas Carrier, and is provided with an IMO certificate according to the Gas Code, Resolution A328(1X). The carrier also complies with U.S. Coast Guard regulations for ships under foreign flag.

Marine Consultants & Designers, Inc. of Cleveland, designers of Pusri's self-unloading urea carriers, provided a transportation study to define the ammonia carrier's requirements and speed, prepared the design and specifications for tendering and contract documents, and represented Pusri during tendering, contract negotiations, and construction, providing both plan review and construction supervision. Marine Consultants & Designers was assisted in these tasks by Intership Services, Inc. of Waltham, Mass., who provided design and consultation for the liquefied gas aspects of the project.

New Superliner For Home Lines

Against strong European competition, Meyer Werft has succeeded in getting a contract for construction of a 1,260-passenger cruise ship. The big vessel—she will be 670 feet long overall with a beam of 95 feet—was ordered by Home Lines Inc. of Panama, a company that has been active in the cruise business for a long time.

The liner is designed to operate in the Caribbean or worldwide. Passengers will be carried in 550 cabins. Two diesel engines, each with an output of 15,820 bhp, will give the vessel a service speed of 22.5 knots.



Meyer will build 1,260-passenger super cruise vessel for Home Lines of Panama.

FOR MORE INFORMATION

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This directory section is an editorial feature published in every issue for the convenience of the readers of MARITIME REPORTER/Engineering News. A quick-reference readers' guide, it includes the names and addresses of the world's leading manufacturers and suppliers of all types of marine machinery, equipment, supplies and services. A listing is provided, at no cost for one year in all 24 issues, only to companies with continuing advertising programs in this publication, whether an advertisement appears in every issue or not. Because it is an editorial service, unpaid and not part of the advertisers contract, MR/EN assumes no responsibility for errors. **If you are interested in having your company listed in this Buyers Directory Section, contact John C. O'Malley at (212) 689-3266.**

AIR COMPRESSORS
Flexaust Company, 11 Chestnut St., Amesbury, MA 01913
Squire Cogswell Company, 3411 Commercial Ave., Northbrook, IL 60062

AIR CONDITIONING AND REFRIGERATION--REPAIR & INSTALLATION
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
Cospolich Refrigerator Co., Inc., 949 Industry Rd., Kenner, LA 70062
Flakt AB, Box 8862, S-40272, Gothenburg, Sweden
Marlo Coil/Nuclear Cooling, Inc., P.O. Box 171, High Ridge, MO 64049
Mechanical Resources, Inc., 210 West Side Ave., Jersey City, NJ 07305
Nance Industries, P.O. Box 1547, Beaumont, TX 77704-1547
Stal Refrigeration AB, Butangsgatan 16, S 601 87 Norrkoping, Sweden
United Technologies Carrier Transicold, P.O. Box 4805, Syracuse, NY 13221
Unitemp Inc., 3590 Kennedy Rd., So. Plainfield, NJ 07080
York Division, Borg-Warner Corp., P.O. Box 1592, York, PA 17405

ANCHORS AND CHAIN
G.J. Wortelboer Jr. B.V., Eemhavenstraat 4, P.O. Box 5003, 3008 AA Rotterdam, Netherlands
Hyosung America Inc., 2302 E. Del Amo, Comption, CA 90220
Neptunia, Via Giovanni da Verrazzano, 12, 16165 Genova, Italy

ANODES—Cathodic Protection
American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Engelhard Industries Division, 2655 U.S. Route 22, Union, NJ 07083
Kaiser Chemical, Div., of Kaiser Aluminum & Chemical Corp., 300 Lakeside Dr., Rm. 1128 KB, Oakland, CA 94643
The Platt Bros. & Co., Box 1030, Waterbury, CT 06721

BASKET STRAINERS
North Star Marine & Industrial Products, Inc., 84 Wall Street, Farmingdale, NY 11735
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130

BEARINGS—Rubber, Metallic, Non-Metallic
Grant Manufacturing & Alloying, Inc., 600 Schoolhouse Rd., Souderton, PA 18964
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Lucian Q. Moffitt, Inc., P.O. Box 1415, Akron, Ohio 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, Wisc. 53186

BLASTING—Cleaning—Equipment
Apache Equipment, Inc., 10690 Shadow Wood Dr., Suite 112, Houston, TX 77043
Aqua-Dyne Inc., 2208 Karbach St., Houston, TX 77092
Atlantic Sandblasting & Coatings, Inc., 2700 Guy Verger Blvd., Tampa, FL 33605
Aurand, 1270 Ellis St., Cincinnati, OH 45223
Butterworth Inc. (USA), 3721 Lapas Dr., P.O. Box 18312, Houston, TX 77223-9989
Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
CLEMCO, P.O. Box 7680, San Francisco, CA 94120
Complete Abrasive Blasting Systems, 18250 68th Avenue South, Kent, WA 98031
E.I. DuPont De Nemours & Co., Inc., Starblast Division, Room X39186, Wilmington, DE 19898
Rockwell International, Power Tool Division, 400 N. Lexington Ave., Pittsburgh, PA 15208
Schmidt Mfg. Inc., P.O. Box 37, Fresno, TX 77545

BOILERS
B&D Marine and Industrial Boilers, Inc., P.O. Box 5702, North Charleston, SC 29406
Combustion Engineering, Inc., Windsor, Connecticut 06095
Forney Engineering Co., P.O. Box 189, Addison, TX 75001
Foster Wheeler Boiler Corp., 110 S. Orange Ave., Livingston, NJ 07039
Howe-Baker Engineers, Inc. (Econoflex Burners), Combustion Systems Div., P.O. Box 956, Tyler, TX 75710
Way-Wolff Associates Inc., 45-10 Vernon Blvd., Long Island City, NY 11101

BOILER CLEANING
Asea Stal, 525 Executive Blvd., Elmsford, NY 10523-1296

BROKERS
S. Danoff U.S.A. Ltd., 2050 Coral Way, Miami, FL 33145
Capt. Astad Company, Inc., P.O. Box 53434, New Orleans, La. 70153
ECO Inc., 1036 Cape St. Claire Center, Annapolis, MD 21401
Hughes Bros., Inc., 17 Battery Pl., New York, N.Y. 10004

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
Alpha Technical Services, Inc., P.O. Box 446, Hamilton, OH 45012
MacGregor-Navire International, Box 8991, S-402 74 Goteborg, Sweden
MacGregor Navire U.S.A. Inc., 135 Dermody St., Cranford, NJ 07016

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

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

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

CONDENSERS
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130

CONTROL SYSTEMS—Monitoring
American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Argo Marine, 140 Franklin St., New York, NY 10013
ASEA, Inc. 4 New King St., White Plains, NY 10604
Autronica Marine USA, 280 Industrial Pkwy., Northvale, NJ 07647
Avicon Corp., 7750 East Redfield Rd., Scottsdale, AZ 85260
Barringer Research, 304 Carlingview Dr., Rexdale, Ontario, Canada M9W5G2
Biospherics Inc., 4928 Wyacondo Rd., Rockville, MD 20852
Bowmar/ALI, Inc., 531 Main St., Acton, MA 01720
Cooper Energy Services, Mount Vernon, OH 43050
Eldec Corp., P.O. Box 100, Lynwood, WA 98036
Louis C. Eitzen Co., P.O. Box 1210, Glenwood Springs, CO 81602
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
Fluidyne, a Div. of Electrodata Inc., P.O. Box 11366, Santa Rosa, CA 95406
Grumman Aerospace, 111 Stewart Ave., Bethpage, NY 11714
ITT Mackay, 441 U.S. Highway #1, Elizabeth, NJ 07202
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
Maritime Protection A/S, Box 100, N-4620 Vagsbygd, Norway
Megasystems, Inc., 1075 N.W. 58th Street, Boca Raton, FL 33431
National Control Systems, Inc., 827 Hanley Industrial Court, St. Louis, MO 63144
Nav-Vue, Inc., P.O. Box 1175, Huntsville, TX 77340
Norske Telektron A/S, Drammensveien 126, Oslo 2, Norway
Offshore Technology Corp., 578 Enterprise St., Escondido, CA 92025
Pandel Instruments Inc., 2100 N. Hwy. 360, Grand Prairie, TX 75050
Propulsion Systems, Inc., 21213 76 Ave., Kent, WA 98032
Seaworthy Systems Inc., 36 Main Street, Essex CT 06426
Teleflex Inc., 771 First Ave., King of Prussia, PA 19406
Transamerica Delaval, Inc., Gems Sensors Division, Cowles Road, Plainville, CT 06062
Valmet Automation A.S., P.O. Box 130, N-3430. Spikkestad, Norway
Wesmar Marine Systems Div., 801 Dexter Ave. N., Box C19074, Seattle, WA 98109

COUPLINGS
Camlock Flange Sales Corp., 60 Inip Dr., Inwood, NY 11696
SKF Steel, 20 Tower Lane, P.O. Box 745, Avon, CT 06001

CRANES—HOISTS—DERRICKS—WHIRLEYS
American Hoist & Derrick Company (AMHoist), St. Paul, MN 55107
Appleton Marine, P.O. Box 2339, Appleton, WI 54913
ASEA Stal-Laval Inc., 525 Executive Blvd., Elmsford, NY 10523
Blohm & Voss Company, 55 Morris Avenue, Springfield, NJ 07081
Chester Hoist Division, Monogram Industries, P.O. Box 229, Lisbon, OH 44432
Grove Manufacturing Co., P.O. Box 21, Shady Grove, PA 17256
HIAB Cranes & Loaders Inc., R.D. 22 Interchange Place, York, PA 17404
Hertz Equipment Rental Corp., 7 Entin Rd., Bldg # 2, Parsippany, NJ 07054
Machinoexport, 35 Mosfilmovskaya Ul., 117330 Moscow, U.S.S.R.
Marine Travelift, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235
National Crane Corp., 11200 North 148 St., Waverly, NE 68462
National Supply Company, 1455 West Loop South, Houston, TX 77027
J.D. Neuhaus, Hebezeuge, D5810, Witten Heven, West Germany
Superior-Lidgerwood-Mundy Corp., 1101 John Ave., Superior, WI 54880

DECK MACHINERY—Cargo Handling Equipment
Argo Marine, 140 Franklin St., New York, NY 10013
Marine Technical Associates, 195 Patterson Avenue, Little Falls, NJ 07424
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, Wash. 98134
Murdock Engineering Company, P.O. Box 2278, Irving, TX 75061
Schoellhorn Albrecht, Div. of St. Louis Ship, 3460 So. Broadway, St. Louis, MO 63118

DECKING—GRATING
International Grating, Inc., 7625 Parkhurst, Houston, TX 77028
Selby, Battersby & Company, 5220 Whiby Ave., Philadelphia, PA 19143
J.E. Steigerwald Co., Inc., 5515 Belair Rd., Baltimore, MD 21206

DIESEL ACCESSORIES—CYLINDER LINERS
B & W Marine Service, 50 Broadway, New York, NY 10004
General Thermodynamics Corporation, 210 South Meadow Road, P.O. Box 1105, Plymouth, Massachusetts 02360
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, NY 11231
Haynes Corporation, P.O. Box 179, Jackson, MI 49204
Illman Jones, 1111 Green Island Rd., American Canyon, CA 94589
Van der Horst Corp. of America, 314 Penn Ave., Olean, NY 14760

DIESEL ENGINE—Spare Parts & Repair
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, NY 11231
Granges Repair Service GMBH, U.S. Rep: Field, Wigham and Co., Inc. 200 Middleneck Road South, P.O. Box 2123, Great Neck, N.Y. 11021
Powerway, 46G Worthington Drive, St. Louis, MO 63141

ELECTRICAL EQUIPMENT
Argo Marine, 140 Franklin St. New York, NY 10013
Jergens Inc., 19520 Nottingham Rd., Cleveland, OH 44110
Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217
Valad Electric Heating Corporation, 162 Wildey St., Tarrytown, NY 10591
Ward Leonard Electric Co., 31 South St., Mt. Vernon, NY 10550
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, Ore. 97201

EMULSIFICATION SYSTEMS
Cleanodan A/S, N. American Agents, American United Marine Corp., 5 Broadway, Route 1, Saugus, MA 01906
Fire-Brite, Hoffert Manufacturing Co., Inc., 3749 Progress Rd., Norfolk, VA 23502

EQUIPMENT—Marine
American General/Levin Corp., 445 Littlefield Ave., So. San Francisco, CA 94080
Argo Marine, 140 Franklin St., New York, NY 10013
ASEA Stal-Laval Inc., 525 Executive Blvd., Elmsford, NY 10523
Bond-It Division, Houdaille Industries, Inc., P.O. Box 16307, Denver, CO 80216
Thomas Coudon Associates, 6655 Amberton Dr., Baltimore, MD 21227
Fitz-Wright Suits Ltd., 17919 Roan Pl., Surrey, B.C., Canada V3S 5K1
Genstar Stone Products Company, Executive Plaza IV, Hunt Valley, MD 21031
Harvey's Commercial Marine Div., 2505 S. 252nd St., Kent, WA 98032
b.v. Holmatro Industrial Equipment, P.O. Box 33, 4940 aa Raamsdonksveer, Holland
Imperial Manufacturing Co., P.O. Box 4119, Bremerton, WA 98312
Juniper Industries Inc., 72-15 Metropolitan Ave., Middle Village, NY 11379
Kearfott Marine Products, 550 South Fulton Ave., Mount Vernon, N.Y. 10550
Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302
John P. Nissen, Jr. Company, Glenside, PA 19038
Stal-Laval Turbin AB, S-612 20 Finspang, Sweden

EVAPORATORS
Alfa-Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
Aqua-Chem Inc., P.O. Box 421, Milwaukee, WI 53201
MECO (Mechanical Equipment Company, Inc.), 861 Carondelet St., New Orleans, LA 70130
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130

FANS—VENTILATORS—BLOWERS
American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Argo Marine, 140 Franklin St., New York, NY 10013
Gaylord Industries, Inc., P.O. Box 558, Wilsonville, OR 97070
Hartzell Fan, Division of Castle Hills Corp., 901 S. Downing St., P.O. Box 919, Piqua, OH 45356
Joy Manufacturing Company, 338 So. Broadway, New Philadelphia, OH 44663
Zidell Explorations, 3121 S.W. Moody St., Portland, Ore. 97201

FENDERING SYSTEMS—Dock & Vessel
Hughes Bros., Inc., 17 Battery Place, New York, N.Y. 10004
InterTrade Industries, 15301 Transistor Lane, Huntington Beach, CA 92649
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Samson Ocean Systems, Inc., 99 High St., Boston, MA 02110
Seaward International, Inc., 6269 Leesburg Ave., Falls Church, Va. 22044

FILTERS
Dahl Manufacturing, Inc., 2521 Railroad Ave., Ceres, CA 95307
Mueller Steam Specialty, P.O. Box 1569, Lumberton, NC 28359
Wm. W. Nugent & Co., P.O. Box 948, Skokie, IL 60076

FINANCING—Leasing
A.G. Becker Paribus Inc., 2 First National Plaza, Chicago, IL 60670
Gulf Western Leasing Corp., 1500 City West Blvd., Suite 300, Houston, TX 77047
Yegen Marine, P.O. Box 25504, Ft. Lauderdale, FL 33320

FIRE PROTECTION, DETECTION, & ALARM SYSTEMS
EEV, Inc., 7 Westchester Plaza, Elmsford, NY 10523
Gulf Publishing Company Video (Firefighting Videotape), P.O. Box 2608, Houston, TX 77001
Walter Kidde, Walter Kidde Dr., Wake Forest, NC 27586
Wormald Fire Systems, One Stanton St., Marinette, WI 54143

FUEL OIL/ADDITIVES—Analysis & Combustion Testing
Ferrous Corporation, 910-108th N.E., P.O. Box 1764, Bellevue, WA 98009
Fuji Trading (America) Ltd., 17 Battery Place, New York, NY 10004
McTigue Industries Inc., 1615 9th Ave., Bohemia, NY 11716
U.S. Borax, 3075 Wilshire Blvd., Los Angeles, CA 90010

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

GALLEY EQUIPMENT
Argo Marine, 140 Franklin St., New York, NY 10013
Insinger Machine Co., 6245 State Rd., Philadelphia, PA 19135

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

HATCH & DECK COVERS—Chain Pipe
Camlock Flange Sales Corp., 60 Inip Dr., Inwood, NY 11696
Hayward Marine Products, 900 Fairmount Avenue, Elizabeth, NJ 07207
Marine Moisture Control Co., 60 Inip Dr., Inwood, N.Y. 11696
MacGregor-Navire International, Box 8991, S-402 74 Goteborg, Sweden
MacGregor Navire U.S.A. Inc., 135 Dermody St., Cranford, NJ 07016
Mock Manufacturing Inc., 777 Rutland Rd., Brooklyn, NY 11203
J.E. Steigerwald Co., Inc., 5515 Belair Rd., Baltimore, MD 21206

HEAT EXCHANGERS
Alfa-Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
American Standard Inc., Heat Transfer Div., Buffalo, NY 14240
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130

HOLD LINERS
Himont U.S.A., Inc., 1313 N. Market St. Wilmington, DE 19894

HULL CLEANING
Butterworth Inc. (USA), 3721 Lapas Dr., P.O. Box 18312, Houston, TX 77223-9989
Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
Gulf International Divers, P.O. Box 1342, Gretna (New Orleans), LA 70052
Pacific Maine Services, TLX: 664540 seaserv, Long Beach, CA 90802
Performance Hull Cleaning Services, Inc., P.O. Box 655, New Orleans, LA 70059-0655
Petrochemical Services, Inc., 3820 Dauphine St., New Orleans, LA 70117
Phosmarine Equipment, 21 Bd. de Paris, 13002, Marseille, France
Seaward Marine Services, Inc., 6269 Leesburg Pike, Falls Church, VA 22044
Stork Services B.V., P.O. Box 2013, 7750 CA Hengelo, Holland
Taylor Diving & Salvage Co. Inc., 701 Engineers Rd., Belle Chasse, LA 70037

HYDRAULICS
Aeroquip Corp., 1130 Maynard Road, Jackson, MI 49202
Del Gavio Marine Hydraulics Inc., 207 W. Central Ave., Maywood, NJ 07607
HRS, Inc., 3334 Victor Court, Santa Clara, CA 95050
Hydronautics, 6338 Lindmar Drive, Goleta, CA 93017
Washington Chain & Supply, Inc., P.O. Box 3646, Seattle, WA 98124

INERT GAS—Generators—Systems
Comar Corp., 186 Prescott St., Worcester, MA 01605
Foster Wheeler Boiler Corp., 110 So. Orange Ave., Livingston, N.J. 07039
Maritime Protection A/S, N. American Agents, American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Salwico Inc., 5 Marine View Plaza, Hoboken, NJ 07030

INSULATION—Cloth, Fiberglass
Bailey Carpenter & Insulation Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
Superior Energies, Inc., P.O. Drawer 386, Groves, TX 77619
Waco Inc., 5450 Lewis Rd., P.O. Box 836, Sandston, VA 23150-0836

INSURANCE
Adams & Porter, 510 Bering Dr., Houston, TX 77057-1408

Adams & Porter, 1 World Trade Center, Suite 8433, New York, N.Y. 10048
Assurance Foreningen Skuld, P.O. Box 1376 Vika, Stortingsgaten 18, N-OSLO 1, Norway
R.A. Fulton & Company Insurance Services, 100 California St., San Francisco, CA 94111
MGA International, 419 Park Avenue South, New York, NY 10016
Midland Insurance Co., 160 Water St., New York, N.Y. 10038
United States P&I Agency, Inc., 80 Maiden Lane, New York, NY 10038

JOINER—Watertight Doors—Paneling
Advanced Structures Corp., 235 W. Industry Ct., Deer Park, NY 11729
Bailey Distributors, Inc., 74 Sullivan St., Brooklyn, NY 11231
Isolamin Panels, c/o Consafe, Inc., P.O. Box 40339, Houston, TX 77040
Masonite Commercial Division, Dover, OH 44622
Megadoor Inc., 441 Lexington Ave., Suite 903, New York, NY 10017
Simpson Timber Company, Third & Franklin, Shelton, WA 98584
Walz & Krenzer, Inc., 400 Trabold Road, Rochester, NY 14624

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

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights
ACR Electronics, Inc., P.O. Box 2148, Hollywood, FL 33022
Keuffel & Esser/Kratos, 20 Whippany Rd., Morristown, NJ 07960
Midland-Ross Corp., Russellstoll Division, 530 W. Mt. Pleasant Ave., Livingston, NJ 07039
Oceanic Electrical Mfg. Co., 157 Perry St., New York, NY 10014
Oreck Corp., 100 Plantation Rd., New Orleans, LA 70123
Perko Inc., P.O. Box 6400D, Miami, Florida 33164
Phoenix Products Company, Inc., 4769 North 27th Street, Milwaukee, WI 53209
Port Electric Supply Corp., 248-264 Third St., Elizabeth, NJ 07206-0434
SSAC Inc., P.O. Box 395, Liverpool, NY 13088

LINE BLINDS
Stacey/Fetterolf Corp., P.O. Box 103, Skippack, PA 19474

MACHINE TOOLS
Republic-Lagun Machine Tool Co., 1000 E. Carson St., Carson, CA 90749

MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING
A-C Brake Co., 308 E. College St., Louisville, KY
AMT Inc., 2400 N.W. 39th Ave., Miami, FL 33142
Amermarine USA Inc., P.O. Box 9205, Baltimore, MD 21222
American General/Levin Corp., 445 Littlefield Ave., So. San Francisco, CA 94080
Essex Machine Works, Essex, CT 06426
Golten Marine Co., Inc., 60 Van Brunt St., Brooklyn, NY 11231
Jered Brown Brothers Inc., 1300 Coolidge, P.O. Box 2006, Troy, MI 48007-2006
Rosan, Inc., 2901 West Coast Hwy., Newport Beach, CA 92663
Scotchman Industries, Inc., P.O. Box 850, Philip, SD 57567-0850

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

MOORING SYSTEMS
Murdock Machine & Engineering Company of Texas, P.O. Box 2278, Irving, TX 75061
Samson Ocean Systems, Inc., 99 High Street, Boston, Mass. 02110

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

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS
Adams & Chute, Huntingtown Road, Newtown, CT 06470
Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Highway (Suite 1300), Arlington, VA 22202
Aero Nav Laboratories, Inc., 14-29 112 St., College Point, NY 11356
American Systems Engineering Corp., P.O. Box 4265, Virginia Beach, VA 23454
Amirikian Engineering Co., Chevy Chase Center Bldg., Suite 505, 35 Wisconsin Circle, Chevy Chase, Md. 20015

U.S. Navy Ship Overhaul Market

A Marketing Guide To The $6.8 Billion Navy Ship Repair And Alteration Program

This directory section is an editorial feature published in every issue for the convenience of the readers of MARITIME REPORTER/Engineering News. A quick-reference readers' guide, it includes the names and addresses of the world's leading manufacturers and suppliers of all types of marine machinery, equipment, supplies and services. A listing is provided, at no cost for one year in all 24 issues, only to companies with continuing advertising programs in this publication, whether an advertisement appears in every issue or not. Because it is an editorial service, unpaid and not part of the advertisers contract, MR/EN assumes no responsibility for errors. **If you are interested in having your company listed in this Buyers Directory Section, contact John C. O'Malley at (212) 689-3266.**

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Squire Cogswell Company, 3411 Commercial Ave., Northbrook, IL 60062
AIR CONDITIONING AND REFRIGERATION--REPAIR & INSTALLATION
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N Y. 11231
Cospolich Refrigerator Co., Inc., 949 Industry Rd., Kenner, LA 70062
Flakt AB, Box 8862, S–40272, Gothenburg, Sweden
Marlo Coil/Nuclear Cooling, Inc., P.O. Box 171, High Ridge, MO 64049
Mechanical Resources, Inc., 210 West Side Ave., Jersey City, NJ 07305
Nance Industries, P.O. Box 1547, Beaumont, TX 77704-1547
Stal Refrigeration AB, Butangsgatan 16, S 601 87 Norrkoping, Sweden
United Technologies Carrier Transicold, P.O. Box 4805, Syracuse, NY 13221
Unitemp Inc., 3590 Kennedy Rd., So. Plainfield, NJ 07080
York Division, Borg-Warner Corp., P.O. Box 1592, York, PA 17405
ANCHORS AND CHAIN
G.J. Wortelboer Jr. B.V., Eemhavenstraat 4, P.O. Box 5003, 3008 AA Rotterdam, Netherlands
Hyosung America Inc., 2302 E. Del Amo, Comption, CA 90220
Neptunia, Via Giovanni da Verrazzano, 12, 16165 Genova, Italy
ANODES—Cathodic Protection
American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Engelhard Industries Division, 2655 U.S. Route 22, Union, NJ 07083
Kaiser Chemical, Div., of Kaiser Aluminum & Chemical Corp., 300 Lakeside Dr., Rm. 1128 KB, Oakland, CA 94643
The Platt Bros. & Co., Box 1030, Waterbury, CT 06721
BASKET STRAINERS
North Star Marine & Industrial Products, Inc., 84 Wall Street, Farmingdale, NY 11735
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130
BEARINGS—Rubber, Metallic, Non-Metallic
Grant Manufacturing & Alloying, Inc., 600 Schoolhouse Rd., Souderton, PA 18964
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Lucian Q. Moffitt, Inc., P.O. Box 1415, Akron, Ohio 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, Wisc. 53186
BLASTING—Cleaning—Equipment
Apache Equipment, Inc., 10690 Shadow Wood Dr., Suite 112, Houston, TX 77043
Aqua-Dyne Inc., 2208 Karbach St., Houston, TX 77092
Atlantic Sandblasting & Coatings, Inc., 2700 Guy Verger Blvd., Tampa, FL 33605
Aurand, 1270 Ellis St., Cincinnati, OH 45223
Butterworth Inc. (USA), 3721 Lapas Dr., P.O. Box 18312, Houston, TX 77223–9989
Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
CLEMCO, P.O. Box 7680, San Francisco, CA 94120
Complete Abrasive Blasting Systems, 18250 68th Avenue South, Kent, WA 98031
E.I. DuPont De Nemours & Co., Inc., Starblast Division, Room X39186, Wilmington, DE 19898
Rockwell International, Power Tool Division, 400 N. Lexington Ave., Pittsburgh, PA 15208
Schmidt Mfg. Inc., P.O. Box 37, Fresno, TX 77545
BOILERS
B&D Marine and Industrial Boilers, Inc., P.O. Box 5702, North Charleston, SC 29406
Combustion Engineering, Inc., Windsor, Connecticut 06095
Forney Engineering Co., P.O. Box 189, Addison, TX 75001
Foster Wheeler Boiler Corp., 110 S. Orange Ave., Livingston, NJ 07039
Howe-Baker Engineers, Inc. (Econoflex Burners), Combustion Systems Div., P.O. Box 956, Tyler, TX 75710
Way-Wolff Associates Inc., 45-10 Vernon Blvd., Long Island City, NY 11101
BOILER CLEANING
Asea Stal, 525 Executive Blvd., Elmsford, NY 10523–1296
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S. Danoff U.S.A. Ltd., 2050 Coral Way, Miami, FL 33145
Capt. Astad Company, Inc., P.O. Box 53434, New Orleans, La. 70153
ECO Inc., 1036 Cape St. Claire Center, Annapolis, MD 21401
Hughes Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
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
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MacGregor-Navire International, Box 8991, S-402 74 Goteborg, Sweden
MacGregor Navire U.S.A. Inc., 135 Dermody St., Cranford, NJ 07016
CHOCKING SYSTEMS
Palmer Products Inc., P.O. Box 8, Worcester, PA 19490
Philadelphia Resins Corp., 20 Commerce Drive, Montgomeryville, Pa 18936
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Cornell-Carr Co. Inc., 63 Main St., Monroe, CT 06468
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Maritime Data Network, Ltd., 102 Hamilton Ave., Stamford, CT 06902
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Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130
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Argo Marine, 140 Franklin St., New York, NY 10013
ASEA, Inc. 4 New King St., White Plains, NY 10604
Autronica Marine USA, 280 Industrial Pkwy., Northvale, NJ 07647
Avicon Corp., 7750 East Redfield Rd., Scottsdale, AZ 85260
Barringer Research, 304 Carlingview Dr., Rexdole, Ontario, Canada M9W5G2
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Bowmar/ALI, Inc., 531 Main St., Acton, MA 01720
Cooper Energy Services, Mount Vernon, OH 43050
Eldec Corp., P.O. Box 100, Lynwood, WA 98036
Louis C. Eitzen Co., P.O. Box 1210, Glenwood Springs, CO 81602
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
Fluidyne, a Div. of Electrodata Inc., P.O. Box 11366, Santa Rosa, CA 95406
Grumman Aerospace, 111 Stewart Ave., Bethpage, NY 11714
ITT Mackay, 441 U.S. Highway #1, Elizabeth, NJ 07202
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
Maritime Protection A/S, Box 100, N-4620 Vogsbygd, Norway
Megasystems, Inc., 1075 N.W. 58th Street, Boca Raton, FL 33431
National Control Systems, Inc., 827 Hanley Industrial Court, St. Louis, MO 63144
Nav-Vue, Inc., P.O. Box 1175, Huntsville, TX 77340
Norske Telektron A/S, Drammensveien 126, Oslo 2, Norway
Offshore Technology Corp., 578 Enterprise St., Escondido, CA 92025
Pandel Instruments Inc., 2100 N. Hwy. 360, Grand Prairie, TX 75050
Propulsion Systems, Inc., 21213 76 Ave., Kent, WA 98032
Seaworthy Systems Inc., 36 Main Street, Essex CT 06426
Teleflex Inc., 771 First Ave., King of Prussia, PA 19406
Transamerica Delaval, Inc., Gems Sensors Division, Cowles Road, Plainville, CT 06062
Valmet Automation A.S., P.O. Box 130, N-3430, Spikkestad, Norway
Wesmar Marine Systems Div., 801 Dexter Ave. N., Box C19074, Seattle, WA 98109
COUPLINGS
Camlock Flange Sales Corp., 60 Inip Dr., Inwood, NY 11696
SKF Steel, 20 Tower Lane, P.O. Box 745, Avon, CT 06001
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American Hoist & Derrick Company (AMHoist), St. Paul, MN 55107
Appleton Marine, P.O. Box 2339, Appleton, WI 54913
ASEA Stal-Laval Inc., 525 Executive Blvd., Elmsford, NY 10523
Blohm & Voss Company, 55 Morris Avenue, Springfield, NJ 07081
Chester Hoist Division, Monogram Industries, P.O. Box 229, Lisbon, OH 44432
Grove Manufacturing Co., P.O. Box 21, Shady Grove, PA 17256
HIAB Cranes & Loaders Inc., R.D. 22 Interchange Place, York, PA 17404
Hertz Equipment Rental Corp., 7 Entin Rd., Bldg # 2, Parsippany, NJ 07054
Machinoexport, 35 Mosfilmovskaya Ul., 117330 Moscow, U.S.S.R.
Marine Travelift, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235
National Crane Corp., 11200 North 148 St., Waverly, NE 68462
National Supply Company, 1455 West Loop South, Houston, TX 77027
J.D. Neuhaus, Hebezeuge, D5810, Witten Heven, West Germany
Superior-Lidgerwood-Mundy Corp., 1101 John Ave., Superior, WI 54880
DECK MACHINERY—Cargo Handling Equipment
Argo Marine, 140 Franklin St., New York, NY 10013
Marine Technical Associates, 195 Patterson Avenue, Little Falls, NJ 07424
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, Wash. 98134
Murdock Engineering Company, P.O. Box 2278, Irving, TX 75061
Schoellhorn Albrecht, Div. of St. Louis Ship, 3460 So. Broadway, St. Louis, MO 63118
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Selby, Battersby & Company, 5220 Whiby Ave., Philadelphia, PA 19143
J.E. Steigerwald Co., Inc., 5515 Belair Rd., Baltimore, MD 21206
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B & W Marine Service, 50 Broadway, New York, NY 10004
General Thermodynamics Corporation, 210 South Meadow Road, P.O. Box 1105, Plymouth, Massachusetts 02360
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, NY 11231
Haynes Corporation, P.O. Box 179, Jackson, MI 49204
Illman Jones, 1111 Green Island Rd., American Canyon, CA 94589
Van der Horst Corp. of America, 314 Penn Ave., Olean, NY 14760
DIESEL ENGINE—Spare Parts & Repair
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, NY 11231
Granges Repair Service GMBH, U.S. Rep: Field, Wigham and Co., Inc. 200 Middleneck Road South, P.O. Box 2123, Great Neck, N.Y. 11021
Powerway, 46G Worthington Drive, St. Louis, MO 63141
ELECTRICAL EQUIPMENT
Argo Marine, 140 Franklin St. New York, NY 10013
Jergens Inc., 19520 Nottingham Rd., Cleveland, OH 44110
Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217
Valad Electric Heating Corporation, 162 Wildey St., Tarrytown, NY 10591
Ward Leonard Electric Co., 31 South St., Mt. Vernon, NY 10550
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, Ore. 97201
EMULSIFICATION SYSTEMS
Cleanodan A/S, N. American Agents, American United Marine Corp., 5 Broadway, Route 1, Saugus, MA 01906
Fire-Brite, Hoffert Manufacturing Co., Inc., 3749 Progress Rd., Norfolk, VA 23502
EQUIPMENT—Marine
American General/Levin Corp., 445 Littlefield Ave., So. San Francisco, CA 94080
Argo Marine, 140 Franklin St., New York, NY 10013
ASEA Stal-Laval Inc., 525 Executive Blvd., Elmsford, NY 10523
Band-It Division, Houdaille Industries, Inc., P.O. Box 16307, Denver, CO 80216
Thomas Coudon Associates, 6655 Amberton Dr., Baltimore, MD 21227
Fitz-Wright Suits Ltd., 17919 Roan Pl., Surrey, B.C., Canada V3S 5K1
Genstar Stone Products Company, Executive Plaza IV, Hunt Valley, MD 21031
Harvey's Commercial Marine Div., 2505 S. 252nd St., Kent, WA 98032
b.v. Holmatro Industrial Equipment, P.O. Box 33, 4940 aa Raamsdonksveer, Holland
Imperial Manufacturing Co., P.O. Box 4119, Bremerton, WA 98312
Juniper Industries Inc., 72-15 Metropolitan Ave., Middle Village, NY 11379
Kearfott Marine Products, 550 South Fulton Ave., Mount Vernon, N.Y. 10550
Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302
John P. Nissen, Jr. Company, Glenside, PA 19038
Stal-Laval Turbin AB, S-612 20 Finspong, Sweden
EVAPORATORS
Alfa-Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
Aqua-Chem Inc., P.O. Box 421, Milwaukee, WI 53201
MECO (Mechanical Equipment Company, Inc.), 861 Carondelet St., New Orleans, LA 70130
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130
FANS—VENTILATORS—BLOWERS
American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Argo Marine, 140 Franklin St., New York, NY 10013
Gaylord Industries, Inc., P.O. Box 558, Wilsonville, OR 97070
Hartzell Fan, Division of Castle Hills Corp., 901 S. Downing St., P.O. Box 919, Piqua, OH 45356
Joy Manufacturing Company, 338 So. Broadway, New Philadelphia, OH 44663
Zidell Explorations, 3121 S.W. Moody St., Portland, Ore. 97201
FENDERING SYSTEMS—Dock & Vessel
Hughes Bros., Inc., 17 Battery Place, New York, N.Y. 10004
InterTrade Industries, 15301 Transistor Lane, Huntington Beach, CA 92649
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Samson Ocean Systems, Inc., 99 High St., Boston, MA 02110
Seaward International, Inc., 6269 Leesburg Ave., Falls Church, Va. 22044
FILTERS
Dahl Manufacturing, Inc., 2521 Railroad Ave., Ceres, CA 95307
Mueller Steam Specialty, P.O. Box 1569, Lumberton, NC 28359
Wm. W. Nugent & Co., P.O. Box 948, Skokie, IL 60076
FINANCING—Leasing
A.G. Becker Paribus Inc., 2 First National Plaza, Chicago, IL 60670
Gulf Western Leasing Corp., 1500 City West Blvd., Suite 300, Houston, TX 77047
Yegen Marine, P.O. Box 25504, Ft. Lauderdale, FL 33320
FIRE PROTECTION, DETECTION, & ALARM SYSTEMS
EEV, Inc., 7 Westchester Plaza, Elmsford, NY 10523
Gulf Publishing Company Video (Firefighting Videotape), P.O. Box 2608, Houston, TX 77001
Walter Kidde, Walter Kidde Dr., Wake Forest, NC 27586
Wormald Fire Systems, One Stanton St., Marinette, WI 54143
FUEL OIL/ADDITIVES—Analysis & Combustion Testing
Ferrous Corporation, 910-108th N.E., P.O. Box 1764, Bellevue, WA 98009
Fuji Trading (America) Ltd., 17 Battery Place, New York, NY 10004
McTigue Industries Inc., 1615 9th Ave., Bohemia, NY 11716
U.S. Borax, 3075 Wilshire Blvd., Los Angeles, CA 90010
FURNITURE
Bailey Carpenter & Insulation Co., 74 Sullivan Street, Brooklyn, N.Y. 11231
Comfort-Mate, Inc., 7988 NW 56th Street, Miami, FL 33166
GALLEY EQUIPMENT
Argo Marine, 140 Franklin St., New York, NY 10013
Insinger Machine Co., 6245 State Rd., Philadelphia, PA 19135
GANGWAYS
Rampmaster Inc., 9825 Osceola Blvd., Vero Beach, FL 32960
HATCH & DECK COVERS—Chain Pipe
Camlock Flange Sales Corp., 60 Inip Dr., Inwood, NY 11696
Hayward Marine Products, 900 Fairmount Avenue, Elizabeth, NJ 07207
Marine Moisture Control Co., 60 Inip Dr., Inwood, N.Y. 11696
MacGregor-Navire International, Box 8991, S-402 74 Goteborg, Sweden
MacGregor Navire U.S.A. Inc., 135 Dermody St., Cranford, NJ 07016
Mock Manufacturing Inc., 777 Rutland Rd., Brooklyn, NY 11203
J.E. Steigerwald Co., Inc., 5515 Belair Rd., Baltimore, MD 21206
HEAT EXCHANGERS
Alfa-Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
American Standard Inc., Heat Transfer Div., Buffalo, NY 14240
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130
HOLD LINERS
Himont U.S.A., Inc, 1313 N. Market St. Wilmington, DE 19894
HULL CLEANING
Butterworth Inc. (USA), 3721 Lapas Dr., P.O. Box 18312, Houston, TX 77223–9989
Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
Gulf International Divers, P.O. Box 1342, Gretna (New Orleans), LA 70052
Pacific Maine Services, TLX: 664540 seaserv, Long Beach, CA 90802
Performance Hull Cleaning Services, Inc., P.O. Box 655, New Orleans, LA 70059-0655
Petrochemical Services, Inc., 3820 Dauphine St., New Orleans, LA 70117
Phosmarine Equipment, 21 Bd. de Paris, 13002, Marseille, France
Seaward Marine Services, Inc., 6269 Leesburg Pike, Falls Church, VA 22044
Stork Services B.V., P.O. Box 2013, 7750 CA Hengelo, Holland
Taylor Diving & Salvage Co. Inc., 701 Engineers Rd., Belle Chasse, LA 70037
HYDRAULICS
Aeroquip Corp., 1130 Maynard Road, Jackson, MI 49202
Del Gavio Marine Hydraulics Inc., 207 W. Central Ave., Maywood, NJ 07607
HRS, Inc., 3334 Victor Court, Santa Clara, CA 95050
Hydronautics, 6338 Lindmar Drive, Goleta, CA 93017
Washington Chain & Supply, Inc., P.O. Box 3646, Seattle, WA 98124
INERT GAS—Generators—Systems
Camar Corp., 186 Prescott St., Worcester, MA 01605
Foster Wheeler Boiler Corp., 110 So. Orange Ave., Livingston, N.J. 07039
Maritime Protection A/S, N. American Agents, American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Salwico Inc., 5 Marine View Plaza, Hoboken, NJ 07030
INSULATION—Cloth, Fiberglass
Bailey Carpenter & Insulation Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
Superior Energies, Inc., P.O. Drawer 386, Groves, TX 77619
Waco Inc., 5450 Lewis Rd., P.O. Box 836, Sandston, VA 23150-0836
INSURANCE
Adams & Porter, 510 Bering Dr., Houston, TX 77057-1408

Adams & Porter, 1 World Trade Center, Suite 8433, New York, N.Y. 10048
Assurance Foreningen Skuld, P.O. Box 1376 Vika, Stortingagoten 18, N-OSLO 1, Norway
R.A. Fulton & Company Insurance Services, 100 California St., San Francisco, CA 94111
MGA International, 419 Park Avenue South, New York, NY 10016
Midland Insurance Co., 160 Water St., New York, N.Y. 10038
United States P&I Agency, Inc., 80 Maiden Lane, New York, NY 10038
JOINER—Watertight Doors—Paneling
Advanced Structures Corp., 235 W. Industry Ct., Deer Park, NY 11729
Bailey Distributors, Inc., 74 Sullivan St., Brooklyn, NY 11231
Isolamin Panels, c/o Consafe, Inc., P.O. Box 40339, Houston, TX 77040
Masonite Commercial Division, Dover, OH 44622
Megodoor Inc., 441 Lexington Ave., Suite 903, New York, NY 10017
Simpson Timber Company, Third & Franklin, Shelton, WA 98584
Walz & Krenzer, Inc., 400 Trabold Road, Rochester, NY 14624
KEEL COOLERS
R.W. Fernstrum & Co., 1716 Eleventh Ave., Menominee, MI 49858
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights
ACR Electronics, Inc., P.O. Box 2148, Hollywood, FL 33022
Keuffel & Esser/Kretos, 20 Whippany Rd., Morristown, NJ 07960
Midland-Ross Corp., Russellstall Division, 530 W. Mt. Pleasant Ave., Livingston, NJ 07039
Oceanic Electrical Mfg. Co., 157 Perry St., New York, NY 10014
Oreck Corp., 100 Plantation Rd., New Orleans, LA 70123
Perko Inc., P.O. Box 6400D, Miami, Florida 33164
Phoenix Products Company, Inc., 4769 North 27th Street, Milwaukee, WI 53209
Port Electric Supply Corp., 248-264 Third St., Elizabeth, NJ 07206-0434
SSAC Inc., P.O. Box 395, Liverpool, NY 13088
LINE BLINDS
Stacey/Fetterolf Corp., P.O. Box 103, Skippack, PA 19474
MACHINE TOOLS
Republic-Lagun Machine Tool Co., 1000 E. Carson St., Carson, CA 90749
MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING
A-C Brake Co., 308 E. College St., Louisville, KY
AMT Inc., 2400 N.W. 39th Ave., Miami, FL 33142
Amermarine USA Inc., P.O. Box 9205, Baltimore, MD 21222
American General/Levin Corp., 445 Littlefield Ave., So. San Francisco, CA 94080
Essex Machine Works, Essex, CT 06426
Golten Marine Co., Inc., 60 Van Brunt St., Brooklyn, NY 11231
Jered Brown Brothers Inc., 1300 Coolidge, P.O. Box 2006, Troy, MI 48007-2006
Rosan, Inc., 2901 West Coast Hwy., Newport Beach, CA 92663
Scotchman Industries, Inc., P.O. Box 850, Philip, SD 57567-0850
METALS
Bayou Steel Corp., P.O. Box 5000, Laplace, LA 70068
Inland Steel Company, 30 West Monroe Street, Chicago, IL 60603
International Grating, Inc., 7625 Parkhurst, Houston, TX 77028
MOORING SYSTEMS
Murdock Machine & Engineering Company of Texas, P.O. Box 2278, Irving, TX 75061
Samson Ocean Systems, Inc., 99 High Street, Boston, Mass. 02110
NAME PLATES—BRONZE—ALUMINUM
Duramax Metals, Inc., 2401 Wesley Street, Portsmouth, VA 23707
NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS
Adams & Chute, Huntingtown Road, Newtown, CT 06470
Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Highway (Suite 1300), Arlington, VA 22202
Aero Nav Laboratories, Inc., 14-29 112 St., College Point, NY 11356
American Systems Engineering Corp., P.O. Box 4265, Virginia Beach, VA 23454
Amirikian Engineering Co., Chevy Chase Center Bldg., Suite 505, 35 Wisconsin Circle, Chevy Chase, Md. 20015

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Bretagne ACB Corp., 344 Camp St., Suite 1000, New Orleans, LA 70130
Carl G. Brimmekamp & Co., Inc., 102 Hamilton Ave., Stamford, CT 06902
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, Mass. 02052
John P. Colletti & Associates, P.O. Box 13378, Pittsburgh, PA 15243
Crandall Dry Dock Engrs., Inc., 21 Pottery Lane, Dedham, Mass. 02026
Crane Consultants Inc., 15301 1st Ave., So. Seattle, Washington 98148
C.R. Cushing & Co., Inc., One World Trade Center, New York, N.Y. 10048
Design Associates Inc., 14360 Chef Menteur Highway, New Orleans, LA 70129
Designers & Planners, Inc., 1725 Jefferson Davis Highway, Suite 700, Arlington, VA 22202
ECO Inc., 1036 Cape St. Claire Center, Annapolis, MD 21401
Encon Management & Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706
Fleetweather Ocean Services, Inc., Rd. # 2, Box 260, Hopewell Junction, NY 12533
Christopher J. Foster, Inc., 16 Sintsink Drive East, Port Washington, N.Y. 11050
GEOD Corporation, 73 Oak Ridge Road, NJ 07438
Giannotti & Associates, Inc., 703 Giddings Ave., Suite U-3, Annapolis, MD 21401
Gibbs & Cox, Inc., 119 West 31st Street, New York, NY 10001
John W. Gilbert Associates, Inc., 66 Long Wharf, Boston, MA 02110
The Glosten Associates, Inc., 610 Colman Bldg., 811 First Ave., Seattle, WA 98104
Phillip Gresser Associates, Ltd., 3250 South Ocean Blvd., Palm Beach, FL 33480
Morris Guralnick Associates, Inc., 620 Folsom Street, Suite 300, San Francisco, CA 94107
Hamilton Cornell Associates, Box 188, Snug Harbor Station, Duxbury, MA 02331
J.J. Henry Co., Inc., Two World Trade Center—Suite 9528, New York, N.Y. 10048
Hi-Test Laboratories, Inc., P.O. Box 226, Buckingham C.H., VA 23921
Hoffman Maritime Consultants Inc., P.O. Box 186, Glen Head, NY 11545
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
Capt. Ernest James, 2849 Beavercrest Dr., Lorain, OH 44053
Jantzen Engineering Co., 6655-H Amberton Drive, Baltimore, Md. 21227
J.L. Konopasek & Associates, 3523 Scrimshaw Dr., Jacksonville, Fl 32217
James S. Krogen & Co., Inc., 3333 Rice St., Miami, Fla. 33133
Rodney E. Lay & Associates, 13891 Atlantic Blvd., Jacksonville, FL 32225
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
John J. McMullen Associates, Inc., 1 World Trade Center, New York, N.Y. 10048
MacLear & Harris, Inc., 28 West 44 Street, New York, N.Y. 10036
Fendall Marbury, 1933 Lincoln Drive, Annapolis, MD 21401
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, Ohio 44114
Marine Design Inc., 401 Broad Hollow Road, Rte. 110, Melville, N.Y. 11746
Marine Power Associates, 4475 Mission Blvd., Suite 235, San Diego, CA 92109
Marine Technical Associates, Inc., 95 River Rd., Hoboken, NJ 07030
George E. Meese, 194 Acton Rd., Annapolis, Md. 21403
Metritape Inc., P.O. Box 2366, Littleton, MA 01460
R. Carter Morrell, 715 S. Cherokee, Bartlesville, OK 74003
NKF Engineering Assoc., Inc., 8150 Leesburg Pike, Vienna, VA 22202
Nelson & Associates, Inc., 610 Northwest 183rd St., Miami, FL 33169
New England Engineering & Marine Services, Rt. 2, Box 50, York, ME 03909
Nickum & Spaulaing Associates, Inc., 2701 First Ave., Seattle, WA 98121
Northern Marine, P.O. Box 1169, Traverse City, MI 49685
Ocean-Oil International Engineering Corporation, 3019 Mercedes Blvd., New Orleans, La. 70114
PRC Guralnick, 5252 Balboa Ave., San Diego, CA 92117
Pearlson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, Florida 33156
S.L. Petchul, Inc., 1380 S.W. 57th Avenue, Fort Lauderdale, FL 33317
Precision Systems Engineering, 824B Eastgate Dr., Mt. Laurel, NJ 08054
M. Rosenblatt & Son, Inc., 350 Broadway, New York, NY 10013 and 667 Mission St., San Francisco, CA 94105
Schmahl and Schmahl, Inc., 1209 S.E. Third Ave., Fort Lauderdale, Florida 33316
SEACOR Systems Engineering Associates Corp., 19 Perino Blvd., Cherry Hill, NJ 08003 (Publications Division at Cherry Hill location)
STV/Sanders & Thomas, Inc., 1745 Jefferson Davis Hwy., Arlington, VA 22202
Seaworthy Engine Systems, 36 Main Street, Essex, CT 06426
Seaworthy Engine Systems, 17 Battery Place, New York, NY 10004
George G. Sharp, Inc., 100 Church St., New York, N.Y. 10007
Simmons Associates, P.O. Box 760, Sarasota, FL 33578
R.A. Stearn, Inc., 253 N. 1st Ave., Sturgeon Bay, WI 54235
J.F. Stroschein Associates, 666 Old Country Rd., Garden City, NY 11530
Richard R. Taubler, Inc., 610 Carriage La., Dover, DE 19901
Timsco, 622 Azalea Road, Mobile, AL 36609
Tracor Hydronautics, Inc., 7210 Pindell School Rd., Laurel, MD 20707
Uhlig & Associates, Inc., 8295 SW 188th St., Miami, FL 33157
Vevey Engineering Works Ltd., CH–1800 Vevey, Switzerland, U.S. Rep: Carl G. Brimmekamp & Co., Inc., 102 Hamilton Ave., Stamford, CT 06902
Thomas B. Wilson, Associates, 1258 North Avalon Blvd., Wilmington, CA 90744
Yacht Design Institute, 9 Main St., Blue Hill, ME 04614

NAVIGATION & COMMUNICATIONS EQUIPMENT

American Hydromoth Co., Buckwheat Bridge Rd., Germantown, N.Y. 12526
Anschutz & Co. GmbH, Postfach 6040, D-2300 Kiel 14, West Germany
Atkinson Dynamics, Section 6, 10 West Orange Ave., South San Francisco, CA 94080
CMC Communications Inc., 5479 Jetport Industrial Blvd., Tampa, FL 33614
COMSAT World Systems, 950 L'Enfant Plaza, S.W., Suite 6151 Washington, D.C. 20024
Cybernet International, Inc., 7 Powder Horn Dr., Warren, NJ 07060
A/S Elektrisk Bureau, P.O. Box 98, N-1360 Nesbru, Norway
Electro-Nav Inc., 840 Bond Street, Elizabeth, NJ 07201
EPSCO Marine, 550 Wholesalers Parkway, Harahan, LA 70123
Fleet Marine, 1820 N.E. 146th Street, North Miami, FL 33181
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
Harris Communications (RF Communications), 1680 University Avenue, Rochester, NY 14610
Henschel Corp., 9 Hoyt Drive, Newburyport, MA 01950
Hose McCann Telephone Company, Inc., 9 Smith Street, Englewood, NJ 07631
Japan Radio Co., Ltd., Akasaka Twin Tower (Main), 17-22 Akasaka 2-chome, Minato-ku, Tokyo 107, Japan
King Radio Corporation, 400 North Rodgers Rd., Olathe, KS 66062
Kongsberg North America Inc., 400 Oser Ave., Hauppauge, NY 11738
Kongsberg Vapenfabrikk, Norcontrol Division, P.O. Box 145, Horten 3191, Norway
Krupp Atlas-Elektronik, 1453 Pinewood St., Rahway, NJ 07065
Lorain Electronics Corp., 2307 Leavitt Rd., Lorain, OH 44052
Magnavox Navigation Systems, 2829 Maricopo Street, Torrance, CA 90503
Magnum Distributors Inc., 1000 S. Dixie Hwy. #3, Pompano Beach, FL 33060
Nav-Com, Inc., 9 Brandywine Drive, Deer Park, NY 11729
Navidyne Corp., 11824 Fishing Point Drive, Newport News, VA 23606
Perko Inc. (Lights), P.O. Box 6400D, Miami, FL 33164
Racal-Decca Marine, Inc., 4200 23rd Avenue West, Seattle, WA 98199
Radar Devices, Inc., 2955 Merced Street, San Leandro, CA 94577
Radio-Holland USA, Inc., 6033 South Loop East, Houston, TX 77033
Raytheon Marine Co., 676 Island Pond Road, Manchester, N.H. 03103
Raytheon Ocean Systems Company, Westminster Park, Risho Avenue, East Providence, RI 02914
Raytheon Service Co., 103 Roesler Rd., Glen Burnie, MD 21061
Rivertronics, P.O. Box 247, Godfrey, IL 62035
Robertson Auto Pilot, 400 Oser Ave., Hauppauge, NY 11738
Selesmar S.p.A., Casella Postale 9, 50020 Montagnana Val Di Peso, Firenze, Italy
Servo Corporation of America, 111 New South Road, Hicksville, NY 11802
Simrad, Inc., 2208 N.W. Market St., Suite 600, Seattle, WA 98107
Sperry Corporation, Great Neck, NY 11020
Standard Communications, P.O. Box 92151, Los Angeles, CA 90009
Texas Instruments, Inc., P.O. Box 405, 3438, Lewisville, TX 75067

OILS—Marine—Additives

Exxon Company, U.S.A., Room 2323 AH, P.O. Box 2180, Houston Tx 77001
Gulf Oil Company—U.S. (Domestic Oils), 909 Fannin Street, Houston, TX 77001
Gulf Oil, New York District Sales Office (Domestic), 433 Hackensack Avenue, Hackensock, NJ 07601
Gulf Oil Trading Co., 535 Madison Ave., New York, NY 10022
Mobil Oil Corp., 150 East 42 Street, New York, NY 10017
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
Texaco, Inc. (International Marine), 135 East 42nd St., N.Y., N.Y. 10017

OIL/WATER SEPARATORS

Alfa Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
Biospherics Incorporated, 5001 Forbes Blvd., Lanham, MD 20801
Butterworth Inc. (USA), 3721 Lopas Dr., P.O. Box 18312, Houston, TX 77223–9989
Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
Centrico, Inc. (Westfalia Separators), 100 Fairway Court, Northvale, NJ 07647
Dohl Manufacturing, Inc., 2521 Railroad Ave., Ceres, CA 95307
Hyde Products, Inc. 810 Sharon Dr., Westlake, OH 44148
Microphor, Inc., P.O. Box 490, Willits, CA 95490
Marine Moisture Control Co., 60 Inip Dr., Inwood, NY 11696
National Fluid Separators, Inc., 1239 Honley Industrial Court, St. Louis, MO 63144
PACE Maine Systems, Div. of St. Louis Ship, 611 E. Marceau St., St. Louis, MO 63111
Phoenix Oil Refiner Co., Inc., 330 Hill Ave., Nashville, TN 37210

PAINTS—COATINGS—CORROSION CONTROL

American Abrasive Metals, 460 Coit Street, Irvington, NJ 07111
Ameron, 4700 Ramona Blvd., Monterey Pak, CA 91754
Argo Marine, 140 Franklin St., New York, NY 10013
Bareco, 6910 East 14th St., Tulsa, OK 74112
A.W. Chesterton Co., Middlesex Industrial Park, Rt. 93, Stoneham, MA 02180
Chugoku Marine Paints (U.S.A.) Inc., 1290 Ave. of Americas, New York, NY 10104
CLEMCO, P.O. Box 7680, San Francisco, CA 94120
"CONSOL" manufactured by Contact Paint & Chemical Co. Inc., 200 S. Franklintown Rd., Baltimore, MD 21223
Dampney Company, Inc., 85 Paris St., Everett, MA 02149
Devoe Marine Coatings Co., P.O. Box 7600, Louisville, KY 40207
Drew Ameroid Marine, One Drew Chemical Plaza, Boonton, NJ 07005
E.I. Dupont De Nemours & Co., Inc., Nemours Bldg. Rm. N-2504-2, Wilmington, DE 19898
Esgard, Box 2698, Lafayette, LA 70502
Eureka Chemical Company, 234 Lawrence Avenue, So. San Francisco, CA 94080
Glidden Coatings & Resins, Architectural & Maintenance, 925 Euclid Ave., Cleveland, OH 44115
Grow Group, Inc., 200 Park Ave., New York, NY 10017
Hempel Marine Paints, Inc., Foot of Currie Ave., Wallington, NJ 07057, 2425 Fountainview, Suite 340, Houston, TX 77057, P.O. Box 10265, New Orleans, LA 70181
International Paint Company, Inc., 2270 Morris Avenue, Union, NJ 07083
Jaegle Paint Co., Inc., 1912 Darby Rd., Havertown, PA 19083
Jotun Marine Coatings Inc., 840 Key Hwy., Baltimore, MD 21230
Magnus Maritec International Inc., 150 Roosevelt Pl., P.O. Box 150, Palisades Park, NJ 07650
Norton Chemplost, 309–150 Dey Rd., Wayne, NJ 07470
Palmer Products Inc., P.O. Box 8, Worcester, PA 19490
Pile-Gard* Manufactured by Osmose-Marine Div., P.O. Drawer 0, Griffin, GA 30224
Products Research & Chemical Corp., 5454 San Fernando Rd., Glendale, CA 91203
Seaguard, 4030 Seaguard Ave., Portsmouth, VA 23705
Selby, Battersby & Company, 5220 Whiby Avenue, Philadelphia, PA 19143
Sermatech International, 4401 SermeTel Dr., Moss Point, MS 39563

PETROLEUM SUPPLIES

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

PIER REPAIRS

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

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

Amermarine International, P.O. Box 9205 Dundalk, MD 21222
Cajon Company, 9760 Shepard Rd., Macedonia, OH 44056
Camlock Flange Sales Corp., 60 Inip Dr., Inwood, NY 11696
Crawford Fitting Company, 29500 Solon Rd., Solon, OH 44139
Hydro-Croft, Inc., 1821 Rochester Industrial Dr., Rochester, MI 48063
Knights Piping Inc., 5309 Industrial Rd., Pascagoula, MS 39567
Metropolitan Plumbing Supply Corp., 5000 Second St., Long Island City, NY 11101
Penco Div./Hudson Engineering Co., One World Trade Center, Suite 3000, New York, NY 10048
Selkirk Metalbestos, Box 19000, Greensboro, NC 27419
Stauff Corporation, 21-31 Industrial Park, Waldwick, NJ 07463
Tioga Pipe Supply Co. Inc., 2450 Wheatsheaf LA., P.O. Box 5997, Philadelphia, PA 19137

PLASTICS—Marine Applications

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

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

American Lohmann Corp., 1415 Chestnut Ave., Hillside, NJ 07205
Aquomaster, 4125 9th Ave., Seattle, WA 98107
Armco Steel/Advanced Materials Div., 703 Curtis St., Middletown, OH 45043
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, La. 70150
Bergen Diesel Inc., 2110 1–10 Service Rd., Kenner, LA 70062
Bird Johnson Company, 110 Norfolk St., Walpole, Mass. 02081
Bombardier, 1051 Dickson, Montreal, Quebec, Canada H1N 2H7
Burmeister & Wain Alpha Diesel AS, DK-1400 Copenhagen K, Denmark
Capitol Gears, 349 N. Hamline Ave., St. Paul, Mn. 55104
Caterpillar Engine Division, 100 N.E. Adams, Peoria, IL 61629
Cincinnati Gear Co., 5657 Wooster Pike, Cincinnati, OH 45227
Colt Industries Inc. (Fairbanks Morse Engine Div.), 701 Lawton Avenue, Beloit, WI 53511
Columbian Bronze Corporation, 216 No. Main Street, Freeport, NY 11520
Combustion Engineering, Inc., Windsor, Connecticut 06095
Daihatsu Diesel (USA) Inc., 180 Adams Ave., Hauppauge, NY 11788
Deutz Corp., 7585 Ponce de Leon Circle, Atlanta, GA 30340
Diesel Marine International, Ltd., c/o NORSHIPCO, P.O. Box 2100, Norfolk, VA 23501
Elliott Company, 1809 Sheridan Ave., Springfield, OH 45505
General Electric Co., Diesel Power Products, 2901 E. Lake Rd., Erie, PA 16531
General Motors, Electro-Motive Division, LaGrange, IL 60525
George Engine Company, Inc., Lafayette, LA
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, NY 11231
Harbormaster, 36 Hancock St., Quincy, MA 02171
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
KaMeWa, P.O. Box 1010, S–68101, Kristinehamn, Sweden
KaMeWa, 1800 West Loop So., Suite 1620, Houston, TX 77027
Krupp Mak Diesels, Inc., 4329-33 Di Paolo Center, Glenview, IL 60025
Lips Propellers, 3617 Koppens Way, Chesapeake, VA 23323
Lufkin Industries, Inc., P.O. Box 749, Lufkin, TX 75901
M.A.N.-B&W Diesel, 2, Ostervej, DK-4960 Holeby, Denmark
MTU of North America, One E. Putnam Ave., Greenwich, CT 06830; 10450 Corporate Dr., Sugarland, TX 77478; 2945 Railroad Ave., Morgan City, LA 70203, 180 Nickerson St., Seattle, WA 98109, 1730 Lynn St., Arlington, VA 22209
MWM-Murphy Diesel, 12 Greenway Plaza, Suite 1100, Houston, TX 77046
Mapeco Products, Inc., 20 Vesey St., New York, NY 10007
Maritime Industries Ltd., 6307 Laurel St. Burnaby, B.C., Canada V5B3B3
Michigan Wheel, 1501 Buchanan Ave., S.W., Grand Rapids, MI 49507
National Marine Service Louisiana, Inc., 222 Bayou Rd., Belle Chasse, LA 70037
Omnithruster Inc., 9515 Sorensen Ave., Santa Fe Springs, CA 90670
Penske GM Power, Inc., 600 Parsippany Road, Parsippany, NJ 07054
Inland Water Propulsion Systems, Inc., 580 Walnut St., Cincinnati, OH 45201
Propulsion Systems, Inc., 21213 76 Ave. So., Kent, WA 98032
SACM (Societe Alsacienne De Constructions Mechaniques De Mulhouse) 1, Rue De La Fonderie, Boite Postale 1210, 68054 Mulhouse Cedex, France
Schottel of America, Inc., 8375 N.W. 56 St., Miami, FL 33166
Karl Senner, Inc., P.O. Box 10055, New Orleans, LA 70181
Skinner Engine Company, P.O. Box 1149, Erie, PA 16512
Stewart & Stevenson Services, Inc., P.O. Box 1637, Houston, TX 77251-1637
Sulzer Brothers, Dept. Diesel Engines, CH-8401 Winterthur, Switzerland
Tech Development Inc., 6800 Poe Ave., P.O. Box 14557, Dayton, Oh 45414
Transamerica DeLaval Inc., Engine & Compressor Div., 550 85th Ave., Oakland, CA 94621
Transamerica Delaval, Inc., Turbine & Compressor Div., P.O. Box 8788, Trenton, N.J. 08650
Turbine Specialties, Inc., P.O. Box 207, West State Street Road, Salina, KS 67401
Turbine Specialties/Gulf Coast, Inc., 1900 Industrial Blvd., Harvey, LA 70058
Ulstein Trading Ltd. A/S, N-6-65, Ulsteinvik, Norway
Voith Schneider America, 159 Great Neck Rd., .Ste 200, Great Neck, NY 11021
Volvo Penta of America, P.O. Box 927, Rockleigh, NJ 07647
WABCO Fluid Power, an American-Standard Company, 1953 Mercer Rd., Lexington, KY 40505
Wartsila Power Inc., 5132 Taravella Rd., P.O. Box 868, Marrero, LA 70072
Waukesha Engine Division, Waukesha, WI 53187
Welco Industries, Inc., 9027 Shell Rd., Cincinnati, OH 45236
ZF of North America, Inc., 3225 Commercial Avenue, Northbrook, IL 60062
ZF of North America, Inc. (Motive Power Corporation, P.O. Box 365, Mineola, NY 11501)

PUMPS—Repairs—Drives

Argo Marine, 140 Franklin St., New York, NY 10013
Jim's Pump Repair, 48-55 36th St., Long Island City, NY 11101
Megator Corporation, 562 Alpha Drive, Pittsburgh, PA 15238
Penco Div./Hudson Engineering Co., One World Trade Center, Suite 3000, New York, NY 10048
Sims Pump Valve Co., Inc., 1314 Park Ave., Hoboken, NJ 07030
Transamerica Delaval, Pyramid Pump Div., P.O. Box 447, Monroe, NC 28110
Vita Motivator Company, 200 West 20th St., New York, NY 10011
Warren Pumps Division, Bridges Avenue, Warren, MA 01083
Wilden Pump & Engineering Co., 22060 Van Buren St., P.O. Box 845, Colton, CA 92324

REFRIGERATION—Refrigerant Valves

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

ROLLING SYSTEMS

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

ROPE—Manilo—Nylon—Hawsers—Fibers

American Mfg. Co., Inc., Willow Avenue, Honesdale, Pa. 18431
Atlantic Cordage Corp., 60 Grant Avenue, Carteret, NJ 07008
DuPont Co., KEVLAR Aramid Fiber, Room G-15465, Wilmington, DE 19898
Norton Chemplost, 309-150 Dey Rd., Wayne, NJ 07470
Samson Ocean Systems, Inc., 99 High Street, Boston, Mass. 02110
Tubbs Cordage Company, P.O. Box 709, Orange, CA 92666
Wall Industries, Inc., P.O. Box 560, Elkin, NC 28621

RUDDER ANGLE INDICATORS—STEERING

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

SAFETY EQUIPMENT

Wormald Fire Systems, One Stanton St., Marinette, WI 54143

SANITATION DEVICES—Pollution Control

Argo Marine, 140 Franklin St., New York, NY 10013
Davit Sales Inc., P.O. Box 232, Jefferson Valley, NY 10535
Envirovac Inc., 1260 Turret Dr., Rockford, IL 61111
FAST Sewage Systems, Div. of St. Louis Ship, 611 East Marceau St., St. Louis, MO 63111
Golar Metal A/S, P.O. Box 70, 4901 Tvedestrand, Norway
Marine Moisture Control Co., Inc., 60 Inip Dr., Inwood, L.I., N.Y. 11696
National Sanitation Foundation, P.O. Box 1468, Ann Arbor, MI 48105

SCAFFOLDING EQUIPMENT—Work Platforms

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

SCUTTLES/MANHOLES

Mock Manufacturing Inc., 777 Rutland Rd., Brooklyn, NY 11203

SHAFT SEALS, REVOLUTION INDICATOR EQUIPMENT

Bird-Johnson Co., 100 Norfolk St., Walpole, MA 02081
Crane Packing Company, 435 Regina Dr., Clarksburg, MD 20734
EG&G Sealol, Engineered Products Div., Marine Products Group, Warwick, RI 02888
Norton Chemplost, 309–150 Dey Rd., Wayne, NJ 07470
Penco Div./Hudson Engineering Co., One World Trade Center, Suite 3000, New York, NY 10048

SHIPBREAKING—Salvage

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

SHIPBUILDING EQUIPMENT

Pearlson Engineering Co., P.O. Box 8, Kendall Branch, Miami, FL 33156
Total Transportation System Inc., 813 Forrest Dr., Newport News, VA 23606
Total Transportation Systems (International) A/S, Bjornegarden, P.O. Box 248, N 5201, Os, Norway

SHIPBUILDING STEEL

Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., Martin Tower, Bethlehem, PA 18018
Tiline, P.O. Box 729, Albany OR 97321
United States Steel Corp., Christy Park Plant, 2214 Walnut St., McKeesport, PA 15132
Welded Beam Company, P.O. Box 280, Perry OH 44081

SHIPBUILDING—Repairs, Maintenance, Drydocking

Advanced Technology, Dept. PZ-01, 7926 Jones Branch Dr., McLean, VA 22102
Alabama Maritime Corp., P.O. Box 3026, Mobile, AL 36652
Amsterdam Drydock Company, Post Box 3006, 1003 AA, Amsterdam, Holland
Arsenale Triestino-San Marco Shipyard, Trieste, Italy, U.S. Rep: Marine Technologies & Brokerage, 33 Rector St., New York, NY 10006

Asmar Shipyards Co., Astilleros y Maestranzs de la Armada, Prat 856, Piso 14, Casilla 150-V, Valporiso, Chile, S.A.
Astilleros Balboa, S.A., c/o Jackson Marine Corp., 17 Battery Place, New York, NY 10004
Atlantic Dry Dock, P.O. Box 276, Ft. George Island, Jacksonville, FL 32226
Atlantic Marine Inc., P.O. Box 138, Ft. George Island, Jacksonville, FL 32226
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, La. 70150
Bath Iron Works Corp., 700 Washington St., Bath, ME 04530
Bay Shipbuilding Corp., 605 North 3rd Ave., Sturgeon Bay, WI 54235
Bender Shipbuilding & Repair Co., Inc., P.O. Box 42, Mobile, AL 36601
Bethlehem Steel Corp., Martin Tower, Bethlehem, PA 18018
Blohm & Voss Company, 55 Morris Avenue, Springfield, NJ 07081
Burmeister & Wain Skibsvaerft A/S, P.O. Box 2122, Refshaleoen-1015 Copenhagen K-Denmark
Burrard Yarrows Corporation, P.O. Box 86099, North Vancouver, B.C., Canada
Caneco Shipyard, Rua Carlos Seidl, 714, Caju, 20.931, Rio de Janeiro, RJ, Brazil
Cantieri Navali Riuniti, Via Cipro, 11, 16100 Genova, Italy
Carrington Slipways Pty. Ltd., Old Punt Rd., Tomago NSW Australia 2322
Conrad Industries, P.O. Box 790, Morgan City, La. 70380
Curacao Drydock Company Inc., 26 Broadway, Suite 741, New York, NY 10004
Daewoo International (America) Corp., 437 Madison Ave., New York, NY 10022
Daewoo Shipbuilding & Heavy Machinery Ltd., Ayangri, Changsung-PO, Koje-Kun, Kyungnam, Korea
Davie Shipbuilding Ltd., P.O. Box 130, Levis, Quebec, Canada G6V6N7
Dorbyl Ltd., Military Road, 1 Industrial Sites, West Bank, 5201 East London, Republic of South Africa
Dravo Marine Equipment Company, Neville Island, Pittsburgh, PA 15225
Dubai Drydocks, P.O. Box 8988, Dubai, United Arab Emirates—U.S.A. Agents: Keppel Marine Agencies Inc., 26 Broadway, New York, NY 10004, 6240 Richmond Ave., Houston, TX 77057
Eastern Marine, Inc., P.O. Box 1009, Panama City, FL 32401
Equitable Shipyards, Inc., P.O. Box 8001, New Orleans, LA 70182
FMC Corp., Marine & Rail Equipment Div., 4700 N.W. Front Ave., Portland, Oregon 97208
Far East Levingston Shipbuilding Ltd., 31 Shipyard Rd., Jurong Town, Singapore 2262
Genstar Marine, 10 Pemberton Ave., No. Vancouver, B.C., Canada V7P 2R1
Gladding-Hearn Shipbuilding Corp., 1 Riverside Ave., Somerset, MA 02725
Golten Marine Co., Inc., 60 Van Brunt St., Brooklyn, NY 11231
HBC Barge, Inc., Grant Building, Pittsburgh, PA 15219
Halter Marine, Inc., P.O. Box 29266, New Orleans, LA 70189
Hitachi Zosen Corp., 1-1-1 Hitotsubashi, Chiyoda-ku, Tokyo 100, Japan
Hoboken Shipyards, Inc., 1301 Hudson St., Hoboken, NJ 07030
Hong Kong United Dockyards Ltd., P.O. Box 534, Kowloon Central Post Office, Kowloon, Hong Kong
Hyundai Mipo Dockyard Ltd., 456 Cheonha-Dong, Ulsan, Korea
I.N.M.A. S.p.A., 19100 La Spezia, v. le S. Bartolomeo 362, Italy
Jakobson Shipyard Inc., P.O. Box 329, Oyster Bay, NY 11771
Jeffboat, Inc., Jeffersonville, Ind. 47130
Keppel Shipyard Limited, 325 Telok Blangah Road, P.O. Box 2169, Singapore 0409
Koch Ellis Barge & Ship Service, P.O. Box 9130, Westwego, LA 70094
Kone Corp., P.O. Box 6, SF-05801, Hyvinkao, Finland
Leevac Corporation, P.O. Box 2607, Morgan City, LA 70381
Paul Lindenau GmbH. & Co., Schiffswerft u. Maschinenfabrik, D-2300 Kiel-Friedrichsort, West Germany
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134
M.A.N. GHH Sterkrade, P.O.B. 110240, D-4200 Oberhausen 11, West Germany
McDermott, Incorporated, 1010 Common Street, New Orleans, LA 77227
Main Iron Works, Inc. P.O. Box 1918, Houma, LA 70361
Marinette Maine Corporation, Marinette, WI 54143
Jos. L. Meyer GmbH & Co., P.O. Box 2990 Papenburg 1, West Germany
Mitsubishi Heavy Industries, Ltd., 5-1, Marunochi 2-chome, Chiyoda-ku, Tokyo, 100 Japan
Monark Boat Co., P.O. Box 210, Monticello, Ark. 71655
Moran Shipping Agencies, 602 Sawyer, Suite 200, Houston, TX 77007
Moss Point Marine Inc., P.O. Box 1310, Escatawpa, MS 39552
Nashville Bridge Company, P.O. Box 239, Nashville, TN 37202
National Marine Service (Shipyard Division), P.O. Box 38, Hartford, IL 62048
National Steel & Shipbuilding Corp., San Diego, Calif. 92112
Neorion Shipyards Syros Ltd., Syros, Greece—U.S.A. Agents: Keppel Marine Agencies Inc., 26 Broadway, New York, NY 10004, 6420 Richmond Ave., Houston TX 77057
Newport News Shipbuilding & Dry Dock Co., 4101 Washington Ave., Newport News, Va. 23607
North Florida Shipyards, P.O. Box 3863, Jacksonville, FL 32206
O.A.R.N. (Officine Allestimento-Riprazioni Navi), P.O. Box 1395, Genoa, Italy 16100
Overseas Shipyards, Inc., 21 West St., New York, NY 10006
Pennsylvania Shipbuilding, P.O. Box 442, Chester, PA 19016
Port Allen Marine Service, P.O. Box 108, Port Allen, LA 70767
Promet (PTE) Ltd., 27 Pandam Rd., Jurong Industrial Estate, Singapore 22
Promet Marine Services Corp., 242 Allens Ave., Providence, RI 02905
Puerto Rico Drydock & Marine Terminals, Inc., P.O. Box 2209, San Juan, Puerto Rico 00903
Rauma-Repola, 26100 Rauma 10, Finland
Samsung Shipbuilding & Heavy Industries Co., Ltd., Samsung Main Bldg. 250, 2Ka, Taepyong-ro, Chung-ku, Seoul, Korea
St. Louis Ship, 611 East Marceau St., St. Louis, MO 63111
Savannah Shipyard Co., P.O. Box 787, Savannah, GA 31402
Schiess Defries, Postfach 111146, Schiess-Str. 61, D-4000 Dusseldorf 11, West Germany
Service Machine Group, Inc., P.O. Box 2664, Morgan City, LA 70381
Southbay Boat Inc., P.O. Box 13308, San Diego, CA 92113
Southern Oregon Marine Engineering and Construction, P.O. Box 1220, Coos Bay, OR 97420
Southwest Marine, Inc., P.O. Box 13308, San Diego, Ca 92113
Swiftships Inc., P.O. Box 1908, Morgan City, LA 70380
Tampa Shipyards Inc., P.O. Box 1277, Tampa, Fl. 33601
Thomas Marine, 37 Bransford St., Patchogue, NY 11772
Todd Shipyards Corp., 1 State St. Plaza, New York, N.Y. 10004
Tracor Marine, P.O. Box 13107, Port Everglades, Fla. 33316
Union Dry Dock & Repair Co., Foot of Pershing Road, Weehawken, N.J. 07087
Vanguard Services, P.O. Drawer A, New Johnsonville, TN 37134
Verolme Estaleiros Reunidos Do Brasil S.A., Rua Buenos Aires, 68, Rio de Janeiro—RJ—Brazil
Vickers Cockatoo Dockyard Pty. Ltd., P.O. Box 162 Milsons Point, N.S.W. 2061, Australia
Walker Boat, P.O. Box 729, Paducah, KY 42002-0729
Zidell Explorations, Inc., 3121 S.W. Moody Street, Portland, OR 97201

SHIPPING—PACKING
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Frank Jeffrey & Assoc., 5201 Westbank Exp., Suite 206, Marrero, LA 70073
M.A. Stream Associates, Inc., 400 Second Ave. W., Seattle, WA 98119

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Dunlap Boat Mfg., 2940 West Pico Blvd., Los Angeles, CA 90006

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Butterworth Inc. (USA), 3721 Lapas Dr., P.O. Box 18312, Houston, TX 77223–9989
Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
Gamlen Marine Division, 375 Allwood Rd, Clifton, N.J. 07013
Gamajet Equipment Div., Sybron Chemicals Inc., 121 S. Maple Ave., So. San Francisco, CA 94080
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Petrochemical Services, Inc., 3820 Dauphine St., New Orleans, LA 70117

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Kongsberg North America Inc., 400 Oser Ave., Hauppauge, NY 11738
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Midland Affiliated Co., 580 Walnut St., Cincinnati, OH 45201
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Turecamo Coastal & Harbor Towing Corp., One Edgewater St., Clifton, Staten Island, N.Y. 10305

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Zidell Explorations, Inc., (Valve Division), 3121 S.W. Moody Avenue, Portland, OR 97201

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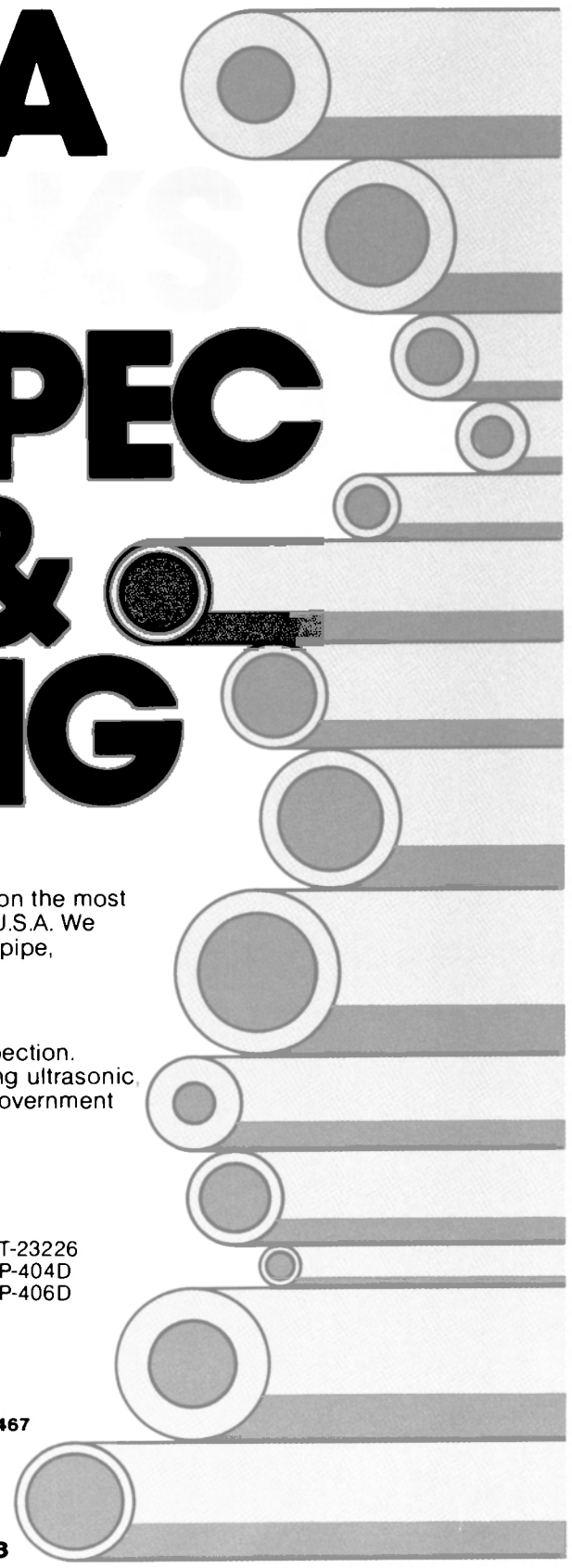

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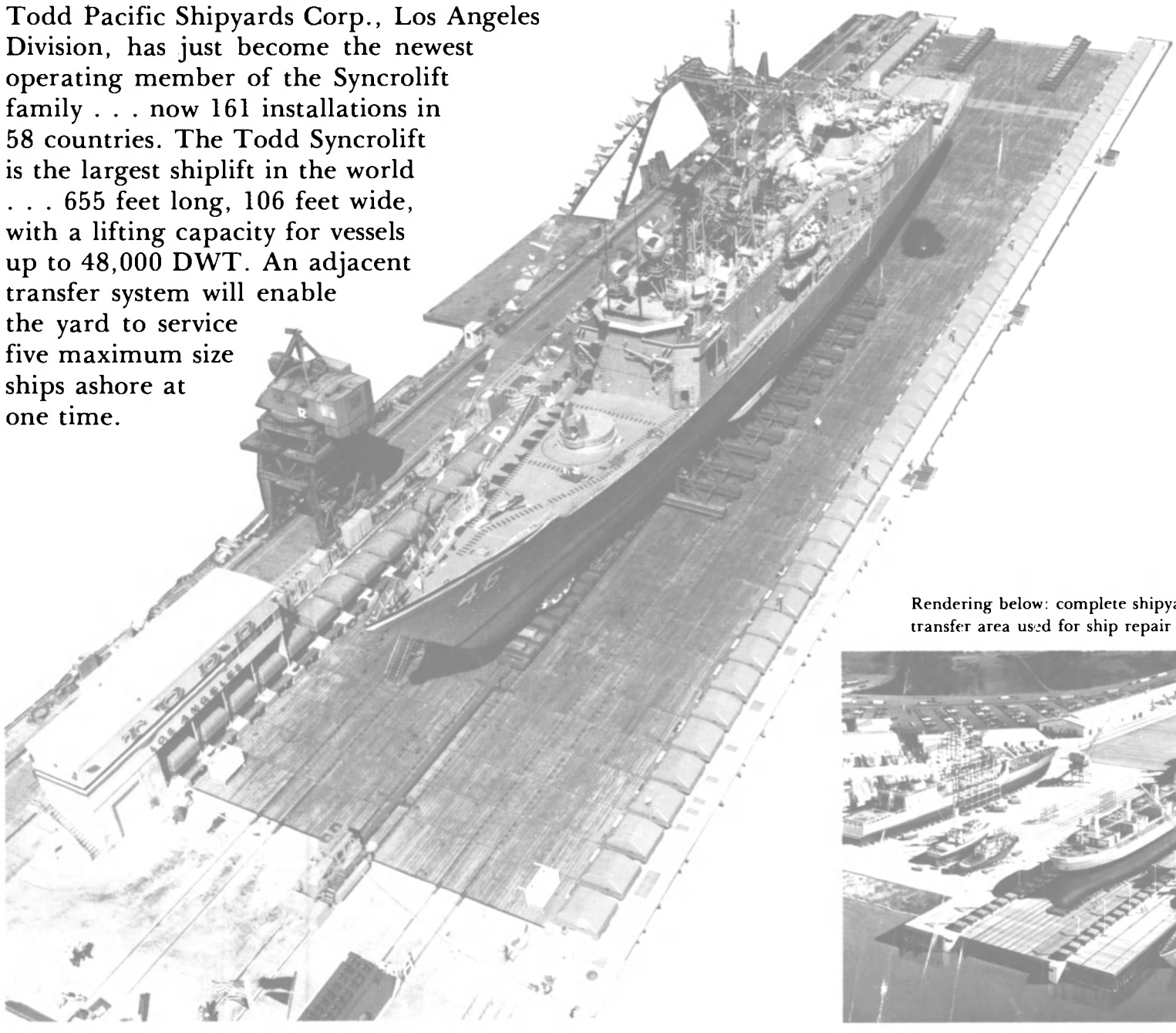

Photograph above taken March 27, 1984, at Inauguration Ceremony.
Photo by Joseph Ernest, Todd Pacific Shipyard.

Rendering below: complete shipyard project including transfer area used for ship repair or new construction.

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