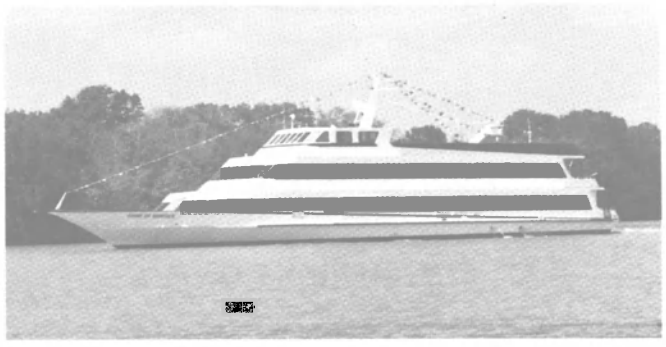
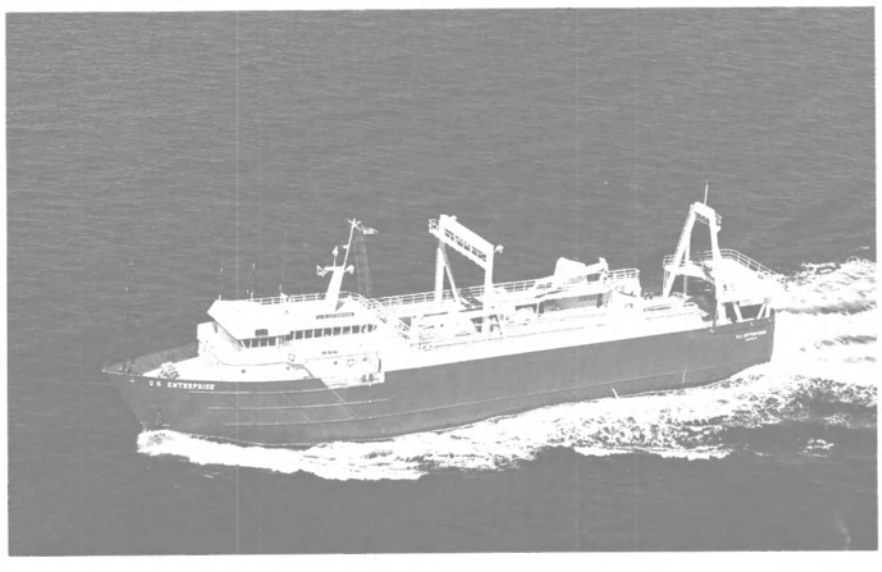
MARITIME REPORTER
AND ENGINEERING NEWS



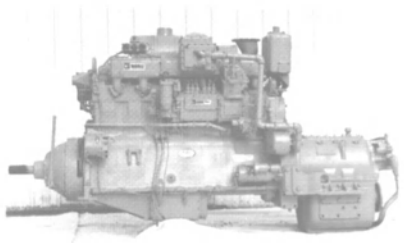


1989 YEARBOOK

JUNE 1989 ISSUE

UMCO

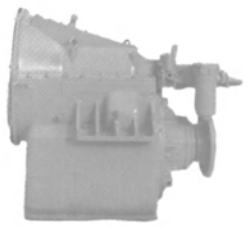
UMCO Standard Caterpillar Fish Boat Package 425 HP, D/353



For over 20 years, Universal Machinery Company has maintained its outstanding reputation known worldwide by providing customers with quality rebuilt Caterpillar engines and power products.

By stocking a large inventory of Caterpillar engines, generators, marine transmissions, parts and attachments we are able to offer quick deliveries of power packages customized to your exact specifications. Being centrally located in the port city of New Orleans also enables UMCO to offer the distinct advantages of diversified transportation services for both our domestic and overseas customers.

UMCO Rebuilt Caterpillar Transmission Models 7251, 7261 Ratios 1.1 - 5.11



All engines, transmissions and related components are rebuilt by highly trained qualified mechanics thereby maintaining the quality of our rebuilt engines to factory standard specifications.

UMCO Rebuilt Caterpillar Exchange Parts

Our large comprehensive parts inventory covering both current and older model Caterpillar engines is maintained for our customers immediate requirements. The availability of new and rebuilt exchange components provided by expert partsmen maximizes your savings while minimizing costly down time.

THE END RESULT - SAVING YOU MONEY Quality, performance and dependabilty with rebuilt Caterpillar engines, generators, marine transmissions and accessories furnished by Universal Machinery Company, Inc.

AN OUTSTANDING VALUE!

What is the difference between these engines?

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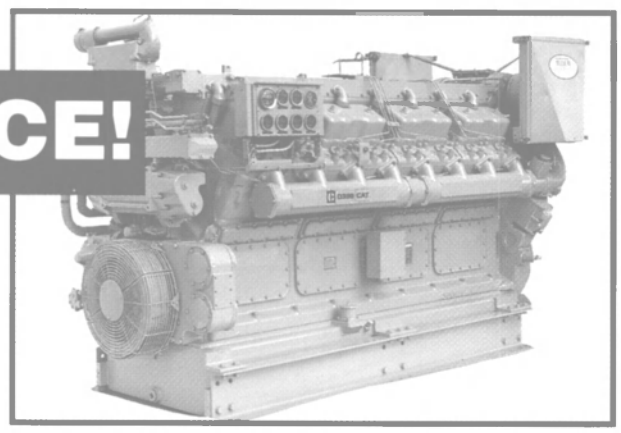

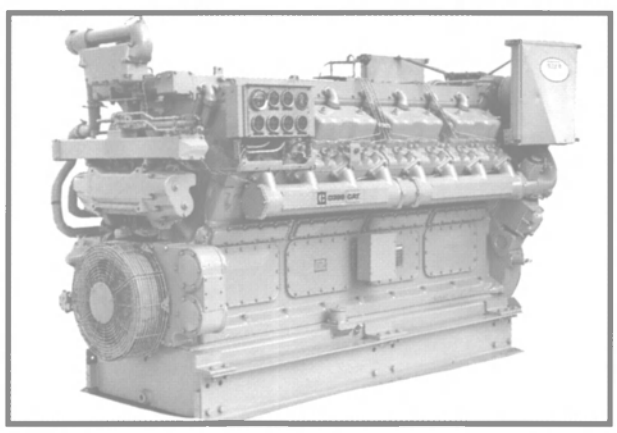

★ PERFROMANCE AND DEPENDABILITY WITH UMCO REBUILT CATERPILLAR ENGINES AND TRANSMISSIONS ★

MORE SAVINGS

Up to 50% DISCOUNTS on new, rebuilt/exchange, and used Caterpillar Parts and New Replacement Parts

WE BUY ENGINES AND PARTS

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Circle 306 on Reader Service Card

The pipe connecting system that leaves other methods dead in the water.

Deutsch offers a total system that joins piping faster, safer and more reliably.

Other methods simply sink to the bottom when compared with the reliability and cost saving features of Pyplok® swage marine fittings.

This proven swage technology developed by Deutsch Metal Components makes the most reliable, permanent pipe connections in a fraction of the time required with hot work-type fittings. And Pyplok® eliminates costly gas freeing, fire watches and drastically reduces system flushing. With Pyplok® NDT is a simple check with a Go-No-Go gage.

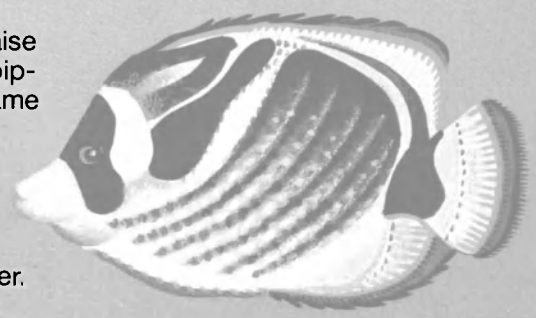
Perhaps more important than the dramatic time and cost savings offered with Pyplok® is its proven* superior performance compared with MIL-F-1183 fittings. In side-by-side comparative tests, Pyplok® endured more punishment, more vigorous testing than its labor-intensive counterpart, including an unprecedented, scorching 2000 degree fire test conducted at a major independent research facility. Pyplok® fittings outperform and outlast MIL-F-1183 connections.

And Deutsch has developed new DLT series tools which have reduced tooling size and weight by nearly 65 percent. That means even easier access into tight, confined compartments. Areas a torch would never fit.

Available in 600 to 6000 psi pressure classes, sizes to 2″ NPS and in a variety of configurations including sweep tees, elbows, couplings and reducers, and in a variety of materials.

When you're ready to raise the performance of your piping systems and, at the same time, substantially reduce its cost, make the connection with Deutsch.

Any other pipe fabrication system would leave you dead in the water.



***For comparative testing information between Pyplok and MIL-F-1183 and a list showing Pyplok® in-use, contact your local Deutsch office or 1-800-DEUTSCH.**

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PYPLOK®
Swage Marine Fittings

DEUTSCH®
METAL COMPONENTS
The source for fluid system components

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ON THE COVER

Photos (clockwise from logo): Birka Princess built by Valmet, Helsinki; LCU, Punta Caxinas, built for the Honduran Navy by Lantana Boatyard; U S Enterprise built by Bender Shipbuilding USS Wasp, an LHD-1 amphibious assault ship, Ingalls Shipbuilding (Ingalls photo); Foss Maritime's tractor tug Andrew Foss; dinner cruise boat, Spirit of Norfolk II, Service Marine Industries; and (center) Panda, oil tanker/chemical carrier, built by 3. Maj for East Asiatic Co.

1989 Yearbook
PAGE 24

New Navy Homeport Dedicated In N.Y.

The new U.S. Navy homeport located in Staten Island, N.Y., was recently dedicated in ceremonies.

Among the principals attending the ceremony were Vice Adm. **Joseph Stover Donnell III**, Commander of the Naval Surface Force, Atlantic Fleet, and Vice Adm. **Leon A. Edney**, Chief of Naval Operations.

The homeport, located in the Stapleton section of Staten Island, will be home to a battle group of about half a dozen ships led by the battleship USS Iowa (BB-61).

The first ships to dock at the homeport were the Aegis cruiser USS Ticonderoga (CG-47) and the destroyer USS Hayler (DD-997). The ships were in the harbor as part of the festivities for the Navy's Fleet Week.

Far East Levingston Gets $100-Million Rig Order

The second oil drilling rig order from Santa Fe International Corp. has been received by Far East Levingston Shipbuilding Ltd.(FELS), a unit of Singapore's Keppel Group.

The $100-Million order is for a Universe-class jackup rig to be completed in 1991. It will be built to designs by Friede & Goldman of New Orleans and is destined for North Sea Drilling.

A $120-million order for a cantilever rig with helipad is nearing completion for Santa Fe by FELS.

Described as more sophisticated than the previous platform, the new platform, dubbed the Galaxy, is capable of working deeper waters. The North Sea is one of the world's most difficult oil-drilling areas.

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Campbell Launches Super Pacific Class Tuna Purse Seiner

Champagne froth flows over the bulbous bow of the tuna superseiner Margaret Z as she is christened at Campbell Shipyard in San Diego.

Campbell Shipyard recently launched its first Super Pacific Class tuna purse seiner, the Margaret Z, being built for the Margaret Z Fishing Company. The vessel is 257 feet long and has a 1,500-ton fish-carrying capacity.

According to Campbell, the new purse seiner design will achieve up to 30 percent savings in annual fuel costs when operated at traditional speeds, and yet will provide a higher speed when the "race to the fish" is on.

Campbell's Super Pacific Class seiners incorporate many other new features suggested by industry veterans, which combine to make these vessels a major advancement for the tuna fishermen of the next decade. In addition to more speed, they feature faster fish loading/unloading; a more rapid freezing system with brine chillers and titanium condensers; a new, fast, 1,000-hp Marco WS550 purse seine winch system; and much more deck space to handle the largest tuna nets.

The Margaret Z is a twin-engine version with one controllable-pitch propeller, which allows the vessel to operate at normal cruising speed on one engine, and to develop top speed with both engines in the highly competitive situations when several vessels are racing for the same school of fish. Having two engines also lengthens the time between overhauls and provides a degree of redundancy.

Campbell has built more than 70 tuna purse seiners in past years and has the capacity to build vessels at a rate of five per year. Six additional superseiners are now under construction for customers in Europe and the Orient, bringing Campbell's current employment to 700.

NMEA Schedules 1989 Annual Meeting

The National Marine Electronics Association (NMEA) has announced plans for its 1989 Annual Meeting and has issued a Call for Papers to be presented at the conference.

The NMEA Annual Meeting will be held October 12-17, 1989, at the Olympic Four Seasons Hotel in Seattle, Wash. The agenda calls for at least two days of technical training seminars to be held by major marine electronics manufacturers for dealer technicians, as well as business workshops, technical papers and committee meetings. The event will be culminated in the Annual Banquet on Tuesday, October 17, at which the NMEA will present its 1989 Product Awards.

Abstracts for papers to be presented at the technical sessions should be submitted no later than July 31, 1989, and should be sent to the attention of the 1989 Papers Chairman, National Marine Electronics Association, P.O. Box 130, Accord, Mass. 02018. Technical papers should address some aspect of marine electronics technology and should not be commercial in nature.

For more information about the NMEA Annual Meeting, contact **Ely Hamaty**, Executive Director, National Marine Electronics Association, P.O. Box 130, Accord, Mass. 02018-0130, phone (617) 878-1723.

Allied-Signal Offers Free Literature On Spectra High-Performance Ropes

Allied-Signal Inc. of Petersburg, Va., is offering free literature on Spectra high-performance ropes, described by the manufacturer as one of the strongest, lightest-weight fibers ever made. Pound for pound it is said to be 10 times stronger than steel and is being used as a replacement for wire rope and synthetics like polyester, nylon, etc.

Recommended marine/commercial fishing applications include topping lifts/fall lines; life lines; oceanographic array lines; trawl net control lines; lightweight purselines; low stretch seine net lines; and deepsea mooring.

Utility/industrial applications include utility winch lines; T & D pulling lines; fiber optic pulling; pilot/fish lines; lifting slings; high-strength chockers; and alternative to wire.

For more information and free literature on Spectra from the High Performance Fibers Group of Allied-Signal Inc.,

Circle 36 on Reader Service Card

Three More Bulkers Ordered By Golden Ocean

With the conclusion of contracts for three Cape-sized bulk carriers from Japanese yards, bulk shipping operator Golden Ocean group has lifted its newbuilding order book to over $400 million.

Golden Ocean has ordered all 10 vessels since last autumn. The latest vessels are of 145,000 deadweight tons and are believed to have been contracted at more than about $42 million each. The three Cape-sized bulk carriers were ordered from separate yards—Kawasaki Heavy Industries, NKK, and Sumitomo Heavy Industries.

The orders follow the contracting by Golden Ocean of a 90,000-ton tanker (to be delivered in March 1991) from Sumitomo, two 260,000-ton tankers from Hitachi, two Panamax-built carriers from Tsuneishi, and two Panamaxes from Sanoyasu, a Sumitomo affiliate. These orders are aimed at securing Golden Ocean's share of the shipping markets in the light of forecast shortages of quality tonnage.

Currently, Golden Ocean operates five Panamaxes and one Cape-sized ship, mostly on traditional time charters.

ASTICAN Offers 18-Page Color Brochure On Facilities And Capabilities

Astilleros Canarios, S.A. (ASTICAN), a full service ship repair yard and the largest marine repair center in the Canary Islands and on the west African coast, is offering an 18-page color brochure on its facilities and capabilities.

The publication lists facts concerning the yard's total area, capacity, main installations including its Syncrolift elevator platform, industrial and secondary installations, cranes, and administrative and service installations.

The brochure states that the yard's equipment and its highly qualified personnel enable it to undertake any type of maintenance, repair or refitting work and offer the highest quality in the shortest time. Every aspect of the yard's work, from elevation and docking to the stringent monitoring of methods and processes, is aimed at minimizing unproductive time for the shipowner. The geographical position of the Canary Islands, with their warm, dry climate and long days throughout the year, is a highly positive factor in this respect.

ASTICAN is technically equipped to undertake periodic overhauls, major repair jobs, stretching operations, and other major refitting jobs.

For more information and free copies of the well-illustrated color brochure from Astilleros Canarios,

Circle 38 on Reader Service Card

← **Circle 247 on Reader Service Card**

APL's container "ships of the future" each have 41 screw pumps aboard.

The President Truman is the first of a new class of five container ships launched during 1988 by American President Lines.

And each pump is a Leistritz.

American President Lines' new C-10 class of container ships is contributing to a significant reduction in the Company's per-unit marine operating costs.

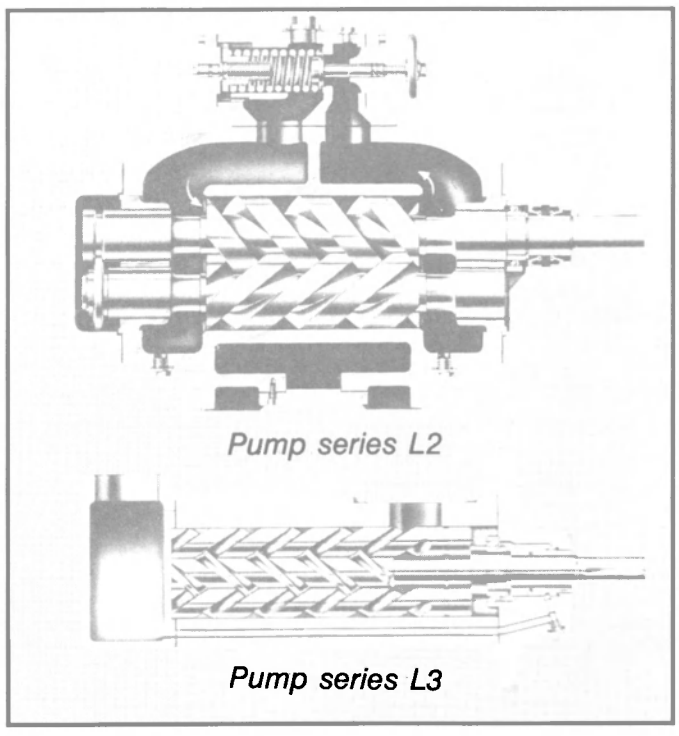
Built in West Germany, these five ships feature a racing-yacht type hull, the world's largest internal combustion engine, and advanced computerized controls.

When it comes to pumping requirements—for lube oil, hydraulic oil, fuel supply, sludge handling, filling and transfer—each of the new APL vessels will be equipped with 41 Leistritz rotary screw pumps.

Designing pumps to meet special fluid-handling requirements is a Leistritz specialty. Leistritz also makes a complete line of standard pumps for both shipboard and industrial applications worldwide. And both our engineered and standard pumps feature the built-in quality, reliability, and efficiency that have made Leistritz a leading name in the industry for more than 60 years.

To find out more about Leistritz pumps and services, call Sven Olson at 201-934-8262, or write Leistritz Corporation, 165 Chestnut Street, Allendale, New Jersey 07401.

Leistritz



Pump series L2

Pump series L3

Circle 257 on Reader Service Card

Vanuatu Appoints Cowley Representative To IMO

Vanuatu recently appointed Dr. **J. Cowley** as its representative to the International Maritime Organization, the U.N. agency concerned with shipping safety and the prevention of pollution from ships.

Prior to his retirement last year, Dr. **Cowley** was the Surveyor General of the Maritime Directorate of the United Kingdom, Department of Transport. His previous positions included Engineer Surveyor in Chief and Chief Examiner of Engineers.

In 1987, Dr. **Cowley** was awarded the International Maritime Prize by IMO. The award is presented annually to the individual or organization judged to have made the most significant contribution to the work and objectives of IMO.

$9.5-Million Navy Contract Awarded Envisions, Inc.

Envisions, Inc. of Chula Vista, Calif., was recently awarded a $9.5-million Navy contract to "implement and manage programs designed to improve efficiency and quality control on board all 15 aircraft carriers of the U.S. Navy Fleet.

The contract, awarded by the U.S. Naval Sea System Command's Field Unit—Planning, Engineering, Repair and Alterations (Aircraft Carriers), calls for Envisions engineers and technicians to develop plans for production of ship's material reports as well as detailed ship's force work reports and quality assurance plans.

Navy Commissions Guided Missile Cruiser

The U.S. Navy recently commissioned the guided missile cruiser USS Philippine Sea at ceremonies in Portland, Maine, at Bath Iron Works shipyard.

Senator **William S. Cohen**, R-Maine, was the principal speaker at the ceremony. **Renee Lyons**, wife of Admiral **James A. Lyons, Jr.**, U.S. Navy (Ret.), was the sponsor of the ship.

USS Philippine Sea is a Ticonderoga Class (CG-47) cruiser built to provide the primary antiair warfare protection for the Navy's battle forces. Equipped with the Aegis combat system, the ship is able to operate in all warfare mission areas to detect, track and destroy enemy aircraft, missiles, submarines and surface ships. The Aegis system, comprising radars, computers and weapons, is designed to function effectively in all weather and hostile countermeasure environments.

USS Philippine Sea is 567 feet in length, has a 55-foot beam and displaces about 9,600 tons. Four GE gas turbine engines enable the ship to reach speeds in excess of 30 knots.

The ship is equipped to carry standard surface-to-air and Tomahawk missiles launched from fore and aft vertical launching systems; the fully automated, radar-controlled Phalanx anti-air weapon system; Harpoon surface-to-surface missiles; two five-inch guns; electronic warfare systems and two Light Airborne Multi-Purpose System (LAMPS) helicopters.

Robertson-Shipmate Offers Free 123-Page Book On Accurate Navigation

Robertson-Shipmate, Inc. recently announced the availability of the 123-page book entitled "GPS—New Perspectives in Accurate Navigation." The publication, originally priced at $10, will be made available at no charge to qualified members of the trade or potential GPS system users.

For a free copy of the book from Robertson-Shipmate

Circle 29 on Reader Service Card

Navy Christens ACS At Tampa Shipyards

The Department of the Navy has christened the auxiliary crane ship USNS Equality State (T-ACS 8) at Tampa Shipyards, Tampa, Fla.

Senator **Malcolm Wallop**, R-Wyo., was the principal speaker at the ceremony. **Mrs. Malcolm Wallop**, wife of the principal speaker, was the sponsor of the ship.

Equality State's mission will be to provide a mobile discharge facility for non-self-sustaining container ships in ports without operational container discharge capability. The ship is equipped with six cranes arranged in three pairs. Each crane is capable of lifting a 20 or 40-foot container; each pair can lift a M-60 battle tank; and four cranes working together can lift a 90-ton causeway. Equality State is 668 feet in length, has a beam of 76 feet and displaces approximately 25,660 long tons. The ship will be operated by the Military Sealift Command. When not in operation, Equality State will be assigned to the Ready Reserve Force maintained by the Maritime Administration.

For free literature detailing the shipbuilding and conversion services of Tampa Shipyards,

Circle 61 on Reader Service Card

Navy Christens MCM At Marinette Marine

The Department of the Navy has christened the mine countermeasures ship USS Champion (MCM-4) at Marinette Marine Corporation, Marinette, Wis.

Senator **Robert W. Kasten, Jr.**, R-Wis., was the principal speaker at the ceremony. **Tina Karalekas**, wife of **S. Stephen Karalekas**, was the sponsor of the ship.

The USS Champion is the latest mine countermeasures ship of the Avenger class built specifically to replace the Navy's aging fleet of ocean minesweepers. These ships will provide enhanced mine-hunting, minesweeping and mine neutralization capability by utilizing state-of-the-art combat systems equipment.

The USS Champion's primary mission will be to hunt, neutralize and sweep mines in coastal waters and critical overseas areas. The ship will be powered by diesel engines that drive two controllable, reversible pitch propellers. It will feature a glass-reinforced, plastic-sheathed wood hull and a degaussing system in order to maintain a very low magnetic signature. Champion is 224 feet in length, has a 39-foot beam and will displace approximately 1,312 tons upon completion.

For free literature detailing the boatbuilding services of Marinette Marine,

Circle 62 on Reader Service Card

Howe Nominated Admiral; To Head U.S. Naval Forces In Europe

The Secretary of Defense **Dick Cheney** has announced that President **George Bush** has nominated Vice Admiral **Jonathan T. Howe**, U.S. Navy, for appointment to the grade of admiral and assignment as Commander in Chief, Allied Forces, Southern Europe/Commander in Chief, U.S. Naval Forces, Europe. Vice Admiral **Howe** is presently serving as Assistant to the Chairman, Joint Chiefs of Staff.

SPD Technologies Names Kott Contract Manager

Michael W. Kott has been named to the new position of contract manager for SPD Technologies, a producer of military circuit-breakers and electrical protection equipment.

In his new position, he will be responsible for the management of all phases of contract management on the G.E. Integrated Electric Drive Program. The project, for which SPD is designing and developing an electrical switchboard and circuit breaker system, is driven electrically rather than by gas turbine.

Unisys Awarded $18.7-Million Contract

Unisys Corporation, Computer Services Division, St. Paul, Minn., is being awarded a $18,742,380 modification to a previously awarded firm-fixed-price contract for AN/USQ-69, AN/USQ-69 with ECP 068 and OL-267 computer equipment units. Work will be performed in Clearwater, Fla. (85 percent), and in St. Paul, Minn. (15 percent), and is expected to be completed by December 1990. This contract combines purchases for the U.S. Navy (99 percent) and Japan (one percent) under the Foreign Military Sales program. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-86-C-5288).

The Detroit Diesel-powered Mark G. Goode is the third ferry delivered by Trinity Marine Group to the Texas Highway and Transportation Department.

Trinity Marine Group Delivers Detroit Diesel-Powered Ferry To Texas Transportation Department

Moss Point Marine, Inc. of the Trinity Marine Group has delivered the 100-foot passenger and vehicle ferry Mark G. Goode to the Texas State Department of Highways and Public Transportation. It has joined six other ferries working between Port Aransas and Aransas Pass, Texas, near Corpus Christi.

The Mark G. Goode is almost identical to the B.L. De Berry, and the J.C. Dingwall, double ended ferries built in 1987 by Halter Marine, Inc., also of the Trinity Marine Group.

The working car deck, with a beam of 44 feet, can accommodate 20 passenger vehicles and 10 walk-on passengers. The elevated pilothouse is designed for total ship control in either direction by the placement of dual commmand stations and unrestricted 360-degree visibility.

Main engine propulsion is provided by two Detroit Diesel 8V92N engines developing 300 bhp at 1,800 coupled to Twin Disc MG 514 reverse/reduction gears with a ratio of 5.16:1. Electrical power is supplied by a pair of 35-kw generators driven by two Detroit Diesel 3-71 engines. The vessel's electrohydraulic steering system was provided by EMI of New Orleans and its pneumatic engine controls were manufactured by Wabco.

A partial list of the navigation and communications equipment includes a Sea-Tec radar with dual display units, two Horizon radio telephones, a Raytheon loud hailer, a Kahlenberg air horn and a Carlisle and Finch searchlight. An EMI engine alarm and fire detection system monitors all critical main engine and ship's services, and a USCG-approved Halon flooding system protects the engine room.

The Goode was built under American Bureau of Shipping rules and regulations and is ABS classed Maltese Cross A-1 Ferry Service, Maltese Cross AMS, Inland Service, and is U.S. Coast Guard certified subchapter "T" with an admeasurement under 100 gross tons.

The Trinity Marine Group is owned by Trinity Industriews, Inc., Dallas, Texas. The group includes Halter Marine, Inc., Moss Point Marine, Inc., Equitable Shipyards, Inc., Gretna Machine and Iron Works, Inc., Aluminum Boats, Inc., Thunderbolt Shipbuilding and Repair, Inc., and HBC Barge, Inc.

For free literature giving complete information on the facilities and capabilities of the Trinity Marine Group,

Circle 17 on Reader Service Card

MARK G. GOODE
List of Suppliers

Main engines	Detroit Diesel
Reverse/reduction gears	Twin Disc
Generator engines	Detroit Diesel
Air Controls	Wabco
Engine monitoring and alarm system	EMI
Electro-hydraulic steering	EMI
Air horn	Kahlenberg
Searchlight	Carlisle & Finch
Radar	Sea-Tec
Radio telephone	Horizon
Air conditioning & heating	Coleman
Engine room exhaust fan	Hartzell
Tail shaft	ARMCO Aquamet
Air compressor	Quincy
Fuel oil filters	Racor

ASNE/SNAME Symposium, Set For January 1990, Sends 'Call For Issues'

A "Call For Issues" was recently sent out for the ASNE/SNAME-sponsored symposium on "Revitalization of the Maritime Industry," scheduled for January 10-12, 1990. Hosts for the conference will be the ASNE Delaware Valley Section and the SNAME Philadelphia Section.

The sponsors are calling for one-page abstracts in the following format: Title; Statement of Problem; Background; Proposed Solution.Topics and typical issues include Maritime Fleet; Shipbuilding & Repair; Facilities; Human Resources; and Engineering Management.

For further information contact **John M. Phinney,** Newport News Shipbuilding, 1260 East Woodland Avenue, Springfield, Pa. 19064; (215) 328-5200.

$2.8-Million Contract For Frigate Repairs Begun By Colonna's Shipyard

Colonna's Shipyard, Norfolk, Va., has begun work on a $2.8-million contract for repairs to the frigate USS Thomas C. Hart (FF-1092).

The contract calls for hull repairs, sandblasting and coating, boiler repairs, electronics and weapons repair and installation, CHT modifications, installation of a Halon fire-fighting system, modifications to the fin stabilizers and miscellaneous deck machinery repairs.

Colonna's Shipyard, located on the Eastern Branch of the Elizabeth River in Norfolk, is a family-owned full-service shipyard which provides ship repairs for commercial and government vessels up to 800 feet.

For free literature giving complete information on the facilities and capabilities of Colonna's Shipyard,

Circle 43 on Reader Service Card

MMA Seminar Held In Pascagoula, Miss.

The Marine Machinery Association (MMA) recently held a seminar in Pascagoula, Miss., on machinery purchasing. The seminar brought together the major shipbuilding yards, some of the principal suppliers of marine equipment, and the Navy for an in-depth look at current issues arising under the new construction programs.

A highlight of the program was a panel discussion led by MMA's president **Jim Fromfield** of Leslie Controls. Panel members **Patrick Thomas** of Bath Iron Works, **Jim Riordan** of General Dynamics' Electric Boat Division, **E.F. Lagonegro, Mort Johnson, Tom Sims**, and **Don Snetsinger** of Ingalls Shipbuilding engaged in discussions with the audience covering issues such as how to deal wiht the current shortage of electric motors and the effects of competition on standardization of equipment within a class of ships.

For further details on the MMA,

Circle 70 on Reader Service Card

Navy Awards $5.7-Million Contract To Norfolk Shipbuilding

Norfolk Shipbuilding and Drydock Corporation, Norfolk, Va., has been awarded a $5,722,062 firm-fixed-price contract for the regular overhaul of USS Yellowstone (AD-41). The work is expected to be completed by October 1989. The contract was awarded by the Supervisor of Shipbuilding, Conversion and Repair, Portsmouth, Va. (N00024-85-H-8195).

Great Lakes Energy Named Supplier Of DDC 6-110 Engine Parts

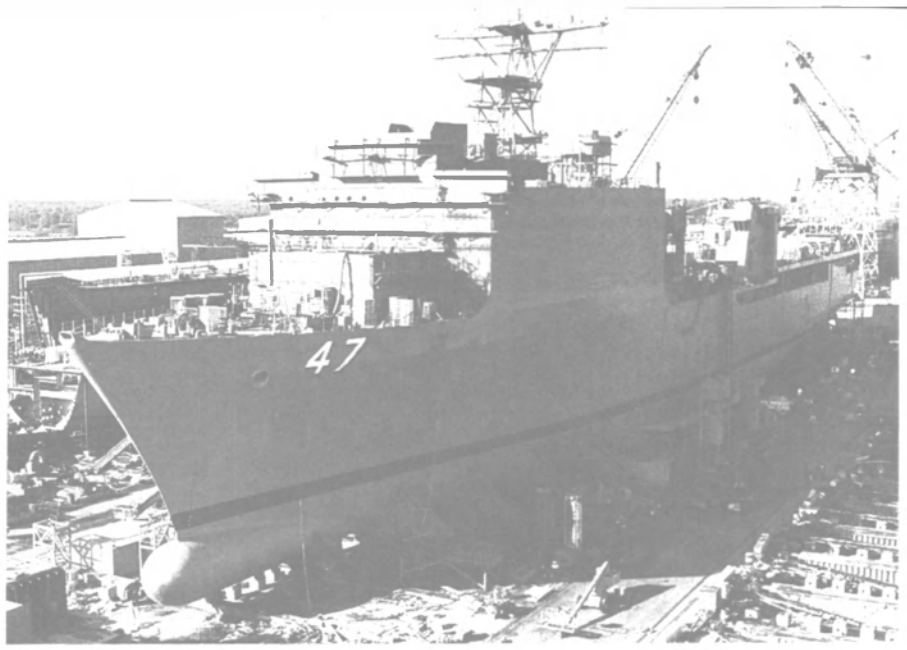
Great Lakes Energy Systems, Columbus, Ohio, is now the exclusive international supplier for Detroit Diesel 6-110 engine parts and components. Great Lakes has purchased all of the 6-110 parts, and the rights to manufacture new parts, from the Detroit Diesel Corporation, according to **Bruce McLeish**, vice president and general manager.

"Although Great Lakes is now the exclusive supplier, nothing has changed for the customer. Customers will continue to purchase parts through the existing Detroit Diesel distribution network," Mr. **McLeish** explained.

Great Lakes Energy Systems, a subsidiary of the Columbus, Ohio-based W.W. Williams Company, sells and services diesel engines, automatic transmissions and generator sets through its branches in Akron, Cleveland, Columbus, Toledo and Youngstown, Ohio. The new 6-110 parts division is headquartered in Cleveland, Ohio.

For more information and free literature from Great Lakes Energy Systems,

Circle 19 on Reader Service Card



The USS Rushmore is pictured while under construction at Avondale Industries.

Avondale Christens USS Rushmore, Fourth In Series Of LSDs For USN

NBC anchorman **Tom Brokaw** and South Dakota Governor **George S. Michelson** were among a number of South Dakota dignitaries who participated recently in the christening and launch of the USS Rushmore at Avondale Industries in New Orleans, La.

The Rushmore is the fourth in a series of Landing Ship Dock (LSD) vessels being built for the U.S. Navy by Avondale's Shipyards Division. It is scheduled for delivery in early August.

Mr. **Brokaw,** a native of South Dakota, was principal speaker at the christening; his wife, **Meredith A. Brokaw,** was the ship's sponsor. Governor **Mickelson** also delivered remarks at the ceremony and his wife, **Linda Michelson**, served as matron of honor.

Another South Dakota native, **Al Neuharth,** co-founder of USA Today, also attended the ceremony.

The Rushmore, like her sister LSD ships, is 610 feet long, has a beam of 84 feet, and a maximum draft of 19 feet 7 inches, displacing 15,623 long tons. She stands 175 feet tall, has a depth of 44 feet 6 inches and is capable of service speeds of 20 knots.

The LCACs which will be carried by the Rushmore also are being built by Avondale at its recently acquired Gulfport marine facility.

The LSDs are multi-functional ships capable of a wide range of amphibious assault operations for the Navy and the U.S. Marine Corps. Their primary mission is to carry, launch and dock up to four Landing Craft Air-Cushion (LCAC) vessels. In combination with the LCACs, the LSD ships permit landing of troops through beach obstacles and heavy surf to potential trouble spots around the world.

The ship christened and launched at Avondale is the second to bear the name Rushmore. The original Rushmore was launched in May 1944, and participated in four amphibious landings, earning three battle stars during World War II.

In addition to Mr. **Brokaw** and Governor **Michelson,** other christening speakers included U.S. Representative **Bob Livingston** (R-La., **Albert L. Bossier Jr.,** chairman and CEO, Avondale Industries; Capt. **Paul D. Hurst,** USN, Supervisor of Shipbuilding Conversion and Repair, New Orleans; and Capt. **Joseph F. King,** USN, Deputy Commander for Amphibious, Auxiliary, Mine and Sealift Ships, representing the Commander of Naval Sea Systems Command.

The Rushmore and other Navy ships under construction at Avondale are built using state-of-the-art modular construction techniques for prefabricated units. The large modular units are assembled and outfitted with piping, ventilation ducts, electrical wireways, and other equipment, in designated zones of the shipyard. The pre-outfitted modules are then moved to the building site and erected into complete ships. Prepackaged units of heavy machinery are assembled ashore and then lifted aboard ship for installation.

Avondale, headquartered in metro New Orleans, is one of the nation's leading marine fabricators. Its Shipyards Division was founded in 1937. In addition to its shipbuilding operations, the company specializes in boat and landing craft (LCAC) construction. It is also a major marine repair contractor, serving both military and commercial customers in addition to engaging in modular construction for many land-based industrial applications, such as electrical power plants.

For free literature containing full information on the facilities and capabilities of Avondale Industries,

Circle 11 on Reader Service Card

Navy Awards $310-Million Contract To Avondale Industries

Avondale Industries Incorporated, New Orleans, La., was awarded a $310,026,350 modification to a previously awarded fixed-price contract for three T-AO 187 class fleet oilers. The work is expected to be completed in February 1992. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-2050).

Wartsila—Turku Shipyard Delivers New Baltic Cruiser 'Athena'

The M/S Athena, a new Baltic cruiser ordered by Rederi AB Slite of Sweden, has been delivered by Wartsila Marine's Turku Shipyard. The vessel recently departed from Turku on her maiden voyage, which will include stops in Mariehamn and her home port of Slite before arrival in Stockholm.

The new cruiser will operate in Viking Line traffic between Stockholm and Mariehamn. She is in the same size category as the other Baltic cruisers which are among the largest in the world. She has a capacity of 2,200 passengers.

The Athena has a maximum length of about 580.4 feet, breadth of 98 feet and draft of 19.6 feet. With a speed of 21 knots, the 40,058-ton Athena is powered bv 4 x Wartsila Sulzer 9 ZAL 40 S main engines with a total of 23,760 kw (32,400 hp). She is fitted with 4 x Wartsila oR32D auxiliary engines, total 9,000 kw (12,240 hp).

Most of the 2,200-passenger ship's 599 cabins are located on the top decks. All 70 luxury-class cabins have a large, curving panorama window which ensures an excellent view of the sea.

The Turku Shipyard is also building a sister ship for the M/S Athena, with delivery scheduled for next year. The keel block was recently put in place at the Turku yard to mark the beginning of hull assembly.

For free literature giving full information on the capabilities and facilities of Wartsila Marine,

Circle 10 on Reader Service Card

The hull and bow of the Athena are designed to minimize wave formation and drag.

Conrad Delivers 150-Foot Floating Drydock To Jones Boatyard Of Miami

The completed floating drydock leaves Conrad Industries shipyard for delivery to Jones Boatyard Of Miami.

Construction of a floating drydock for Jones Boatyard of Miami was recently completed by Conrad Industries Inc. of Morgan City, La.

Measuring 150 feet long, 70 feet wide and 8 feet deep with a wingwall height of 18 feet, a wingwall width of 5 feet and an inside clearance of 60 feet, the 1,600 short-ton-capacity drydock is to be used by Jones Boatyard for making repairs to coastal freight ships and small tugs.

Each of the three sections of the drydock, measuring 50 feet long by 70 feet wide, is equipped with bulkheads to create four watertight compartments with a 20-inch flush watertight single bolt manhole.

There are two watertight compartments in each section of the wingwall with a 20-inch watertight single bolt manhole.

For free literature giving complete information on the facilities and capabilities of Conrad Industries shipyard,

Circle 45 on Reader Service Card

1989 International Maritime Exposition To Expand Its Exhibitor Emphasis

Official plans have been announced for the 1989 International Maritime Exposition, which is held in conjunction with the Annual Meeting of The Society of Naval Architects and Marine Engineers (SNAME). In past years, the show's primary exhibitor focus has been the design, construction, use, and maintenance of large ships, military and commercial. This year, however, the exposition will include products, equipment, supplies, and services for vehicles and platforms of all types and sizes. Among the market segments being addressed are cruise ships, workboats, and fishing boats.

To encourage greater participation, SNAME has also broadened the scope of the technical program. In addition to theme-oriented mini-symposia being planned on ice-breaker technology and propulsion plant instrumentation, the number and diversity of technical papers to be given has been expanded. The Society has reduced the traditional 90-minute technical sessions to 60 minutes and is considering abstracts or papers on the following: successful applications of CAD/CAM, new methods to reduce propeller vibration excitation on ships, the "whys" of the blistering encountered on the USS Midway, vapor collection systems for coastal and river barges, and papers from Soviet presenters.

The 1989 International Maritime Exposition is scheduled for November 15-17 at the New York Hilton in New York City. Show hours are 2 p.m. to 6 p.m. on November 15, 10 a.m. to 6 p.m. on November 16, and 10 a.m. to 4 p.m. on November 17.

For exhibitor or attendance information, contact the Reber-Friel Company, 221 King Manor Drive, King of Prussia, Pa. 19406, (215) 272-4020.

Second Tanker With One-Man Bridge Delivered By B & W

The Copenhagen-based yard Burmeister & Wain, recently delivered the Petrobulk Jupiter, the 11th ship in a series of Panamax product tankers. The vessel has gone on time-charter to Shell International Marine Ltd. for a period of five years.

This is the first in a batch of five sister vessels from Burmeister & Wain which Shell will control. The next four vessels to be delivered from the yard will go on bare-boat charter to the oil company.

The Petrobulk Jupiter is equipped with a one-man-operated bridge. The ship is the second one in the world (the first one, the sistership Petrobulk Mars was delivered in November 1988) classified by Det norske Veritas with the new class registration "Watch 1 - Ocean Areas and Coastal Waters" (W1-OC), which means that the ship can be operated safely by only one person on the bridge day and night under normal operating conditions - as soon as this has been approved by the IMO, the United Nations' International Maritime Organization. According to the international conventions this has so far only been allowed in the daytime and on approval of the highest ranking officer of the watch. Some of the biggest seafaring nations are now working on an extension of this convention so as to apply also to navigation at night.

Both the Petrobulk Jupiter and Petrobulk Mars are registered under the Vanuatu flag.

The Petrobulk Jupiter was contracted by K/S Eriksholm. The owners behind the project are Naess, Jahre & Partners, Oslo, in cooperation with the PetroBulk Carriers-group consisting of Bulls Tankrederi A/S, Norway, Exmar S. A., Belgium, Mitsui O.S.K., Tokyo, and Shipping Development Company Limited (Erling D. Naess, Bermuda). The ship will be operated technically by Naess shipping (Holland) B.V. and commercially by PetroBulk carriers A/S.

For free literature detailing the shipbuilding services of Burmeister & Wain,

Circle 60 on Reader Service Card

MarAd Awards Contracts For Training Vessel Work

Two contracts for maintenance and repair work on the training vessel Golden Bear were recently awarded by the Maritime Administration. The vessel is operated by the California Maritime Academy, Vallejo, Calif.

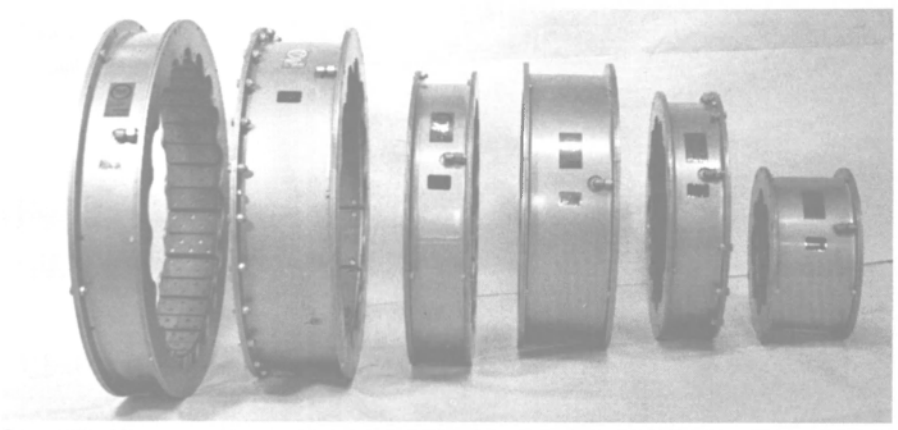
Southwest Marine Inc. of San Francisco received a $413,071 contract for drydocking and underwater repairs

General Engineering and Machine Works, San Francisco, was awarded a $455,592 contract for maintenance and repair work that includes refurbishment of the machinery and piping systems, interior preservation and coating and installation of a trash incinerator.

PROPULSION UPDATE

Marine Gears Introduces 'TR' Series Marine Clutches

—Free Brochure Available—



Greenville, Miss.-based Marine Gears, Inc., offers a wide power range of marine clutches for dependable, durable operation.

Marine Gears, Inc., Greenville, Miss., is offering the new Haley MGI "Torsionally Resilient" Marine Clutch in ten sizes ranging from 800 to 6,250 hp.

Available in stock and ready for immediate delivery, all "TR" Series Marine Clutch components—rims, tubes and shoes—are designed and manufactured to meet Haley MGI's exacting engineering and production standards, then combined in-plant and tested to meet performance specifications.

According to the company, the "TR" Series is subjected to rigorous testing for torsional resilience, damping coefficient, radial stiffness and maximum torque capability by registered professional engineers of the Mechanical Engineering Department of Mississippi State University.

As for the components of the "TR" Series Clutch, the torsionally resilient air gland tube is made of durable neoprene elastomer, reinforced with eight-ply polyester cord, formed and cured on Haley MGI designed and constructed precision molds. The tube provides excellent strength, durability and torsional resilience.

Marine Gears reports that whether a new rim rolled and finish-machined by MGI, or a rim remanufactured with new welded replacement registers finish-machined to original tolerances, every "TR" Series Marine Clutch rim meets equally exacting engineering and manufacturing standards.

The air gland tube is formed, cured and bonded onto the rim resulting in a rim-tube combination which provides a tough torsionally resilient air gland foundation for excellent friction shoe positioning, before, during and after clutch engagement.

MGI, founded in 1973, also offers Haley "TB" Series Clutches for use in exceptional high-torque applications. The "TB" Series is very versatile because they are interchangeable with all torque bar series marine clutches. The hard rubber-coated torque bars and induction-hardened side plate holes reduce wear.

MGI claims that excluded aluminum shoes provide higher strength and reduced weight. "TB" Series clutches and drums are available in stock for immediate delivery in new or remanufactured sizes 14-inch through 32-inch "TB" wide series and 20-inch through 42-inch "TB" narrow series. Split tubes are also available.

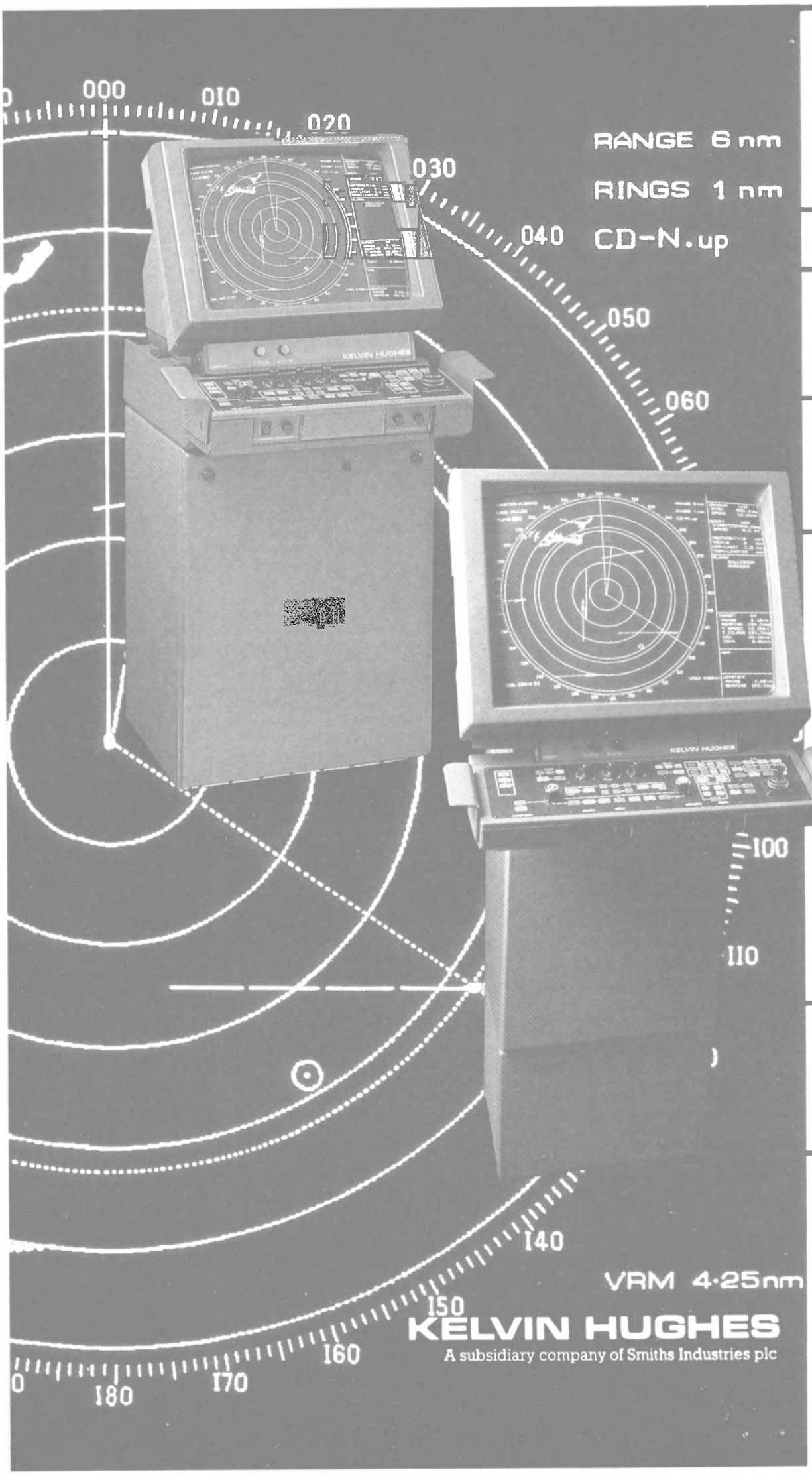
Marine Gears, Inc., an American Gear Manufacturers Association-certified manufacturer, offers a wide range of marine clutches, as well as marine gears. For a free brochure detailing MGI products,

Circle 68 on Reader Service Card

Navy Awards $24.2-Million Contract To Bath Iron Works

Bath Iron Works Corporation, Bath, Maine, has been awarded a $24,169,400 modification to a previously awarded cost-plus-award-fee contract for lead yard services for DDG-51 class ships. The contract was awarded by Naval Sea Systems Command, Washington, D.C. (N00024-87-C-2077).

From Concept to Reality



HR 2000
HR 3000

The new generation *Concept* radar systems from Kelvin Hughes provide a unique and flexible approach to ergonomic bridge layout.

Concept HR series has been developed to achieve total radar system integration in either existing vessels or bridge designs for the 90's.

The high-resolution monitor, keyboard and processor can be situated remotely in any configuration - either bulkhead, deck console, deck head or desk mounted, or can form one fully-integrated unit in which the monitor angles can be adjusted to suit operator preference. Additional remote monochrome or colour monitors can also be included in the *Concept* package.

Concept HR systems offer Relative Motion, True Motion and ARPA facilities, combined with E-Plot II, an enhanced version of the unique Kelvin Hughes electronic plotting program. Identical positioning of keyboard controls for these features throughout the range assists operational confidence and familiarity.

Now, all ship data and status can be ideally zoned for instant assimilation, making *Concept* HR the perfect radar system for today's navigational realities.

Radio Holland USA—Houston Phone: (713) 943-3325
8943 Gulf Freeway Fax: (713) 943-3802
Houston, Texas 77017 Telex: 795438
Radio Holland—Ft. Lauderdale Phone: (305) 764-0130
Radio Holland—Norfolk Phone: (804) 431-2926
Radio Holland—Long Beach Phone: (213) 595-0039
Radio Holland—Kenilworth Phone: (201) 298-9100
Radio Holland—Portland Phone: (503) 223-5715
Radio Holland—San Francisco Phone: (415) 420-8635
Radio Holland—Seattle Phone: (206) 573-4930
Radio Holland—Mobile Phone: (205) 432-3139
Radio Holland—New Orleans Phone: (504) 733-4024
Radio Holland—Corpus Christi Phone: (512) 851-9390

Marine & Offshore Offers Free Color Brochure On ABB Variable AC Drives

Marine & Offshore of Helsinki, Finland, is offering a free 12-page color brochure on ABB variable speed AC drives for marine propulsion and dynamically positioned vessels.

The brochure discusses the SAMI Megastar variable speed AC thruster drives with fixed-pitch propellers which are said to give superior performance, shortest pay-back time, and documented fuel savings exceeding 40 percent in DP operation. According to ABB, the Sami Megastar frequency converter meets all the set requirements, and uses conventional AC cage induction motors to drive the thrusters. In practice, it has also turned out to be a solution superior to two-speed AC motors and variable-speed DC drives.

The SAMI Megastar drives are controlled by a Selma Marine thruster assignment system. This allows the ship to be controlled either manually using the thruster control levers, by autopilot, or—in the Automatic DP mode—by a Kongsberg Dynamic Positioning System (NMD class III). In addition, each frequency converter has its own control panel. The thrust control system is completely digital without hydraulic or mechanical components.

The publication is well illustrated with color photos, drawings, etc. For free copies,

Circle 52 on Reader Service Card

MAR Ship Awarded $85.8-Million Contract With $142-Million Potential

MAR Ship Operators, Inc. of Rockville, Md., was recently awarded a $85.8-million contract to operate and maintain 10 U.S. naval ships for three years, with two one-year options. Subsequently, if the U.S. Government exercises both option years, the total would be $141,998,560 for five years.

As part of the Military Sealift Command's (MSC) Special Mission Support Force, these ships are operated worldwide for the Naval Oceanographic Office. They average 25 days at sea and five days in port monthly.

The USNS H.H. Hess and USNS Wyman collect deep ocean bathymetric data; the USNS Chauvenet and USNS Harkness conduct hydrographic surveys in support of Defense Mapping Agency charting requirements; the USNS De Steiguer, USNS Bartlett, USNS Lynch, USNS Silas Bent, USNS Kane, and USNS Wilkes are used to support oceanography and oceanographic survey programs.

Under the terms of the contract, MAR Ship Operators will provide personnel, operational and technical support ashore and afloat, equipment, tools, provisions, and supplies necessary to operate these 10 ships. The contract does not include items such as repair parts, fuel, and port services which are reimbursable at cost to the contractor.

MarAd Awards Bender $1-Million Contract For Drydock And Repair

Bender Shipbuilding & Repair Co., Inc. was recently awarded contracts for the drydocking and repair of the S/S Cape Clear and S/S Cape Charles. Both vessels are 495 feet by 69 feet general cargo ships based in the Maritime Administration Ready Reserve Fleet in Beaumont, Texas. Bender will perform the work commencing in July, employing approximately 40 workers. The total base value of the combined contracts is $1,010,592.

Bender is a full-service shipyard that builds, converts and repairs vessels for commercial and governmental owners and operators.

For more information and free literature on the facilities and capabilities of Bender Shipbuilding & Repair,

Circle 30 on Reader Service Card

Schrader Appointed Controller Of Moran Towing, Maryland

W. Kevin Schrader has been appointed as controller of Moran Towing of Maryland, Inc. He will be based at the company office at the World Trade Center, Baltimore and will report to **Edmond J. Moran Jr.**, president of the Moran Towing of Maryland, Inc. Mr. **Schrader** will be responsible for the accounting and financial aspects of the Moran operations in the Ports of Philadelphia (Moran Towing of Pennsylvania, Inc.), Baltimore (Moran Towing of Maryland, Inc.) and Norfolk (Moran Towing of Virginia, Inc.).

Mr. **Schrader** is a 1981 graduate of Marshall University where he received his undergraduate degree in Business Administration. He is a Certified Public Accountant in West Virginia.

Mr. **Schrader** has held executive positions in financial management in the international CPA firm of KMG-Main Hurdman, Charleston, WV and the Union Carbide Corporation, South Charleston, WV. Prior to joining Moran, he was Division Controller at Waste Management, Inc., Martinsburg, WV.

L&C Associates Named Manufacturers Reps For CTI Industries

L&C Associates, dehumidification and sealing specialists, have been named manufacturers representatives by CTI Industries, Inc. L&C Associates will offer CTI's Tube Restoration Systems to the maritime market.

The CTI system involves replacing worn tube ends with a custom-made alloy insert which fits over the damaged end of the tube. These inserts, CTI Shield/Seals®, cut tube replacement costs by 80 percent, and are installed without removing the tubes or the waterbox. Shield/Seals are guaranteed for up to 15 years, depending on the type of alloy used.

Services offered by CTI include inspection, cleaning, and restoration of condenser and heat exchange tubing.

For more information and free literature,

Circle 20 on Reader Service Card

SPD Awarded Contract For Integrated Electric Drive System

SPD Technologies has been awarded a $6.7-million contract to design and produce the 5,000-volt switchgear for the U.S. Navy's surface ship Integrated Electric Drive Program.

The contract was awarded by General Electric's Naval and Drive Turbine System Division in Fitchburg, Mass., prime contractor for the IED development program. Scheduled for delivery in August 1993, the switchgear will be installed in the Navy's Land Based Test Site at the Naval Ship Systems Engineering Station (NAVSSES) in Philadelphia, Pa.

The contract is the result of several years' work with GE to assist in system/concept development as related to switchgear and the overall electrical protection system. Recently, the Chief of Naval Operations announced the Navy's intention to power future surface combatants with electric drive propulsion systems.

SPD president **George M. Gordon** said being a member of the IED team was a significant win which positions SPD to be a strong participant in a very critical aspect of the ongoing "revolution at sea" concept formulated by Vice Adm. **Metcalf**, USN (ret.).

Mr. **Gordon** said the company is already receiving inquiries from shipbuilders and Navy program offices concerning similar equipment for specific shipbuilding programs evaluation.

SPD Technologies is the largest producer of military circuit breakers and a world leader in advanced electrical protection equipment designed for harsh operating evaluation.

For more information and free literature on SPD Technologies,

Circle 42 on Reader Service Card

Phillips Cartner Elects Principals And Adds New Staff Members

At the annual board of directors meeting of Phillips Cartner & Co., Inc., Alexandria, Va., Dr. **John A. Cartner** was reelected chairman, **Robert W. Urban** was elected director, managing principal and chief executive officer, and **John A. Kupersmith** was elected director and principal in charge of engineering.

Mr. **Urban** also recently announced the addition of several new staff members.

Lester J. Sonnenmark, engineering services department manager in the Services Division in Alexandria, will be responsible for engineering services contracts held by the firm in the Services Division. Mr. **Sonnenmark** was previously with Giannotti Associates of Texas.

Thomas F. McCaffery, analytic services department manager in the Services Division in Alexandria, will be responsible for analytic services contracts held by the firm in the Services Division. Mr. **McCaffery** was previously with RCI, Inc. of Vienna, Va.

June F. Gotowicki, administration department manager in the Corporate Division in Alexandria, will be responsible for the firm's internal administrative matters. Ms. **Gotowicki** was previously a commissioned officer in the U.S. Army.

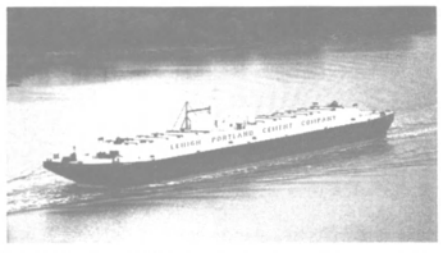
Frank D. Marcinkowski, principal engineer in the Services Division in Alexandria, will be responsible for environmental engineering in the engineering services department in Alexandria. Mr. **Marcinkowski** came to the firm from the U.S. Department of the Interior.

Phillips Cartner & Co., Inc. is a marine and naval engineering and manufacturing firm with operations in North America, Europe and Asia.

For free literature giving more information on Phillips Cartner,

Circle 65 on Reader Service Card

American Marine Completes Refurbishment Of Bulk Cement Carrier



The self-unloading bulk cement carrier after it was enlarged and modernized by American Marine Corporation.

American Marine Corporation of New Orleans, La., recently completed the enlargement and modernization of a self-unloading bulk cement carrier for Lehigh Portland Cement Company of Allentown, Pa.

The refurbishment included cutting the vessel in half while on drydock, translating the two sections apart and installing a prefabricated midbody section lengthening the vessel to a total length of 282 feet.

The existing cargo deck was completely cut off, removed, sent to the shipyard's fabrication shop, structurally reinforced and raised 3 feet. The retrofit increased the cargo capacity 46 percent to 3,800 tons.

According to **Peter Durant,** American Marine Corporation's president, the midbody module was designed, prefabricated and ready for installation prior to the vessel's arrival which enabled a fast delivery and quick turnaround for the barge's normal northeastern area of operation.

Additionally, a screw-type conveyor with pneumatic air slides was installed to enable the vessel to self-unload.

For free literature giving full details on the facilities and capabilities of American Marine Corporation,

Circle 47 on Reader Service Card

1-800-426-2818:
The Logical Alternative for
EMD®
Diesel Engine Replacement Parts

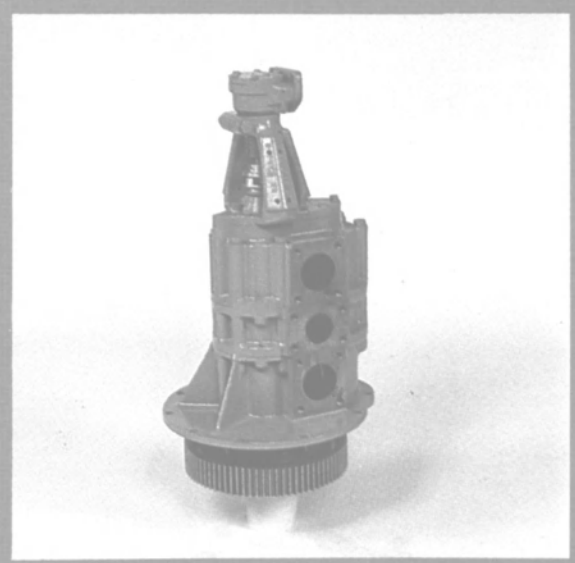
Due to changes in the industry, many of you have concerns regarding the availability of parts and service for your EMD engine requirements. You are wondering who you can turn to for the kind of service you've come to expect. THE LOGICAL ALTERNATIVE IS HATCH & KIRK.

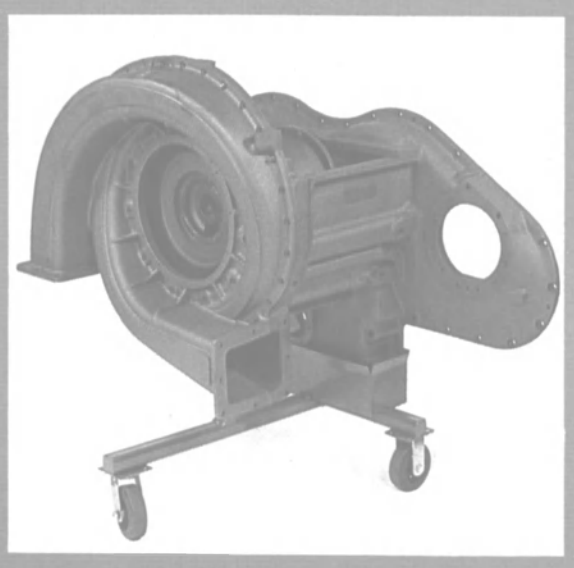
Based on forty five years of experience with the EMD product line and twenty years as a diesel engine parts manufacturer, Hatch & Kirk Inc. is committed to a program that will provide an EMD replacement part, competitively priced and available from stock.

Today, Hatch & Kirk has many high wear items such as power pack components, bearings, and gaskets available for immediate shipment. Our engineering and quality control departments are in place to expand the product line on a continuous basis.

In addition, we have increased our service capabilities providing trained and experienced mechanics wherever you require fast and efficient maintenance and repair.

The next time you require EMD parts or service, do the logical thing. Give us a call and receive the kind of treatment you deserve. THE HATCH & KIRK ALTERNATIVE, IT ONLY MAKES SENSE.





HATCH & KIRK

Diesel Parts Specialists

*EMD is a registered trademark of General Motors Corp.
Hatch & Kirk is not a part of or related to GMC.

Circle 244 on Reader Service Card

MMFG Announces Major Changes For Duradek Fiberglass Grating

Morrison Molded Fiber Glass Company (MMFG) of Bristol, Va., recently announced that major changes in Duradek® fiberglass grating have recently been made to improve and upgrade the product and make it more readily available to the customer.

Over one million dollars' worth of the new product is now in stock and can be shipped within 48 hours to a customer anywhere in the country.

Duradek is manufactured by the AFC Division of MMFG located in Chatfield, Minn. The changes to Duradek are described below.

A surfacing veil is standard on all ARC gratings (including polyester grating). This enhances both corrosion and UV resistance.

All Duradek gratings (including vinyl ester) are fire-retardant. This means they meet all the requirements of Class 1 on ASTM E-84 and the self-extinguishing requirements of ASTM D-635.

All Duradek gratings will have a UV inhibitor added to the resin. UV coatings remain as an option to be used only when UV inhibitors are not considered adequate for the application. UV coating is still the best long-term solution to UV exposure.

Now the construction of Duradek more closely parallels the construction of Extren fiberglass pultruded structural shapes.

All Duradek gratings have a new cross-rod spacing of 6 inches center of bearing bar to center of bearing bar. This makes the product more acceptable and gives a higher yield when complex field cutting is required. Cross-rod spacing (12-inch) is also available with a reduction in price.

Circle 26 on Reader Service Card

Sigma Publishes Manual On Pipeline Protection

Following the success of their recent miniaturized pocket-size illustrated booklet on Protection and Maintenance of Ferrous and Non-ferrous Metals, Sigma Coatings have now produced a similar booklet on Protection and Maintenance of Pipelines. Again, this is a readable, illustrated manual of 280 pages which explains lucidly the problems and solutions applying not only to pipelines for natural gas, potable water, industrial and waste water, process water and chemicals, sea and fresh water, etc., but also, for example, to various shipboard piping systems.

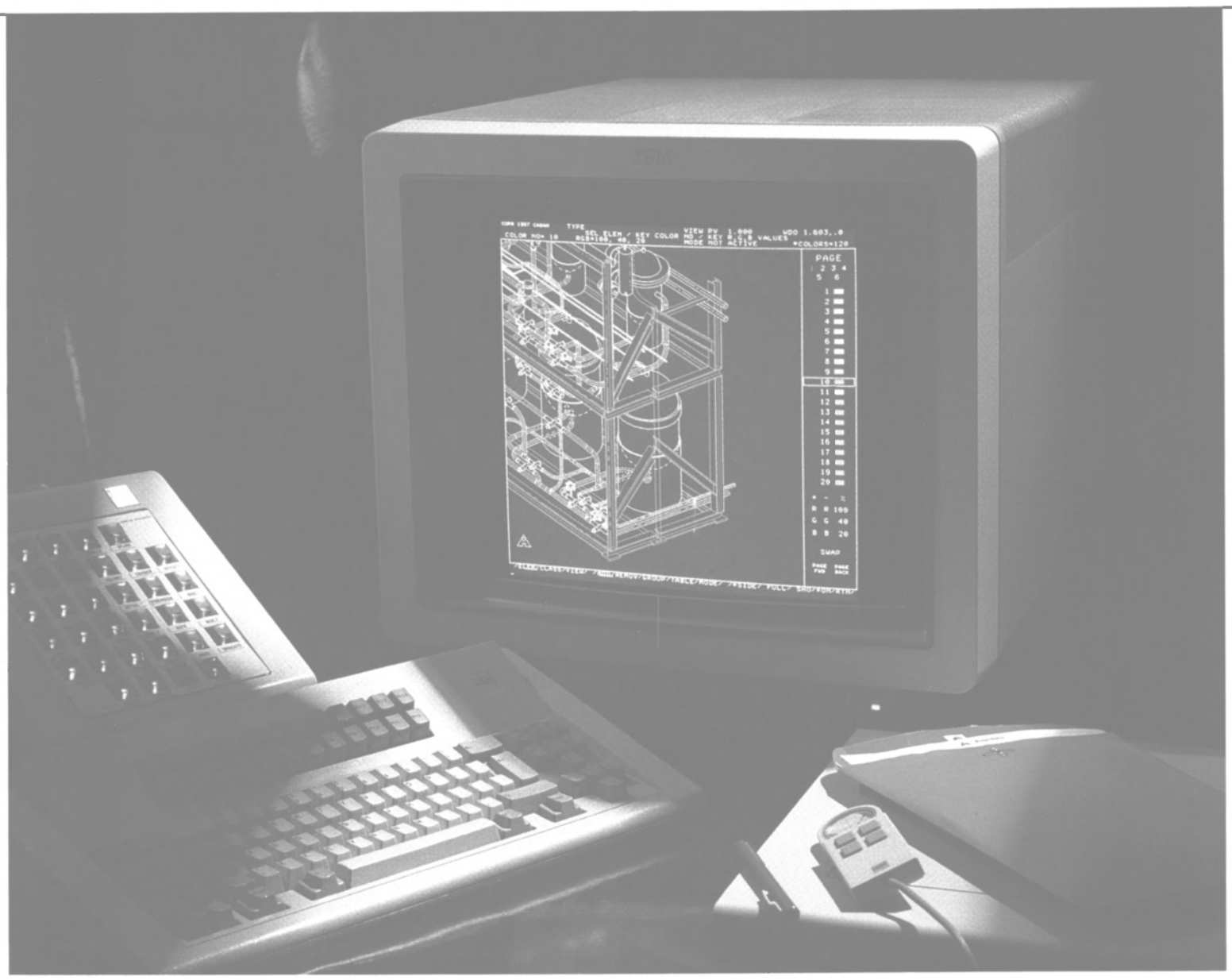
For free copies of this handy-sized manual on pipeline protection,

Circle 71 on Reader Service Card

Shaw Joins Pacific Ship As VP, Government Relations And Marketing

David L. Bain, president and CEO of Pacific Ship Repair & Fabrication, Inc., San Diego, Calif., recently announced that **Dennis R. Shaw** has joined the company as vice president, Government Relations and Marketing.

Mr. **Shaw** held key senior executive and political appointee positions at the Department of Defense during the Reagan Administration. He served on the staff of two Secretaries of Defense, **Casper Weinberger and Frank Carlucci**, as the principal Deputy Assistant Secretary of Defense (Reserve Affairs), acting Assistant Secretary of Defense (Reserve Affairs), and as Special Assistant to the Assistant Secretary of Defense (Production & Logistics). Mr. **Shaw** also was Deputy Under Secretary of the Navy (Policy) for Navy Secretary **James H. Webb Jr.** Prior to leaving the Navy, Secretary **Webb** nominated Mr. **Shaw** to become General Counsel of the Navy.



Avondale draws on its past to fabricate America's future.

When heavy industry was being written off as passe in America, the executive team of Avondale Industries, Inc., went quietly about the business of securing a bright future in heavy, industrial manufacturing.

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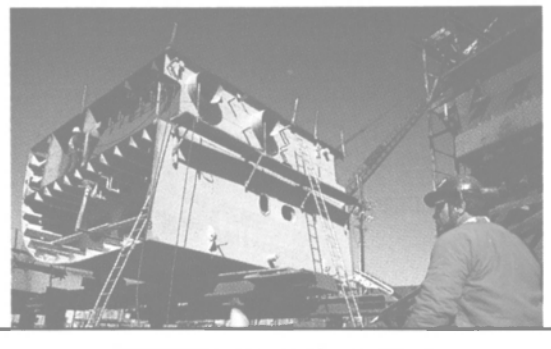

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U.S. NAVY

THE OUTLOOK FOR U.S. NAVY SHIPBUILDING AND SHIP REPAIR

Status of U.S. Navy Ship Modernization and Maintenance

By Dr. James R. McCaul, President
IMA Associates, Inc.

NAVY BUDGET

The proposed Navy budget is $101.7 billion in FY 1990 and $105.1 billion in FY 1991. This would represent a three to four percent increase over current spending. Described below are Navy's plans and budget for major program activities over the next several years.

SHIPBUILDING

Navy has requested $10.4 billion in FY 1990 to fund construction of 20 new ships and two major conversions. The amount of $9.8 billion is requested in FY 1991 to build 14 ships—including two follow ships in the SSN 21 attack submarine program.

Outlays for ship construction will grow from $8.9 billion in FY 1988 to $10.9 billion in FY 1991. **This growth occurs despite the fact that obligational authority is much lower in FY 1991 than FY 1988.**

Shown in Exhibit 1 is the breakdown of the shipbuilding budget request for the FY 1988-1991 period. Exhibit 2 shows the projected program over the next five years.

A major change in the future program has been the deletion of three SSN 688 submarines originally planned for FY 1991 and 1992. There had been criticism of Navy's plan to overlap construction of the SSN 21 and SSN 688. The current plan is now to end the SSN 688 program in FY 1990. In FY 1991 Navy plans to order two SSN 21's and maintain a construction rate of three per year thereafter.

Navy plans to build DDG 51 Aegis destroyers at the rate of five per year over the next five years. This program is a target for budget cutting—most likely by stretch-out—building fewer ships per year over a longer period.

Other changes from last year's plan include a change in timing for several programs—including the AOE fast combat support ship, LHD amphibious assault ship and TAGOS surveillance ship. Three MCM mine countermeasure ships have been added for FY 1990. (See MR, 3/89 issue page 25 for a full report on 'The Navy—A $35-Billion Annual Market')

Exhibit 1—Shipbuilding and Conversion Budget
(in millions of $)

	FY 1988		FY 1989		FY 1990		FY 1991	
	Qty	$	Qty	$	Qty	$	Qty	$
New Construction								
Trident Submarine (SSBN)	1	$1,260.8	1	$1,196.2	1	$1,228.6	1	$1,254.5
Carrier Replacement (CVN)	2	6,225.0	—	—	—	—	—	—
Attack Submarine (SSN 688)	3	1,676.9	2	1,364.6	2	1,520.3	—	—
New Attack Submarine (SSN 21)	—	257.6	1	1,533.0	—	866.0	2	3,161.9
Aegis Cruiser (CG 47)	5	4,100.7	—	—	—	—	—	—
Destroyer (DDG 51)	—	5.5	4	2,826.1	5	3,600.7	5	3,604.7
Mine Countermeasure Ship (MCM)	—	—	—	—	3	341.5	—	—
Coastal Minehunter (MHC)	—	—	2	196.7	3	230.3	3	214.9
Amphib. Landing Craft (LSD 41)	1	258.0			1	229.3	1	232.7
Amphib. Assault Ship (LHD 1)	1	752.9	1	733.1	—	—	—	35.8
Ocean Surveill. Ship (TAGOS)	—	—	3	158.9	1	155.8	—	—
Fleet Oiler (TAO-187)	2	256.4	5	689.9	—	—	—	—
Fast Combat Support Ship (AOE)	—	—	1	363.1	1	356.4	1	357.7
Ocean. Research Ship (AGOR)	—	—	—	—	3	278.1	1	41.9
Landing Craft (LCAC)	—	35.3	(15)	305.5	(9)	219.3	(12)	284.0
Conversion/Acquisition								
Carrier Modernization (CV SLEP)	1	729.8	—	62.7	1	651.2	—	72.6
Crane Ship Conversion (TAC)	2	53.1	—	—	—	—	—	—
Fleet Oiler Lengthening (AO 177)	1	44.1	2	75.0	1	35.7	—	—
Moored Training Ship	—	—	—	—	1	220.0	—	—
Other costs	—	319.6	—	376.8	—	486.4	—	500.7
Total Budget	**19**	**$15,975.7**	**22**	**$9,881.6**	**22**	**$10,419.6**	**14**	**$9,765.4**

Source: Department of the Navy

Exhibit 2—Navy Shipbuilding and Conversion Five Year Plan (FY 1990-1994)

	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1990-94
New Construction						
Trident Submarine (SSBN)	1	1	1	1	1	5
Attack Submarine (SSN 688)	2	—	—	—	—	2
New Attack Submarine (SSN 21)	—	2	3	3	3	11
Destroyer (DDG 51)	5	5	5	5	5	25
Mine Countermeasure Ship (MCM)	3	—	—	—	—	3
Coastal Minehunter (MHC)	3	3	4	4	—	14
Amphib. Landing Craft (LSD 41)	1	1	1	1	1	5
Amphib. Assault Ship (LHD 1)	—	—	1	1	—	2
Ocean Surveill. Ship (TAGOS)	1	—	2	1	2	6
Ammunition Ship (AE)	—	—	—	1	2	3
Fast Combat Support Ship (AOE)	1	1	1	1	1	5
Ocean. Research Ship (AGOR)	3	1	2	2	1	9
Ocean Surveill. Ship (AGOS)	—	—	1	—	2	3
Repair Ship (AR)	—	—	—	—	1	1
Salvage Ship (ARS)	—	—	—	—	1	1
SOF Landing Craft	—	—	—	(1)	(6)	(7)
Landing Craft LCAC)	(9)	(12)	(12)	(12)	(12)	(57)
Total New Construction	**20**	**14**	**21**	**20**	**20**	**95**
Conversion/Acquisition						
Carrier Modernization (CV SLEP)	1	—	—	1	—	2
Fleet Oiler Lengthening (AO 177)	1	—	—	—	—	1
Moored Training Ship	(1)	—	(1)	—	—	(2)
Total Conversion	**2**	**—**	**—**	**1**	**—**	**3**
Total Ships	**22**	**14**	**21**	**21**	**20**	**98**

Source: Department of the Navy

SHIP REPAIR

U.S. Navy ship maintenance and modernization continues to be a major source of business for many shipyards and equipment suppliers in the United States.

Funding for Active Forces

Maintenance and Modernization

The Navy has asked for $5.5 bil-

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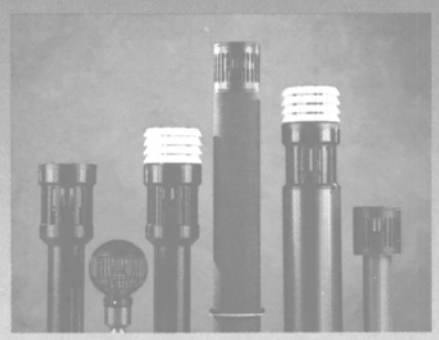

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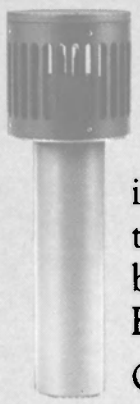

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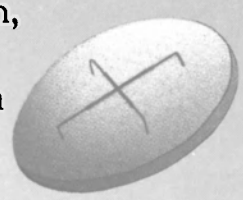

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U.S. NAVY

Exhibit 3—Funding for Active Forces Ship Maintenance and Modernization
FY 1982-1991
(millions of $)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
									—Requested—	
Ship Depot Level Repair	$2,969	$3,407	$3,145	$3,724	$3,076	$3,366	$2,618	$2,923	$3,413	$3,521
Depot Level Support	99	124	108	121	132	146	162	174	194	200
Intermediate Maint. Avail.	246	298	313	327	322	368	349	359	371	423
Modernization	934	895	1,054	1,345	1,303	1,343	959	1,101	1,035	1,048
Outfitting	161	198	294	301	328	290	323	357	331	330
Inactivations	10	33	45	29	41	26	100	108	194	185
Total	$4,420	$4,956	$4,958	$5,846	$5,202	$5,538	$4,511	$5,022	$5,537	$5,706

Source: Department of the Navy

(continued)

lion in FY 1990 and $5.7 billion in FY 1991 to maintain and modernize ships in the active forces. This compares with $5.0 billion this year and $4.5 billion in FY 1988. Details are shown in Exhibit 3.

While total funding is projected to increase, the number of maintenance availabilities is expected to fall. As shown in Exhibit 4, the number of active fleet overhauls is projected to drop to 15 in FY 1990, 12 in FY 1991. This is below the current year, where 25 overhauls are scheduled.

Short term availabilities will also fall over the next two years. The number projected for FY 1991—128 short term availabilities—is lower than the current level of activity.

Distorting the funding trend is a conventional carrier overhaul in FY 1990 and the complex overhaul of the nuclear carrier U.S.S. Enterprise (CVN-65) in FY 1991. These two overhauls consume a substantial portion of the ship maintenance budget—and the work is earmarked for performance in specific shipyards.

Exhibit 4—Number of Active Fleet Scheduled Maintenance Availabilities
FY 1988 - 1991

	FY 1988	FY 1989	FY 1990	FY 1991
Overhauls:				
Job Starts	22	25	15	12
Overhaul Backlog	4	3	4	5
Short Term Availabilities				
Depot Modernization Periods	—	5	4	4
Selected Restricted Avail.	87	82	91	81
Phased Maintenance Avail.	64	62	59	43

Source: Department of the Navy

Naval Reserve Fleet

Funding of $208 million is requested in each of the next two years for maintenance and modernization of ships in the Navy reserve fleet. This compares with $199.0 million in FY 1989 and $157.0 million in FY 1988. Details are provided in Exhibit 5.

Exhibit 5
Navy Reserve Fleet
Maintenance and Modernization
FY 1982—1991

Fiscal Year	Amount (millions of $)
1982	$ 63
1983	100
1984	97
1985	124
1986	128
1987	148
1988	157
1989	199
1990	208
1991	208

Source: Department of the Navy

Military Sealift Command

Spending for MSC ship maintenance and modernization is projected to be $162.7 million in FY 1990 and $171.4 million in FY 1991. A total of 41 and 42 overhauls are scheduled in FY 1990 and 1991 respectively. Details are shown in Exhibit 6.

Deferred Maintenance Occurring

The Navy is obviously deferring maintenance and modernization to stay within budget constraints. In its presentation to Congress, Navy indicates budget pressures will create a ship overhaul backlog of three ships in FY 1989, four ships in FY 1990 and five ships in FY 1991. Navy also indicates "funding constraints force the deferral of short term availabilities."

Our data suggest a far worse situation occurring. By our count, the Navy had planned to perform 27 overhauls and over 200 short term availabilities in FY 1990. Assuming these figures are accurate, the number of ship overhauls has been cut by 44 percent in FY 1990 and short term availabilities in FY 1990. Assuming these figures are accurate, the number of ship overhauls has been cut by 44 percent in FY 1990 and short term availabilities have been cut by more than one quarter.

Long Term Implications

The Navy is facing a serious prob-

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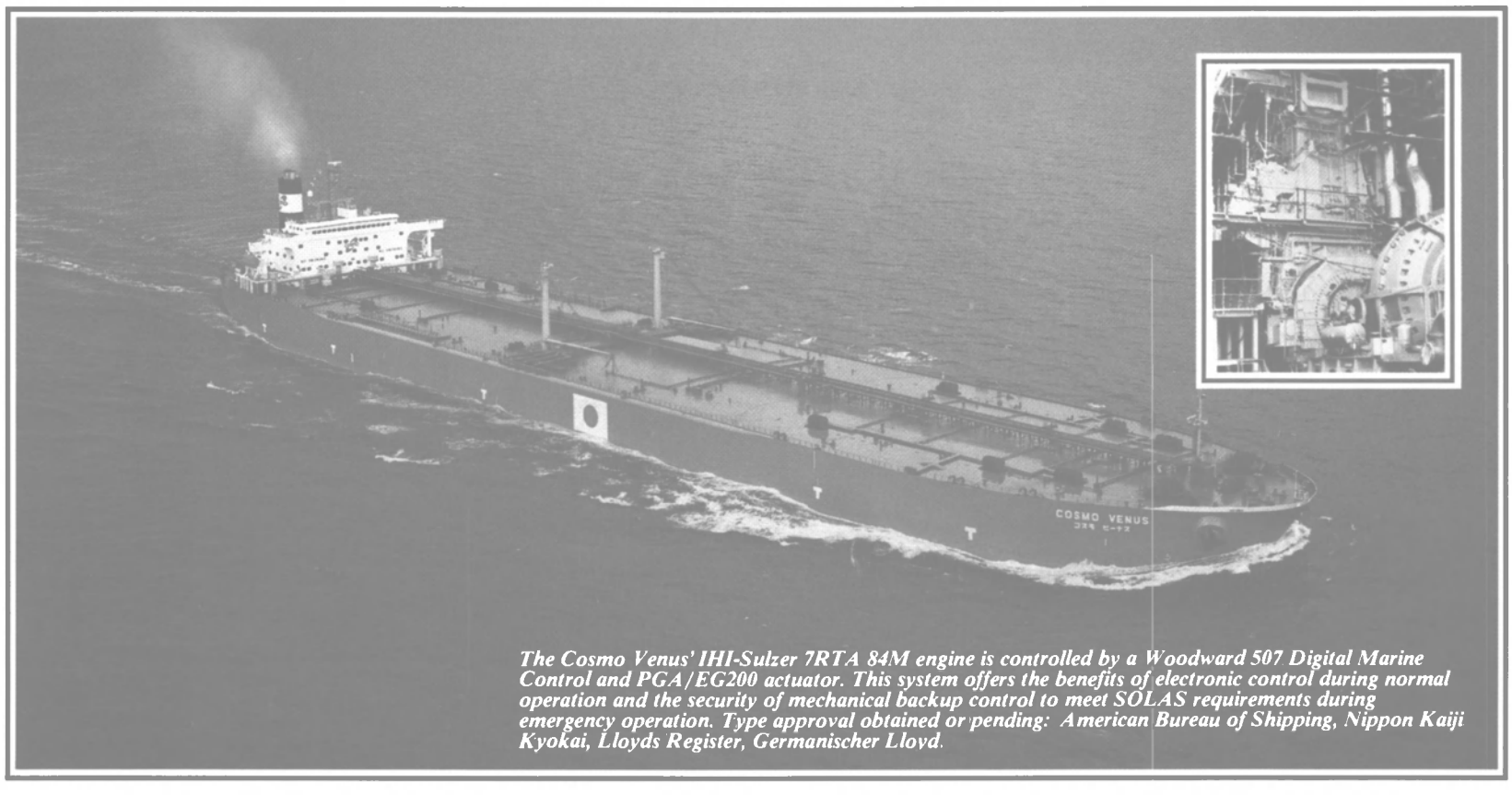

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U.S. NAVY

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lem. As shown in Exhibit 7, the buying spree over the past ten years has resulted in a larger fleet. The active force has grown from 545 ships in 1985 to 568 ships this year. Growth in fleet size will continue over the next several years—despite plans to decommission 39 ships in FY 1990 and 1991.

Exhibit 6—MSC Ship Maintenance and Repair/Alteration Expenditures
(millions of $)

	FY 1989 Approved		FY 1989 Current Estimate		FY 1990 Estimate		FY 1991 Estimate	
Type Ship	M & R	Alts	M & R	Alts	M & R	Alts	M & R	Alts
Rate Recoverable:								
Cargo	$ .9	$ .4	$ 3.4	$ .2	$ .6	$ .2	$ 1.4	$ .4
POL	0	2.9	0	6.1	0	4.2	0	0
Afloat prepositioning/FSS	35.4	9.0	22.3	8.7	25.4	3.1	31.4	3.4
Special Mission	26.1	6.7	28.2	6.6	30.4	10.2	32.8	12.1
Fleet Auxiliary	75.3	17.1	83.7	13.1	67.8	16.8	73.4	12.7
Subtotal	137.7	36.2	137.5	34.7	124.2	34.5	139.0	28.7
Reimbursable:								
Fleet Auxiliary	.2	0	.4	.3	2.4	.2	4.4	0
Special Mission	0	0	.3	.01	1.3	0	0	0
Subtotal	.2	0	.7	.3	3.7	.2	4.4	0
Total	137.9	36.2	138.2	35.0	128.0	34.7	143.4	28.0
	$174.1		$173.2		$162.7		$171.4	
Number of Overhauls Scheduled			33		41		42	

Source: Military Sealift Command

Exhibit 7—Navy Active Force
FY 1985—1991

Fiscal Year	Strategic Forces	Battle Forces	Support Forces	Mobilization Forces	Total
1985	43	435	50	14	542
1986	45	437	55	18	555
1987	43	446	57	22	568
1988	43	437	60	25	565
1989	42	434	65	27	568
1990	41	435	68	30	574
1991	41	425	70	35	571

Source: Department of the Navy

These ships need to be maintained. Yet the funds available for such maintenance are increasingly difficult to find. This dilemma probably cannot be resolved internally by Navy. There are too many special interest groups with which to contend. Proponents of aircraft carriers, the new SSN 21 submarine, Aegis destroyers, etc. will continue to resist cuts in the ship construction budget. Reducing funding for ship maintenance—particularly non-nuclear surface ship maintenance—will continue to be a path of least resistance.

Eventually the Congress, the GAO, perhaps the DOD Inspector General's office will examine what is taking place. There will be efforts to require Navy to perform more maintenance. Some modest increases in funding and shifts in pirorities may result. But don't expect major shifts until a catastrophe occurs.

Things To Look For

Here's a short list of possible actions to look for over the next 12 to 24 months which affect ship maintenance:

- cancellation of the Enterprise (CVN 65) refueling overhaul and decommissioning of the ship—despite the sunk cost already invested in this effort;
- continued substitution of short term maintenance availablilities for overhauls (bad news for firms outside homeport areas);
- accelerated retirement of Adams/Farragut (DDG 2/37) class destroyers;
- cuts in purchases of replacement and modernization components;
- smaller work packages as planned alterations are cancelled due to funding constraints;
- cuts in force structure—13 instead of 15 carrier groups (watch for hearings before the Senate Subcommittee on Projection Forces and Regional Defense);
- reduced fleet operating tempo;
- shift of ships from active to reserve status (eight ships already earmarked during FY 1990 and 1991);
- privatization efforts to fund military construction needs.

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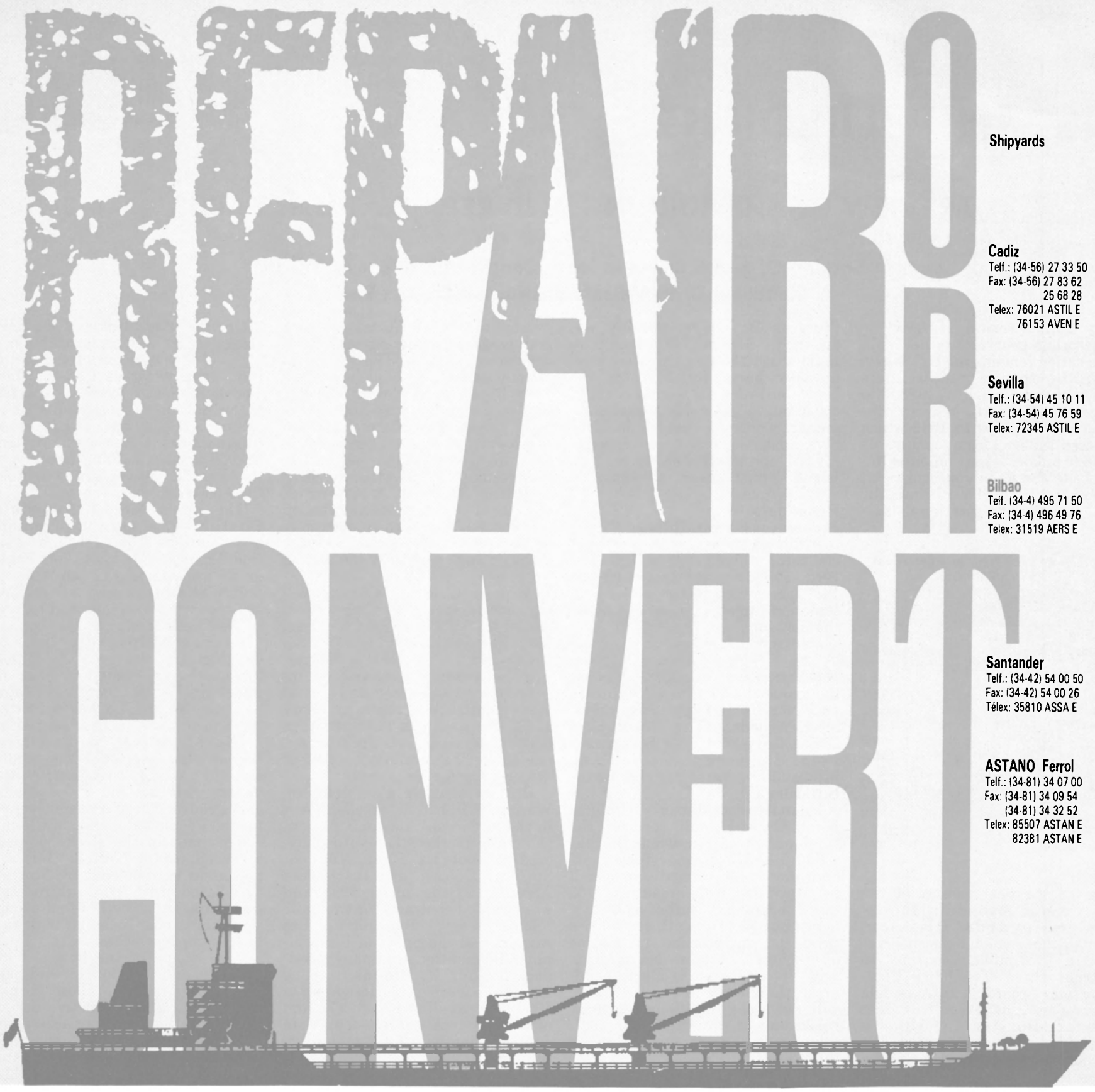

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U.S. SHIPBUILDING

REVIEW OF SHIPBUILDING AND REPAIR AT U.S. YARDS

Backlog Of $16.6 Billion In Navy Construction Work At Yards; Shallow-Draft Vessel Construction On The Rise

Navy Construction

The prime generator of new ship construction remains the U.S. Navy. According to the Shipbuilders Council of America (SCA) 1988 Ship Construction Report, the Navy contracted for 32 ships in 1988 which increased the backlog at U.S. yards to $16.6 billion. This compares favorably to the $9-billion backlog at the end of 1987. Table 1. shows the final FY 1989 appropriation data.

Table 1.—FY 1989 Navy Appropriations ($ in millions)

Program	# of Ships	Funding
SSBN-728	1	1,196.2
SSN-688	2	1,364.6
SSN-21	1	1,533.0
DDG-51	4	2,826.1
LHD-1	1	733.1
AOE-6	1	363.1
MHC-51	2	196.7
TAO-187	5	689.9
TAGOS	3	158.9
LCAC	15	305.5
CV SLEP	—	62.7
AO Jumbo	2	75.0
Other costs	—	376.8
Total—	22	9,881.6

Source: U.S. Navy

One of the beneficiaries of the Navy work is **Avondale Industries' Shipyards Division**, Avondale, La. Avondale recently received a $319-million contract to construct three T-AO-187 Class fleet oilers. According to Avondale chairman and chief executive officer **Albert L. Bossier Jr.**, with the inclusion of the latest award, the yard has been contracted to build a total of 16 Henry J. Kaiser Class oilers since 1982, amounting to $1.9 billion in work. The yard also has six Landing Ship Docks (LSD-41) on its orderbook.

Another Navy contractor, **Bath Iron Works**, Bath, Maine, was awarded a $610.1-million contract to build three Arleigh Burke Class (DDG-51) Aegis destroyers. Bath is currently constructing the lead ship of the class along with several Ticonderoga Class cruisers.

At about the same time as the Bath award, **Ingalls Shipbuilding, Inc.**, Pascagoula, Miss., received a $466.5-million award to build two Arleigh Burke destroyers. To date, Ingalls has been awarded contracts for a total of three destroyers. At present, the yard is preparing the lead ship of the LHD-1 Class, the 844-foot amphibious assault ship USS Wasp, for delivery.

Peterson Builders, Inc. of Sturgeon Bay, Wis., recently was awarded a $185-million contract to build three 224-foot mine countermeasure ships (MCMs) for the Navy. PBI now has a solid backlog, consisting of both Navy and commercial work. The yard is building dive boats, harbor security boats, MCMs, and a ferry for Washington Island Ferry Lines of Wisconsin.

Prospects In Merchant Shipbuilding

Although there were no commercial ships ordered from a U.S. shipyard in 1988 and the first quarter of 1989, the award of two major construction projects appears to be on the horizon.

One of the projects was put forth by San Francisco-based Matson Navigation Co. The U.S. shipping line requested bids from **Avondale Industries' Shipyards Division,** Avondale, La.; **Bethlehem Steel Corporation's Sparrows Point Shipyard**, Sparrows Point, Md.; and **National Steel & Shipbuilding Co.,** San Diego, Calif.

Intended for Matson's U.S.-flag West Coast-Hawaii service, the combination carrier would have a 1,600-TFEU (twenty-four-foot-equivalent-unit) capacity, an overall length of 783 feet, breadth of 105 feet 9 inches and draft of 35 feet.

Arthur J. Haskell, senior vice president, engineering and marine operations, Matson Navigation, said, "This program is a logical add-on to the growth in our trade. We will need the additional capacity based on our projections for 1991. She should take care of our needs into the early 1990s."

A second possible commercial project for U.S. yards involves the reconstruction of the wrecked tanker M/V Fuji. Hvide Shipping, Inc., Fort Lauderdale, Fla., has requested bids from 14 U.S. shipyards for the project. The work would involve the rebuilding of the Fuji utilizing the forebody of the Barge 4102 (Oxy Producer), built by Avondale Industries. The tanker, which would be renamed the Seabulk America and operate under the U.S. flag, would have an overall length of 685 feet, molded beam of 99 feet, draft of 36-1/2 feet and deadweight tonnage of 41,000.

As of press time, contracts have not been awarded for either of these projects.

Shallow-Draft Construction

A possible resurgence in the shallow-draft workboat sector may be on the horizon. One sign is the reopening of the **Jeffboat** towboat and barge construction facility in Jeffersonville, Ind. The yard has already signed a $3-million contract with Hines, Inc., Bowling Green, Ky., to construct three large river-tank barges. The contract for the 300-foot by 54-foot tankers accelerated the opening of the the yard.

According to **St. Louis Ship** president **Richard A. Coonrod**, the inland waterway transportation industry has improved substantially in the past few months, and the shipyard has more than doubled its workforce.

At present, St. Louis Ship is filling an order for 43 open hopper coal barges for M/G Transport Services, Inc., Cincinnati, Ohio.

Conrad Industries of Morgan City, La., has been busy with a number of inland waterways and coastal vessel construction contracts. Since 1988, the yard has delivered four floating drydocks, five deck barges, one anchor barge and one 160-foot vehicle-carrying ferry.

Blount Marine Corporation, Warren, R.I., had an excellent year in the harbor/shallow-draft passenger vessel market. The yard delivered 92-foot La Pinta, 192-foot Spirit of Chicago and the 87-foot Alexandria Belle during 1988, and was awarded contracts for two more "Spirit" vessels—the Spirit of Los Angeles and the Spirit of Philadelphia. In addition, company president **Luther H. Blount** unveiled an ultramodern type design for a 400-passenger dinner boat. The first of the new type, the 114-foot Vista Jubilee being built for Rentacruise, Inc., will be delivered in July of this year.

The LaCrosse, Wis., shipyard of **Skipperliner Industries** delivered a number of passenger vessels to the shallow-draft market. Highlighting these deliveries were the 120-passenger European-style canal boat Edelweiss II and the 150-passenger boat Discovery. Skipperliner has several other passenger boats on its orderbook.

Two passenger catamaran specialists, **Gladding-Hearn Shipbuilding** of Somerset, Mass., and **Nichols Brothers Boat Builders** of Whidbey Island, Wash., were the beneficiaries of several new construction awards. One of Nichols Bros. recent awards was for the construction of the $4.5-million "ocean catamaran" Nantucket Spray for Bay State Cruises of Boston, Mass. The 121-1/2-foot vessel will operate on a passenger service run between Boston and Nantucket.

On the East Coast, Gladding-Hearn signed a contract to build a high-speed catamaran for Put-In-Bay Transportation Co. of Ohio. The 95-foot Jet Express is expected to be delivered shortly. Both the Nantucket Spray and Jet Express of International Catamarans design. Nichols and Gladding-Hearn are the only U.S. yards licensed to build the Australian-designed vessels.

The newly formed **Avondale Boat Division** was able to capture two contracts from Tri-State Marine Transport, Inc., of New York, for the construction of two 400-passenger SES high-speed ferries. The 109-foot vessels are planned for use in New York commuter service.

Leevac Shipyards, Inc., of Jennings, La., delivered an 86-foot, 315-passenger excursion boat to Padelford Packet Boat Co. of Minneapolis, Minn. The Anson Northrup will operate on the Mississippi in the Minneapolis-St. Paul area. Leevac also completed the reconstruction of 110-foot steel-hulled landing craft for naval operations, and a conversion of a seismic vessel for the People's Republic of China.

This month, the sleek 500-passenger Spirit of Norfolk II is expected to be delivered by Morgan City-based **Service Marine Industries, Inc.** The 175-foot excursion/dinner boat is similar in design to Italian megayachts.

"The shape of the bow is both dramatic and functional," said Service Marine president **Tom Hensley**. "It gives a distinctive design element to the vessel, but also serves as an open deck area for panoramic sightseeing during day cruises and stargazing on dinner cruises." She will be operated by Holiday Cruises IV out of Norfolk, Va.

Other passenger vessels from Service Marine included the 600-passenger replica paddlewheeler Annabel Lee, the elegant Bay Lady and the converted dinner boat Cape Ann.

The **Trinity Marine Group,** which is comprised of nine shipyards (soon to be 10), has been contracted to build a number of Navy, military and commercial vessels. The group, which is comprised of **Halter Marine,** with yards in Moss Point, Miss., and Lockport, La., **Equitable Shipyards**, with yards in New Orleans and Madisonville, La., **Moss Point Shipyard**, Moss Point, Miss., **Gretna Machine & Iron Works,** Harvey, La., **Aluminum Boats**, Moss Point, Miss., **Thunderbolt Shipbuild-**

(continued)

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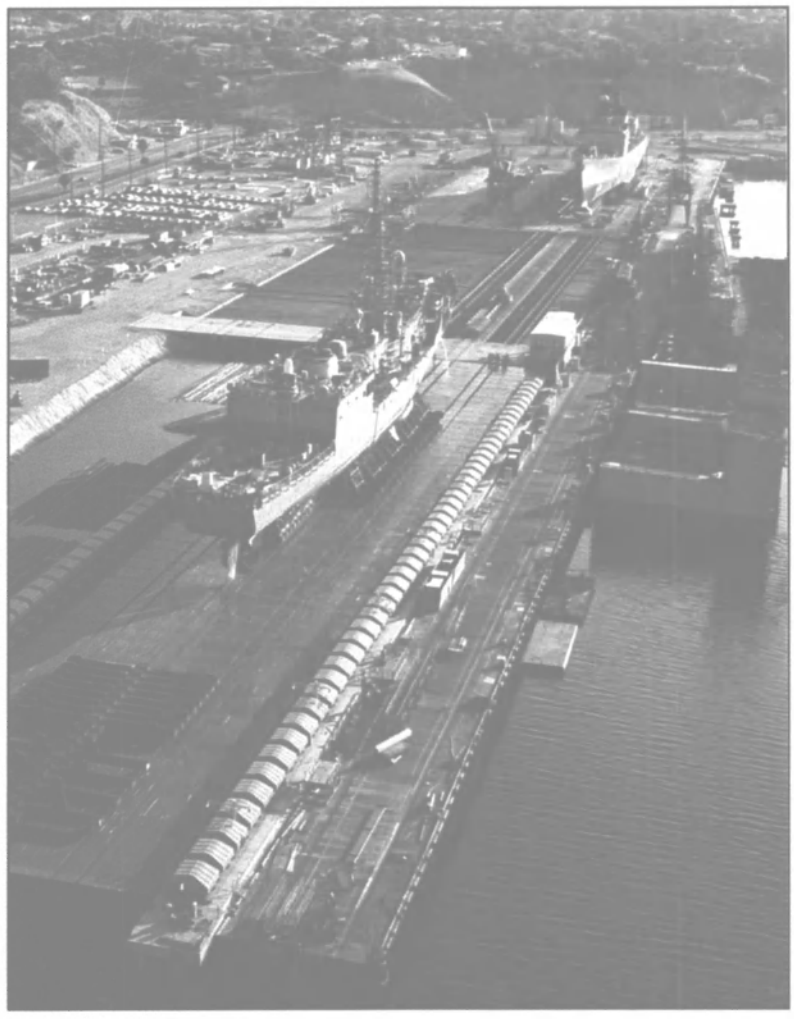

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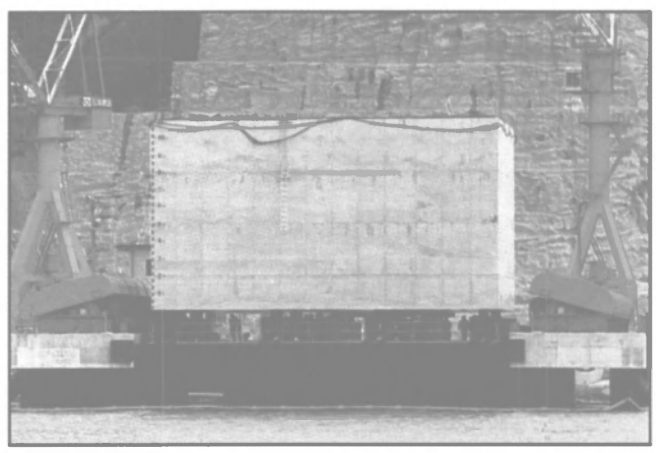

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U.S. SHIPBUILDING

(continued)

ing & Repair, Savannah, Ga., and **HBC Barge** of Brownsville, Pa. Trinity has just recently signed a letter of intent to purchase the former Bethlehem-Beaumont shipyard in Texas. The Trinity Marine Group has an impressive orderbook, with vessels ranging in size from a 33-foot tugboat for the Panama Canal Commission to a 224-foot ocean surveillance ship for the U.S. Navy.

Among the notable deliveries were: the 183-foot dinner boat California Hornblower for Hornblower Dining Yachts of California, from Moss Point Marine; the 232-passenger, high-speed ferry Caribe Tide, built by Equitable Shipyards; and the 224-foot T-AGOS USNS Adventurous, from Halter Marine.

The Halter Marine yard was also awarded a $20.9-million contract to build a 263-foot oceanographic research vessel for the U.S. Navy. The A-GOR-23 will be operated by the University of Washington.

SeaArk Marine, Inc., formerly MonArk Boat Co., Little Rock, Ark., has recently delivered the first five high-speed patrols boats to the El Salvadorian Navy. The work is being performed under a $3.7-million, ten-vessel contract.

Robert E. Derecktor Shipyards of Rhode Island is presently constructing five large harbor tugboats for the U.S. Army. The contract contains options for a total of ten vessels, which, if exercised, would bring its value to $36 million.

Textron Marine Systems, New Orleans, La., was awarded a $225-million contract by the Navy to build a series of 12 LCAC (Landing Craft, Air Cushion vehicles). The contract options could bring the value of the award up to between $400 million and $500 million. TMS has delivered 14 LCACs to the Navy and is currently building 10 others.

Gulf Craft of Patterson, La., delivered the 155-foot crewboat Aaron McCall to McCall Enterprises of Cameron, La. The unique feature of the crewboat is her six Cummins propulsion engines.

Boatbuilder **Munson Manufacturing** of Edmonds, Wash., delivered the multipurpose fireboat Phoenix III to the San Francisco International Airport authorities. In addition, The Washington yard delivered the high-speed passenger boat Yukon Queen to Holland America Lines-Westours for operation in Alaska.

Growth In Fishing Vessel Construction

Last year saw the revival of the U.S. tuna shipbuilding industry, with several yards winning major newbuilding and conversion contracts in the fishing vessel construction market.

As of late 1988, **Bender Shipbuilding & Repair,** Mobile, Ala., had a fishing vessel order book worth in excess of $90 million into 1990. Recent deliveries from the Alabama yard include the newly built 155-foot Arctic IV for Arctic Fisheries and the converted 184-foot factory trawler Unimak Enterprise to owners Unimak Enterprise. Both companies are units of the Arctic Alaska Fishing Corp. of Seattle.

MARCO-Seattle recently signed a contract to build two 135-foot steel freezer longliners for Alaska Frontier Co. of Seattle, Wash. The vessels are expected to be delivered in August and October 1989, respectively.

The Seattle yard also completed the lengthening and refit of the 160-foot longliner/crabber Westward Wind, as well as major conversion contracts on the Alaskan Command and the Resolute.

Another U.S. yard fairing well in the fishing vessel sector is **Campbell Shipyard**, San Diego, Calif. The yard has introduced a new design for tuna purse seiners—the 257-foot, 1,500-ton-capacity Super Pacific Class—which has met great success. The yard has seven Super Pacific Class seiners on its orderbook, some valued at as much as $12 million. Even more impressive about Campbell's showing is that six of the seven vessels are for export—four for South Korean owners and two for French.

The first Super Pacific Class tuna purse seiner, the Margaret Z, was recently launched for her U.S. owners, Margaret Z Fishing Co. of Guam.

Also Jacksonville, Fla.-based **Atlantic Marine** recently signed a contract with Chalice Trawlers Corporation to build a 123-foot longliner processor, the Aleutian Chalice. She is expected to be delivered this September. Atlantic Marine also announced it will be leasing the ADDSCO Industries repair facility in Mobile, Ala. The firm plans to recondition the facility and seek both Navy and commercial work.

Ship Repair

The ship-repair sector continues to be an ongoing source of work for U.S. yards. **Portland Ship Repair Yard (PSRY)** of Portland, Ore., reported that during 1988 the yard and its three main contractors, **Cascade General, Inc., Northwest Marine Iron Works,** and **West State, Inc.,** did $140 million worth of business.

PSRY reported that 70 percent of its work lies in the tanker sector, 5 to 10 percent in the cruise ship sector, and 25 percent in the military sector.

West State recently overhauled the tanker Exxon Long Beach under a $5.5-million contract.

Northwest Marine Iron Works, which was recently purchased by **Southwest Marine, Inc.**, reported that it repaired almost 200 vessels during a recent 12-month period. One of its latest projects was the $15-million overhaul of the assault ship USS Okinawa (LPH-3).

Cascade General recently completed the overhaul of the Polar Star, one of two large icebreakers operated by the U.S. Coast Guard.

Southwest Marine's San Diego facility recently undertook the dual drydocking of two U.S. Navy frigates, the USS McClusky and USS Thach. The feat was accomplished in the facility's huge 655-foot floating drydock. The destroyer USS O'Brien (DD-975) is currently being overhauled at the San Diego facility under a $19.6-million contract. Southwest Marine also operates shipyards in San Pedro, San Francisco and American Samoa.

Todd Pacific Shipyards, San Pedro Division recently completed general repair and propeller shaft work on the S.S. Majestic (ex-Sun Princess). The 8,885-nrt vessel was lifted on the Todd facility's 655-foot Syncrolift, which is certified to hoist a ship with a light displacement of 15,000 long tons. It was the heaviest passenger vessel ever lifted on the San Pedro's Syncrolift. Most recently, **Todd Pacific's Seattle Division** was awarded a $26.7-million Navy award for the New Threat Upgrade of the destroyer USS Chandler (DDG-996).

On the East Coast, **Norfolk Shipbuilding & Repair Co. (NORSHIPCO)**, Norfolk, Va., had a successful year in the ship-repair sector. Besides a great deal of Navy and Military Sealift Command repair work, NORSHIPCO drydocked and repaired over a dozen large cruise vessels, including the 18,953-ton Carnivale and 12,795-ton Amerikanis.

Also in the cruise sector, **New York Shipyard Corporation** recently completed the drydocking of the 925-passenger Dawn Princess (ex-Sitmar Fairwind). The shaft repairs and exterior work were performed at the firm's Brooklyn, N.Y., facility, located on the former site of Todd Shipyard-Brooklyn.

Maryland-based **Bethlehem Steel-Sparrows Point** shipyard recently completed hull repairs on the Premier Cruise Line vessel the S.S. Royale. Premier plans to sell the vessel to Dolphin Cruises of Miami.

Norfolk, Va.-based **Colonna's Shipyard**, a family-owned, full-service facility, completed a substantial amount of Navy repair work during 1988. The yard was recently awarded a $3.05-million contract for the DSRA of the frigate USS Donald B. Beary (FF-1085). ■

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SURVEY OF NEW VESSEL CONSTRUCTION AT U.S. SHIPYARDS

(Survey based on information received as of press time)

Compiled by Maritime Reporter Staff

BUILDER	VESSEL	TYPE	DIMENSIONS Lgth-Wdth-Dft (In feet)	MAIN ENGINES	OWNER/OPERATOR	STATUS
Allen Marine, Inc. Sitka, AK	Alaskan Dream	Catamaran	100 x 28 x 3	(4) Caterpillar	Alaska Catamaran	D-7/88
	St. Rufina	Catamaran	78 x 24 x 3	(2) Detroit Diesel	Alaska Catamaran	D-6/88
Atlantic Marine, Inc. Jacksonville, FL	Sandra Jane	Trawler	95 x 25	Caterpillar	M. Kwilhaug	D-2/88
	Canima	Tender	105 x 31	(2) GM	Bermuda Gov't	D-5/88
	Bermudian	Tender	105 x 31	(2) GM	Bermuda Gov't	D-6/88
	Aleutian Chalice	Longliner	123 x 32	(2) Caterpillar	Chalice Trawler	D-9/89
	N/A	Ferry	59 x 17	(2) GM	Bermuda Gov't	C-4/89
	N/A	Ferry	59 x 17	(2) GM	Bermuda Gov't	C-4/89
	N/A	Ferry	59 x 17	(2) GM	Bermuda Gov't	C-4/89
Avondale Industries. Shipyards Division, Avondale, LA	Walter S. Diehl	T-AO-193	677.5 x 97.5	(2) Colt-Pielstick	U.S. Navy	D-9/88
	John Ericsson	T-AO-194	677.5 x 97.5	(2) Colt-Pielstick	U.S. Navy	L-1/90
	Leroy Grumman	T-AO-195	677.5 x 97.5	(2) Colt-Pielstick	U.S. Navy	D-7/89
	Kanawha	T-AO-196	677.5 x 97.5	(2) Colt-Pielstick	U.S. Navy	L-5/90
	Pecos	T-AO-197	677.5 x 97.5	(2) Colt-Pielstick	U.S. Navy	L-8/89
	Unnamed	T-A0-198	677.5 x 97.5	(2) Colt-Pielstick	U.S. Navy	L-10/90
	Unnamed	T-AO-200	677.5 x 97.5	(2) Colt-Pielstick	U.S. Navy	L-7/91
	Unnamed	T-AO-202	677.5 x 97.5	(2) Colt-Pielstick	U.S. Navy	L-4/92
	Unnamed	T-AO-204	677.5 x 97.5	(2) Colt-Pielstick	U.S. Navy	L-1/93
	Gunston Hall	LSD-44	609.6 x 84	(2) Colt-Pielstick	U.S. Navy	D-2/89
	Comstock	LSD-45	609.6 x 84	(2) Colt-Pielstick	U.S. Navy	D-9/89
	Tortuga	LSD-46	609.6 x 84	(2) Colt-Pielstick	U.S. Navy	D-3/90
	Rushmore	LSD-47	609.6 x 84	(2) Colt-Pielstick	U.S. Navy	L-5/89
	Ashland	LSD-48	609.6 x 84	(2) Colt-Pielstick	U.S. Navy	L-11/89
	Unnamed	LSD-49	609.6 x 84	(2) Colt-Pielstick	U.S. Navy	L-10/92
Bath Iron Works, Bath, ME	Philippine Sea	CG-58	563 x 55	(4) GE gas turbines	U.S. Navy	D-1/89
	Normandy	CG-60	563 x 55	(4) GE gas turbines	U.S. Navy	D-10/89
	Monterrey	CG-61	563 x 55	(4) GE gas turbines	U.S. Navy	D-3/90
	Cowpens	CG-63	563 x 55	(4) GE gas turbines	U.S. Navy	D-7/90
	Gettysburg	CG-64	563 x 55	(4) GE gas turbines	U.S. Navy	D-11/90
	Shiloh	CG-67	563 x 55	(4) GE gas turbines	U.S. Navy	D-4/92
	Unnamed	CG-70	563 x 55	(4) GE gas turbines	U.S. Navy	D-6/93
	Arleigh Burke	DDG-51	466 x 59	(4) GE gas turbines	U.S. Navy	D-7/90
	John Paul Jones	DDG-53	466 x 59	(4) GE gas turbines	U.S. Navy	D-7/92
	Curtis Wilbur	DDG-54	466 x 59	(4) GE gas turbines	U.S. Navy	C-88
	Unnamed	DDG-56	466 x 59	(4) GE gas turbines	U.S. Navy	C-88
	Unnamed	DDG-58	466 x 59	(4) GE gas turbines	U.S. Navy	C-88
Bender Shipbuilding & Repair Mobile, AL	Arctic IV	Trawler	155	EMD	Arctic Fisheries	D-10/88
Bethlehem Steel Corp., Sparrows Point, Sparrows Point, MD	Maury	T-AGS-39	500 x 72	(2) Medium-speed diesels	U.S. Navy	L-9/87
	Tanner	T-AGS-40	500 x 72	(2) Medium-speed diesels	U.S. Navy	L-1/88
Blount Marine Warren, RI	La Nina	Passenger Ferry	92 x 22 x 5	(3) Detroit Diesel	Puerto Rico Port Authority	D-12/87
	La Pinta	Passenger Ferry	92 x 22 x 5	(3) Detroit Diesel	Puerto Rico Port Authority	D-6/88
	Spirit Of Chicago	Dinner boat	192 x 35 x 6	(2) Detroit Diesel	Holiday Cruises	D-4/88
	Alexandria Belle	Dinner boat	87 x 32 x 8	(2) Detroit Diesel	Uncle Sam Boat Tour	D-7/88
	Spirit Of Los Angeles	Dinner Boat	192 x 35 x 6	(2) Detroit Diesel	Holiday Cruises	D-3/89
	Spirit Of Philadelphia	Dinner Boat	192 x 35 x 6	(2) Detroit Diesel	Holiday Cruises	D-5/89
Bollinger Lockport, LA	Attu	WPB 1317	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-2/88
	Baranof	WPB 1318	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-3/88
	Chandeleur	WPB 1319	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-4/88
	Chincoteague	WPB 1320	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-5/88
	Cushing	WPB 1321	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-6/88
	Cuttyhunk	WPB 1322	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-7/88
	Drumond	WPB 1323	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-9/88
	Key Largo	WPB 1324	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-10/88
	Metomkin	WPB 1325	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-11/88
	Monomoy	WPB 1326	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-12/88
	Orcas	WPB 1327	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-1/89
	Padre	WPB 1328	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-2/89
	Sitkinak	WPB 1329	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-3/89
	Tybee	WPB 1330	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-5/89
	Washington	WPT 1331	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-6/89
	Wrangell	WPB 1332	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-7/89
	Adak	WPB 1333	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-8/89
	Liberty	WPB 1334	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-9/89
	Anacapa	WPB 1335	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-10/89
	Kiska	WPB 1336	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-12/89
	Assategaue	WPB 1337	110 x 22 x 7.5	(2) Paxman-Valenta	U.S. Coast Guard	D-1/90
Campbell Shipyard, San Diego, CA	Margaret Z	Purse Seiner	257 x 45 x 20	(2) Caterpillar	Margaret Z Fishing Co.	D-6/89
	Jai Won Master	Purse Seiner	257 x 45 x 20	EMD	Jai Won Industrial	D-9/89
	N/A	Purse Seiner	257 x 45 x 20	EMD	Silla Corp.	C-88
	N/A	Purse Seiner	257 x 45 x 20	EMD	Silla Corp.	C-88
	N/A	Purse Seiner	257 x 45 x 20	EMD	Silla Corp.	C-88
	N/A	Purse Seiner	257 x 45 x 20	Caterpillar	Saupiquet	C-88
	N/A	Purse Seiner	257 x 45 x 20	Caterpillar	Saupiquet	C-88




















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BUILDER	VESSEL	TYPE	DIMENSIONS Lgth-Wdth-Dft (in feet)	MAIN ENGINES	OWNER/OPERATOR	STATUS
Cape Marine, Inc. Monument Beach, MA	Floyd Knight	Pilot boat	30 x 11 x 3	(2) Cummins	U.S. Virgin Is. Port Authority	L-8/88
	Walrus	Mooring Hndlg.	26 x 12 x 3	Ford	Nantucket Mooring Service	L-5/88
	Annar	Crew boat	36 x 13 x 3	(2) Cummins	Boston Line & Service	C-12/88
Conrad Industries Morgan City, LA	Hull C-490	Floating DD	90 x 50 x 7	N/A	Naval Drydock Guadeloupe	D-2/88
	G. Rowe	Deck Barge	135 x 55 x 8	N/A	N/A	D-3/88
	Hull C-492	Floating DD	120 x 52 x 7	N/A	N/A	D-6/88
	Hull C-493	Floating DD	180 x 78 x 10	N/A	Missouri Drydock	D-9/88
	Fort Morgan	Auto Ferry	160 x 46 x 7	(2) Cummins	Mobile Bay Ferry	D-11/88
	C.P. 42	Deck Barge	180 x 54 x 14	N/A	N/A	D-11/88
	C.P. 43	Deck Barge	180 x 54 x 14	N/A	N/A	D-11/88
	Mobro 128	Deck Barge	120 x 45 x 7	N/A	Moody Bros.	D-12/88
	Mobro 129	Deck Barge	120 x 45 x 7	N/A	Moody Bros.	D-12/88
	Hull C-499	Floating DD	150 x 70 x 8	N/A	N/A	D-3/89
	G.L. 108	Anchor Barge	60 x 38 x 6	N/A	N/A	D-2/89
Eastern Shipyards Panama City, FL	Northern Traveler	Catcher/Processor	130 x 30 x 11.6	(2) Detroit Diesel	Frozen At Sea Partners II	D-11/88
	Katahdin	Stern Trawler	106.4 x 25 x 13.3	Caterpillar	Capt. Edison Love	D-11/88
	Unnamed	Passenger/Vehicle Ferry	240 x 60 x 15	(2) EMD	Cross Sound Ferry Services	D-6/89
Electric Boat Division, General Dynamics, Groton, CT	Tennessee	SSBN-734	560 x 42	GE steam turbines	U.S. Navy	D-12/88
	Pennsylvania	SSBN-735	560 x 42	GE steam turbines	U.S. Navy	L-4/88
	West Virginia	SSBN-736	560 x 42	GE steam turbines	U.S. Navy	C-83
	Kentucky	SSBN-737	560 x 42	GE steam turbines	U.S. Navy	C-85
	Maryland	SSBN-738	560 x 42	GE steam turbines	U.S. Navy	C-86
	Nebraska	SSBN-739	560 x 42	GE steam turbines	U.S. Navy	C-87
	Unnamed	SSBN-740	560 x 42	GE steam turbines	U.S. Navy	C-88
	Unnamed	SSBN-741	560 x 42	GE steam turbines	U.S. Navy	C-88
	San Juan	SSN-751	360 x 33	GE steam turbines	U.S. Navy	D-8/88
	Pasadena	SSN-752	360 x 33	GE steam turbines	U.S. Navy	D-2/89
	Topeka	SSN-754	360 x 33	GE steam turbines	U.S. Navy	L-1/88
	Miami	SSN-755	360 x 33	GE steam turbines	U.S. Navy	L-11/88
	Alexandria	SSN-757	360 x 33	GE steam turbines	U.S. Navy	C-84
	Annapolis	SSN-760	360 x 33	GE steam turbines	U.S. Navy	C-86
	Springfield	SSN-761	360 x 33	GE steam turbines	U.S. Navy	C-86
	Columbus	SSN-762	360 x 33	GE steam turbines	U.S. Navy	C-86
	Santa Fe	SSN-763	360 x 33	GE steam turbines	U.S. Navy	C-86
	Hartford	SSN-768	360 x 33	GE steam turbines	U.S. Navy	C-88
	Unnamed	SSN-771	360 x 33	GE steam turbines	U.S. Navy	C-89
	Seawolf	SSN-21	353	GE steam turbines	U.S. Navy	C-89

BUILDER	VESSEL	TYPE	DIMENSIONS Lgth-Wdth-Dft (in feet)	MAIN ENGINES	OWNER/OPERATOR	STATUS
Freeport Shipbuilding, Freeport, FL	Island Duchess	Passenger	101 × 27 × 5	(2) Detroit Diesel	Empire Boat Tours	D-3/88
	Island Countess	Passenger	101 × 27 × 5	(2) Detroit Diesel	Empire Boat Tours	D-4/88
	Princess II	Passenger	75 × 21 × 6	(2) Cummins	All Aboard Party Cruises	D-5/88
	Southern Star	Passenger	65 × 26 × 3	(2) Cummins	Charleston Paddlewheel	D-6/88
	Empress	Passenger	90 × 32 × 5	(2) Cummins	Island Queen Excur.	D-12/88
	Treasure Island I	Passenger	53 × 20 × 2.5	(2) Caterpillar	Treasure Cay	D-5/89
	Treasure Island II	Passenger	53 × 20 × 2.5	(2) Caterpillar	Treasure Cay	D-5/89
	Unnamed	Passenger	65 × 26 × 3	(2) Cummins	Lanee Chamber Yacht Sales	D-5/89
	Grand Romance	Passenger	136 × 46 × 4.5	(2) Cummins	Amer. River Cruises	D-6/89
Gladding-Hearn Shipbuilding, The Duclos Corp. Somerset, MA	Island Express	Catamaran	82.5 × 28.5 × 6.8	(2) Deutz MWM	Arnold Transit	D-5/88
	Vineyard Spray	Catamaran	82.5 × 28.5 × 6.8	(2) Deutz MWM	Bay State & Provincetown Cruise	D-6/88
	TNT Express	Catamaran	82.5 × 28.5 × 3.5	(2) Deutz MWM	TNT Hydrolines	D-2/89
	Jet Express	Catamaran	95 × 28.5 × 3.5	(2) Deutz MWM	Put-In-Bay Transp.	D-6/89
Gulf Craft, Inc., Patterson, LA	Whale Watcher	Whale watch	95 × 24 × 5.5	(3) Detroit Diesel	J & J Fishing	D-5/89
	George Washington	Commuter	95 × 24 × 5.5	(2) Caterpillar	A/H Battery Assoc.	D-5/89
	Thomas Jefferson	Commuter	95 × 24 × 5.5	(2) Caterpillar	A/H Battery Assoc.	D-6/89
	George Washington	Commuter	95 × 24 × 5.5	(2) Caterpillar	A/H Battery Assoc.	D-7/89
	George Washington	Commuter	95 x 24 x 5.5	(2) Caterpillar	A/H Battery Assoc.	D-8/89
	J.J. Callis	Crewboat	110 × 25 × 6	(4) Detroit Diesel	U.S. Dep't Agricult.	D-3/89
	Norman McCall	Crewboat	160 × 30 × 8	(6) Cummins	McCall's Boat Rentals	D-2/89
	Pilot II	Party fish.	65 × 24 × 5.5	(2) Detroit Diesel	T. Marconi	D-1/89
	Stringray	Commuter	80 × 24 × 5.5	(2) Detroit Diesel	Bahamian Gov't	D-11/88
	Tarpon	Commuter	80 × 24 × 5.5	(2) Detroit Diesel	Bahamian Gov't	D-11/88
	Virgin Mermaid I	Tour boat	80 × 30 × 4	(2) Detroit Diesel	Seamar Corp.	D-9/88
	Aaron McCall	Crewboat	160 × 30 × 8	(6) Cummins	McCall's Boat Rentals	D-7/88
	Super Ranger	Party fish	95 × 24 × 6	(3) Detroit Diesel	Ranger Fishing Fleet	D-6/88
	Radisson	Commuter	80 x 24 x 5.5	(4) Detroit Diesel	Starline	D-5/88
	Massachusetts	Commuter	95 x 25 x 6	(4) Detroit Diesel	Massachusetts Bay Lines	D-5/88
	Port Imperial N.J.	Commuter	90 x 24 x 5.5	(2) Caterpillar	A.P.A. Transport	D-3/88

BUILDER	VESSEL	TYPE	DIMENSIONS Lgth-Wdth-Dft (in feet)	MAIN ENGINES	OWNER/OPERATOR	STATUS
Ingalls Shipbuilding, Pascagoula, MS	San Jacinto	CG-56	567 x 55	(4) GE gas turbines	U.S. Navy	D-1/88
	Lake Champlain	CG-57	567 x 55	(4) GE gas turbines	U.S. Navy	D-8/88
	Princeton	CG-59	567 x 55	(4) GE gas turbines	U.S. Navy	D-12/88
	Chancellorsville	CG-62	567 x 55	(4) GE gas turbines	U.S. Navy	D-6/89
	Chosin	CG-65	567 x 55	(4) GE gas turbines	U.S. Navy	D-11/90
	Hue City	CG-66	567 x 55	(4) GE gas turbines	U.S. Navy	D-10/91
	Anzio	CG-68	567 x 55	(4) GE gas turbines	U.S. Navy	D-4/92
	Unnamed	CG-69	567 x 55	(4) GE gas turbines	U.S. Navy	C-88
	Unnamed	CG-71	567 x 55	(4) GE gas turbines	U.S. Navy	C-88
	Unnamed	CG-72	567 x 55	(4) GE gas turbines	U.S. Navy	C-88
	Unnamed	CG-73	567 x 55	(4) GE gas turbines	U.S. Navy	C-88
	Wasp	LHD-1	844 x 106	(2) Westinghouse steam turbines	U.S. Navy	D-7/89
	Essex	LHD-2	844 x 106	N/A	U.S. Navy	D-4/92
	Kearsage	LHD-3	844 x 106	N/A	U.S. Navy	D-1/93
	Unnamed	LHD-4	844 x 106	N/A	U.S. Navy	D-4/94
Intermarine USA, Savannah, GA	Osprey	MHC-51	188 x 36	N/A	U.S. Navy	D-4/91
Lantana Boatyard, Inc., Lantana, FL	Isla De Bioko	PB	68.8 x 18.3 x 1	(2) Detroit Diesel	Equatorial Guinea Navy	D-5/88
	Punta Caxinas	LCU	149.5 x 32 x 6.5	(3) Caterpillar	Honduran Navy	D-3/88
	Guaymuras	PB	105 x 24 x 7	(3) MTU	Honduran Navy	D-12/88
MARCO-Seattle, Seattle, WA	N/A	Longliner	135	(2) Caterpillar	Alaska Frontier	C-89
	N/A	Longliner	135	(2) Caterpillar	Alaska Frontier	C-89
Marinette Marine Corp., Marinette, WI	Champion	MCM-4	224 x 39	(4) Isotta Fraschini	U.S. Navy	D-6/89
	Patriot	MCM-7	224 x 39	(4) Isotta Fraschini	U.S. Navy	D-11/89
Munson Manufacturing, Edmonds, WA	N/A	PB	36 x 12 x 2	(3) Cummins	Chautauqua Cty. Sheriff	D-7/88
	N/A	Dive boat	30 x 11 x 3	(2) Cummins	Yap Divers	D-6/88
	N/A	PB	30 x 11 x 3	(2) Cummins	Philadelphia Police	D-7/88
	N/A	Dive boat	38 x 14 x 4	(2) Detroit Diesel	Kona Coast Divers	D-8/88
	N/A	Service boat	32 x 11 x 3	(2) Cummins	US Forest Service	D-9/88
	N/A	Pilot boat	44 x 15 x 4	(2) Lugger	Middle Rock	D-11/88
	Yukon Queen	Tour boat	58 x 17 x 3	(3) Lugger	HAL-Westours	D-5/88
	N/A	Dive boat	36 x 12 x 2	(2) Detroit Diesel	U.S. Navy	D-11/88
National Steel & Shipbuilding San Diego, CA	Supply	AOE-6	753 x 107	(4) GE gas turbines	U.S. Navy	D-4/91
	Unnamed	AOE-7	753 x 107	(4) GE gas turbines	U.S. Navy	C-88
Newport News Shipbuilding, Newport News, VA	Abraham Lincoln	CVN-72	1040 x 134	(4) GE steam turbines	U.S. Navy	D-12/89
	George Washington	CVN-73	1040 x 134	(4) GE steam turbines	U.S. Navy	D-12/91
	John C. Stennis	CVN-74	1040 x 134	(4) GE steam turbines	U.S. Navy	C-88
	Unnamed	CVN-75	1040 x 134	(4) GE steam turbines	U.S. Navy	C-88
	Albany	SSN-753	360 x 33	(4) GE steam turbines	U.S. Navy	D-7/89
	Scranton	SSN-756	360 x 33	(4) GE steam turbines	U.S. Navy	D-9/89
	Asheville	SSN-758	360 x 33	(4) GE steam turbines	U.S. Navy	D-1/90
	Jefferson City	SSN-759	360 x 33	(4) GE steam turbines	U.S. Navy	D-6/90
	Boise	SSN-764	360 x 33	(4) GE steam turbines	U.S. Navy	C-87
	Montpelier	SSN-765	360 x 33	(4) GE steam turbines	U.S. Navy	C-87
	Charlotte	SSN-766	360 x 33	(4) GE steam turbines	U.S. Navy	C-87
	Hampton	SSN-767	360 x 33	(4) GE steam turbines	U.S. Navy	C-87
	Toledo	SSN-769	360 x 33	(4) GE steam turbines	U.S. Navy	C-88
	Tucson	SSN-770	360 x 33	(4) GE steam turbines	U.S. Navy	C-88
Nichols Bros. Whidbey Island, WA	Jeland	Catamaran	75 x 28 x 5.5	(2) Detroit Diesel	U.S. Army	D-4/88
	Jera	Catamaran	75 x 28 x 5.5	(2) Detroit Diesel	U.S. Army	D-10/88
	Catalina Flyer	Catamaran	118 x 36 x 8.2	(2) Caterpillar	Catalina Passenger Service	D-5/88
	Nantucket Spray	Catamaran	121 x 52 x 4.10	(2) Deutz MWM	Boston Harbor Acquisition	D-5/89
	(No name to date)	Catamaran	75 x 28 x 5.5	(2) Detroit Diesel	Puerto Rico Boat Authority	D-8/89
	(No name to date)	Catamaran	75 x 28 x 5.5	(2) Detroit Diesel	Puerto Rico Boat Authority	D-9/89
Pan American Hovercraft Melbourne, FL	SAH 2200	Hovercraft	35 x 13.9	Deutz MWM	Maryland State	D-88
Patti Shipyard Pensacola, FL	West Virginia Belle	Passenger Vessel	197.9 x 45 x 6.6	(3) Cummins	Robert River Rides	D-5/88
	Service Barge 101	Barge	150 x 52 x 6	Non-Self Prop.	U.S. Army C Of E	D-3/89
	(3 Ferries)	Ferry	150 x 42 x 3.6	(2) Caterpillar	State Of North Carolina	D-1/90
Pennsylvania Shipbuilding, Chester, PA	Benj. Isherwood	T-AO-191	677.5 x 97.5	(2) Colt-Pielstick	U.S. Navy	L-1/88
	Henry Eckford	T-AO-192	677.5 x 97.5	(2) Colt-Pielstick	U.S. Navy	D-7/90
Peterson Builders, Inc. Sturgeon Bay, WI	Sentry	MCM-3	224 x 39 x 11	(4) Isotta Fraschini	U.S. Navy	D-89
	Guardian	MCM-5	224 x 39 x 11	(4) Isotta Fraschini	U.S. Navy	L-6/87
	Devastator	MCM-6	224 x 39 x 11	(4) Isotta Fraschini	U.S. Navy	L-6/88
	Scout	MCM-8	224 x 39 x 11	(4) Isotta Fraschini	U.S. Navy	L-5/89
	Pioneer	MCM-9	224 x 39 x 11	(4) Isotta Fraschini	U.S. Navy	C-2/89
	Warrior	MCM-10	224 x 39 x 11	(4) Isotta Fraschini	U.S. Navy	C-2/89
	Gladiator	MCM-11	224 x 39 x 11	(4) Isotta Fraschini	U.S. Navy	C-2/89
	(50) HSB-8701-8750	Harbor boat	24 x 7.7 x 2.2	Volvo Penta	U.S. Navy	C-7/87
	(25) HSB-8801-8825	Harbor boat	24 x 7.7 x 2.2	Volvo Penta	U.S. Navy	C-4/88
	(10) HSB-8901-8910	Harbor boat	24 x 7.7 x 2.2	Volvo Penta	U.S. Navy	C-11/88
	Hull # 8901	Drive boat	50 x 14.8 x 3	(2) Detroit Diesel	U.S. Navy	D-11/89
	Hull # 8902	Drive boat	50 x 14.8 x 3	(2) Detroit Diesel	U.S. Navy	D-11/89
	Washington	Ferry	100 x 37 x 9.3	(2) Cummins	Washington Island Ferry Lines	D-6/89
Platzer Shipyard Houston, TX	DXE 1901	Tank Barge	218 x 52.5 x 12.5	N/A	Dixie Carriers	D-4/89
	DXE 1902	Tank Barge	218 x 52.5 x 12.5	N/A	Dixie Carriers	D-8/89
	DXE 1903	Tank Barge	218 x 52.5 x 12.5	N/A	Dixie Carriers	D-10/89

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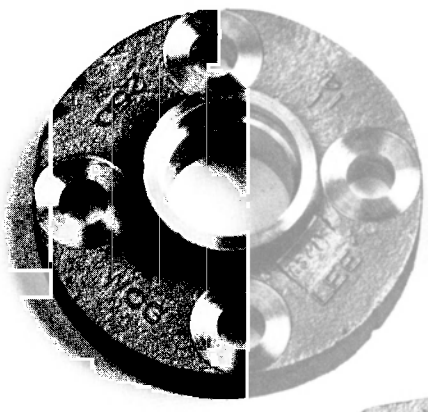

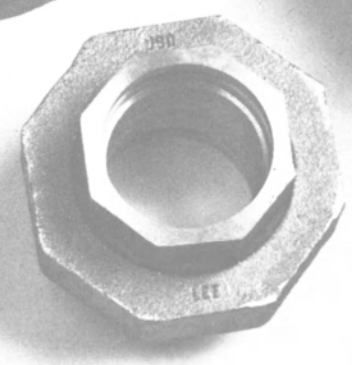

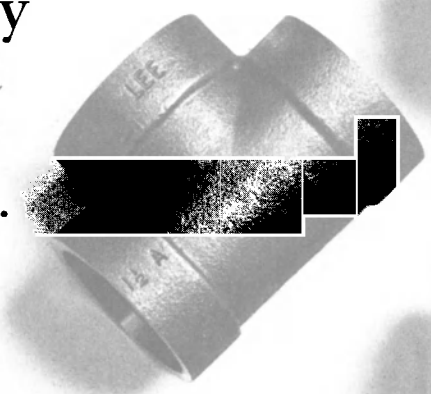

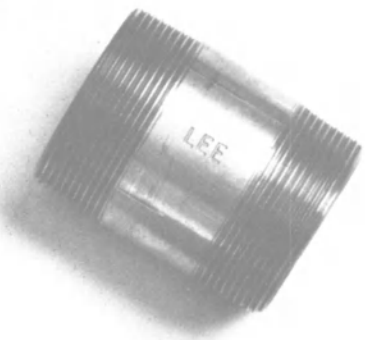

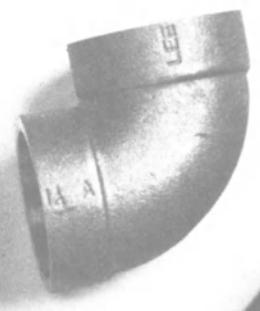

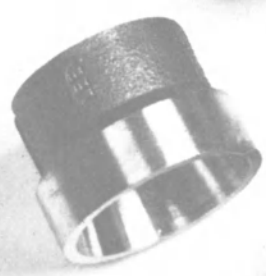

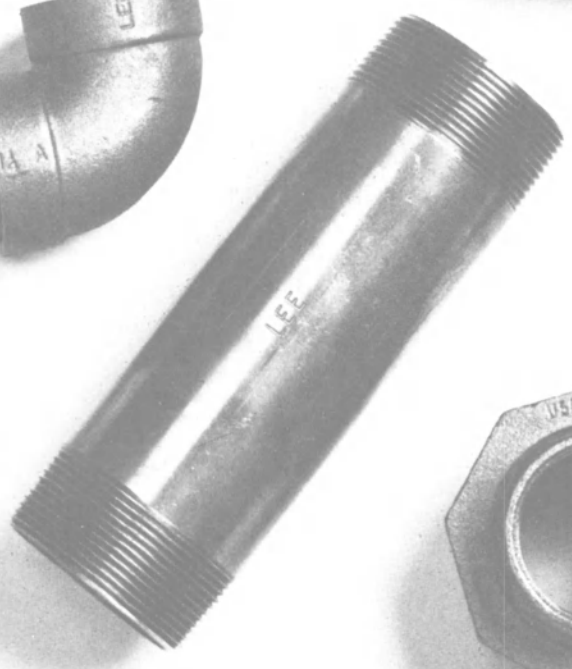

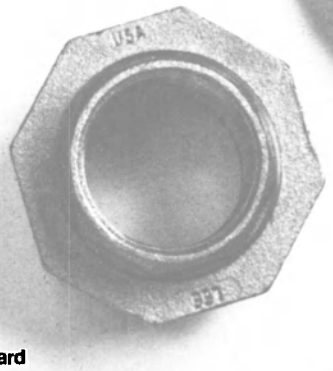

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BUILDER	VESSEL	TYPE	DIMENSIONS Lgth-Wdth-Dft (in feet)	MAIN ENGINES	OWNER/OPERATOR	STATUS
Robert E. Derector Shipyards Of Rhode Island, Middletown, RI	Campbell	WMEC-909	270 x 38 x 14	(2) Alco	U.S. Coast Guard	D-1/88
	Thetis	WMEC-910	270 x 38 x 14	(2) Alco	U.S. Coast Guard	D-5/88
	Forward	WMEC-911	270 x 38 x 14	(2) Alco	U.S. Coast Guard	D-9/88
	Legare	WMEC-912	270 x 38 x 14	(2) Alco	U.S. Coast Guard	D-1/89
	Mohawk	WMEC-913	270 x 38 x 14	(2) Alco	U.S. Coast Guard	D-5/89
	Hull # 130A	Tugboat	128 x 36 x 16	(2) EMD	U.S. Army	L-7/89
	Hull # 130B	Tugboat	128 x 36 x 16	(2) EMD	U.S. Army	KL-4/88
	Hull # 130C	Tugboat	128 x 36 x 16	(2) EMD	U.S. Army	KL-1/89
	Hull # 130D	Tugboat	128 x 36 x 16	(2) EMD	U.S. Army	KL-2/89
	Hull # 130E	Tugboat	128 x 36 x 16	(2) EMD	U.S. Army	D-91
Scarano Boat Building Albany, NY	Horicon	Dinner Boat	85 x 22 x 4	Cummins	Shoreline	D-5/88
SeaArk Marine, Inc., Monticello, AR	Hull # 40451	—	31 x 10.8 x 2	Detroit Diesel	Panama Canal Comm.	D-4/88
	Hull # 40452	—	31 x 10.8 x 2	Volvo Penta	Panama Canal Comm.	D-4/88
	Hull # 40453	—	31 x 10.8 x 2	Volvo Penta	Panama Canal Comm.	D-4/88
	Hull # 40521	—	31 x 10.8 x 2	Volvo Penta	Panama Canal Comm.	D-1/89
	Hull # 40522	—	31 x 10.8 x 2	Volvo Penta	Panama Canal Comm.	D-1/89
	Hull # 40311	PB	28 x 11 x 1.9	Volvo Penta	Rockland Cty., NY	D-9/87
	Hull # 40442	Protector	28 x 11 x 1.9	Yamaha	Dep't Natural Res.	D-2/88
	Hull # 40478	Research	28 x 11 x 1.9	Volvo Penta	Univ. Montana	D-1/89
	(10) Hull # 40461-40470	PBs	40 x 12.7 x 5.8	(2) Caterpillar	El Salvador Navy	D-3/89
Serodino, Inc. Chattanooga, IN	Tarheel	Towboat	52 x 26 x 5.6	(2) Cummins	N/A	D-3/89
Service Marine Morgan City, LA	M/V Bay Lady	Dinner/Excursion	140 x 36 x 9.10	(2) Cummins	Baltimore Harbor Bay Tours	D-3/88
	M/V Annabel Lee	Dinner/Excursion	92 x 34 x 7	(2) Detroit Diesel	Heritage Cruise Line	D-4/88
	M/V Cape Ann	Dinner/Excursion	166	N/A	A/C Cruise Line	D-6/88
	Spirit Of Norfolk	Dinner/Excursion	175 x 35 x 10	(2) Caterpillar	Cruise International	D-4/89
	Spirit of Mt. Vernon	Dinner/Excursion	142 x 31.6 x 11	(2) Caterpillar	Cruise International	D-6/89
	F/V Perserverence	Catcher/Processor	166 x 38 x 12	(2) Detroit Diesel	King Crab	D-3/88
Skipperliner, Industries, LaCrosse, WI	Edelweiss II	Passenger	77 x 20	(2) Cummins	Folgelson Co.	D-5/89
	Discovery	Passenger	72 x 18 x 3.5	(2) Cummins	Browning Marine	D-6/89
	Jambalaya	Passenger	65 x 20 x 3.5	(2) Cummins	Showboat, Inc.	D-7/89
	Spirit of St. Croix	Yacht	55 x 14 x 3.2	(2) Cummins	St. Croix Custom Cruises	D-6/89
	Jollie Ollie	Sternwheeler	52 x 16 x 3.5	(2) Cummins	Kerry Marine	D-8/89
	Anticipation II	Passenger	72 x 18 x 3.5	(2) Cummins	Marine Hospitality	D-10/88
	Catawba Queen	Sidewheeler	65 x 20 x 3.5	(2) Cummins	Lake Norman Cruises	D-11/88
	Fiesta Queen	Sidewheeler	65 x 20 x 3.5	(2) Cummins	Laughlin River Tours	D-12/88
	Virginia Dare	Sidewheeler	65 x 20 x 3.5	(2) Caterpillar	Bluewater Cruise	D-3/89
	Island Girl IV	Passenger	72 x 18 x 3.5	(2) Cummins	Island Girl Cruise	D-4/89
	Celebration II	Passenger	84 x 21 x 4.3	(2) Cummins	Celebration	D-4/89
South Seas Catamaran, Cape Coral, FL	Blue Waters	Catamaran	43 x 16.5 x 3	(2) Isuzu	D. Sands	D-2/88
	Cat B'lue	Catamaran	43 x 16.5 x 3	(2) Isuzu	Blue Water Divers	D-3/88
	Ripple	Catamaran	44 x 16.5 x 4	(2) Isuzu	C. Wells	D-1/88
	Palm Island I	Catamaran	43 x 16.5 x 3	(2) Volvo Penta	Island Harbor Marine & Resort	D-1/88
	Dive Cat	Catamaran	43 x 16.5 x 3	(2) Detroit Diesel	T. Massimino	D-6/88
	Island Roamer	Catamaran	49 x 16.5 x 4	(2) Detroit Diesel	P. Cook	D-7/88
	Treasure Island	Catamaran	50 x 16.5 x 2	(2) Isuzu	Treasure Island Cruises	D-11/88
	Curacao Caribbean	Catamaran	63.5 x 16.5 x 4	(2) Detroit Diesel	V. Cozzo	D-3/89
	Grand Style I	Catamaran	53 x 16.5 x 3	(2) Detroit Diesel	Great Cruz Bay Development	D-3/89
	Grand Style II	Catamaran	53 x 16.5 x 3	(2) Detroit Diesel	Great Cruz Bay Development	D-3/89
Swiftships, Inc., Morgan City, LA	Carousel	Yacht	135	(2) Caterpillar	Great Bay Boat	D-10/88
	Miss Fernie	Crewboat	120	(4) Detroit Diesel	Marine Asset Mgmt	D-9/88
	C/Vigalante	Crewboat	110	(3) GM	Ocean Survey	D-10/88
	Hull# 388	PB	38	(2) GM	Cameroon Navy	D-12/88
	Trailer Launch System		—	—	Cameroon Navy	D-12/88
	Hull# 389	Missile Ret.	120	(4) GM	U.S. Navy	D-3/88
	Hull# 390	Missile Ret.	120	(4) GM	U.S. Navy	D-5/88
	Hull# 391	Missile Ret.	120	(4) GM	U.S. Navy	D-6/89
	Hull# 392	Missile Ret.	120	(4) GM	U.S. Navy	D-8/88
	Hull# 393	Missile Ret.	120	(4) GM	U.S. Navy	D-12/88
	Hull# 352	Explosive Ord. Boat	65	(2) GM	U.S. Navy	C-3/87
	Hull# 353	Explosive Ord. Boat	65	(2) GM	U.S. Navy	C-3/87
	Hull# 395	Bridge boat	27	GM	Egypt	D-12/88
	Hull# 396	Bridge boat	27	GM	Egypt	D-12/88
	Hull# 397	Bridge boat	27	GM	Egypt	D-12/88
	Hull# 398	Bridge boat	27	GM	Egypt	D-12/88
	Hull# 399	Bridge boat	27	GM	Egypt	D-12/88
	Hull# 400	Bridge boat	27	GM	Egypt	D-12/88
	Hull# 401	Bridge boat	27	GM	Egypt	D-12/88
	Hull# 402	Bridge boat	27	GM	Egypt	D-12/88
	Hull# 403	Bridge boat	27	GM	Egypt	D-12/88
	Hull# 404	Bridge boat	27	GM	Egypt	D-12/88
Textron Marine Systems,	—	LCAC-13	87.9 x 47*	(4) Avco Lycoming gas turbines	U.S. Navy	D-9/88
New Orleans, LA	—	LCAC-14	87.9 x 47*	(4) Avco Lycoming gas turbines	U.S. Navy	D-11/88
	—	(10) LCAC-24-33	87.9 x 47*	(4) Avco Lycoming gas turbines	U.S. Navy	C-7/87
	—	(12) LCAC-37-48	87.9 x 47*	(4) Avco Lycoming gas turbines	U.S. Navy	C-12/88
	N/A	Motor LB	47	N/A	U.S.C.G.	C-7/88

*Length and beam on cushion

BUILDER	VESSEL	TYPE	DIMENSIONS Lgth-Wdth-Dft (in feet)	MAIN ENGINES	OWNER/OPERATOR	STATUS
Todd Pacific Shipyards, San Pedro, CA	Ingraham	FFG-61	445 x 45	(2) GE gas turbines	U.S. Navy	D-6/89
Thompson Metal Fab, Vancouver, WA	Navatek I*	SWATH	140 x 53 x 8-12	(2) Deutz MWM	Pacific Marine	D-4/89
*Superstructure fitted by Northwest Marine Iron Works						
Trinity Marine Group, New Orleans, LA (Includes: **Aluminum Boats, Equitable Shipyards, Gretna Machine & Iron Works, Halter Marine, HBC Barge, Moss Point Shipyard, Thunderbolt Shipbuilding & Repair.)**	N/A	Pilot Boat	53	(2) Detroit Diesel	Panama Canal Commission	D-8/89
	N/A	Pilot Boat	53	(2) Detroit Diesel	Panama Canal Commission	D-6/89
	N/A	Pilot Boat	33	(2) Detroit Diesel	Panama Canal Commission	D-6/89
	N/A	Pilot Boat	53	(2) Detroit Diesel	Panama Canal Commission	D-6/89
	Cajun Express	Ferry Boat	110	(2) Detroit Diesel	N/A	D-6/89
	N/A	Crewboat Hull	85	N/A	Barber Lines Navigation	D-6/89
	N/A	Towboat	60	(2) Cummins	Jordanian Port Commission	D-11/89
	N/A	Towboat	60	(2) Cummins	Jordanian Port Commission	D-11/88
	N/A	Tug	106	(2) EMD	Jordanian Port Corp.	D-5/89
	N/A	Tug	106	(2) EMD	Jordanian Port Corp.	D-5/89
	N/A	Tug	125	(2) Detroit Diesel	UDI	D-5/89
	California Hornblower	Excursion Boat	183	(2) Detroit Diesel	Horn Blower Dev. Corp.	D-5/89
	N/A	Fireboat	110	(2) Detroit Diesel	Hawaii	D-11/89
	N/A	Ferry	100	(2) Detroit Diesel	State of Texas	D-2/89
	N/A	Ferry	108	(2) Cummins	State of Michigan	D-10/89
	Carteret	Ferry	161	(2) Caterpillar	State of North Carolina	D-6/88
	Caribe Tide	Passenger Ferry	85	(4) Cummins	Transportation Serv. of St. John	D-8/88
	N/A	Fuel Oil Barge	95	(2) Detroit Diesel	Jordan/Adaba Port Authority	D-7/88
	N/A	Pilot Boat	50	(2) Detroit Diesel	Jordan/Adaba Port Authority	D-11/88
	Chevron USA	Tug	110	(2) EMD	Chevron	D-12/88
	ATCO Marwa	Crew Boat	101	(3) Detroit Diesel	UDI	D-10/88
	ATCO Daiina	Crew Boat	101	(3) Detroit Diesel	UDI	D-10/88
	N/A	Ferry	112	(4) Detroit Diesel	State of Washington	D-7/89
	N/A	Ferry	112	(4) Detroit Diesel	State of Washington	D-7/89
	N/A	Detroit Diesel	110	(2) Detroit Diesel	UDI	D-2/89
	N/A	Security Boat	101	(3) Detroit Diesel	UDI	D-2/89
	N/A	Security Boat	101	(3) Detroit Diesel	UDI	D-3/89
	N/A	Yacht	97	(2) MTU	UDI	D-10/89
	ATCO Hebah	Crew Boat	101	(3) Detroit Diesel	UDI	D-6/88
	N/A	Barge	470	—	UDI	D-5/89
	N/A	Barge	285	—	UDI	D-8/89
	N/A	Barge	446	—	Bouchard Towing	D-12/89
	N/A	Tug	127	(2) EMD	Bouchard Towing	D-11/89
	Gen. Somerville	L.S.V.—3	272	(2) EMD	U.S. Army	D-4/88
	Lt. Gen. Bunker	L.S.V.—4	272	(2) EMD	U.S. Army	D-6/88
	Adventurous	T-AGOS 13	224	SCR Diesel Electric	U.S. Navy	D-8/88
	Worthy	T-AGOS 14	224	SCR Diesel Electric	U.S. Navy	D-12/88
	Titan	T-AGOS 15	224	SCR Diesel Electric	U.S. Navy	D-3/89
	Capable	T-AGOS 16	195	SCR Diesel Electric	U.S. Navy	D-1/90
	Intrepid	T-AGOS 17	224	SCR Diesel Electric	U.S. Navy	L-89
	Relentless	T-AGOS 18	224	SCR Diesel Electric	U.S. Navy	L-89
	N/A	Barge (2)	195		UDI	D-4/89
	N/A	Barge (12)	195		UDI	D-5/89
	N/A	Barge (25)	195		UDI	D-7/89
	N/A	Barge (13)	175		UDI	D-8/89
	N/A	Barge (40)	195		UDI	D-12/89
	N/A	Landing Craft Utility	162	(2) Cummins	U.S. Army	D-5/89
	N/A	Landing Craft Utility	162	(2) Cummins	U.S. Army	D-5/89
	N/A	Landing Craft Utility	162	(2) Cummins	U.S. Army	D-6/89
	N/A	Landing Craft Utility	162	(2) Cummins	U.S. Army	D-6/89
	N/A	Landing Craft Utility	162	(2) Cummins	U.S. Army	D-7/89
	N/A	Landing Craft Utility	162	(2) Cummins	U.S. Army	D-8/89
	N/A	Landing Craft Utility	162	(2) Cummins	U.S. Army	D-10/89
	N/A	Landing Craft Utility	162	(2) Cummins	U.S. Army	D-11/89
	N/A	Landing Craft Utility	162	(2) Cummins	U.S. Army	D-12/89
	N/A	Landing Craft Utility	162	(2) Cummins	U.S. Army	D-12/89
	N/A	Barge	50		State of South Carolina	D-5/89
	N/A	Hopper Barges (15)	195	—	UDI	D-12/88
	N/A	Barges (24)	175	—	UDI	D-1/89
	N/A	Barges (12)	195	—	UDI	D-2/89
Washburn & Doughty Associates, E. Boothbay, ME	Restless	Longliner	82 x 22 x 9.5	Caterpillar	D. Kruza	D-3/88
	Bay Lady	Schooner	64.8 x 18.5 x 7	Cummins	G. Mohr	D-8/88
	Great Point	Passenger	185 x 35 x 12	(2) Caterpillar	Hy-Line Cruises	D-8/88
	Theresa & Allyson	Dragger	70 x 20	Caterpillar	D. Jordan	D-4/89
Westport Shipyard,	Ocean Sentinel	Ocean. Surv.	65 x 20 x 6	(2) Detroit Diesel	L.A. County	D-2/89
	Endeavor	Dive boat	50 x 17 x 5	(2) Detroit Diesel	Lahina Divers	D-3/88
	Golden Delicious	Yacht	98 x 22 x 6	(2) Detroit Diesel	Wm. Gammie	D-4/88

Legend: C-Contract; D-Delivery; KL-Keel Laying; L-Launching

U.S. BARGE AND TOWING OPERATIONS

AWO In 1989: Tested By Drought And Ready To Face New Challenges

By J.A. Tinkey, President
Mid-America Transportation Company
And
Chairman Of The Board Of The American Waterways Operators

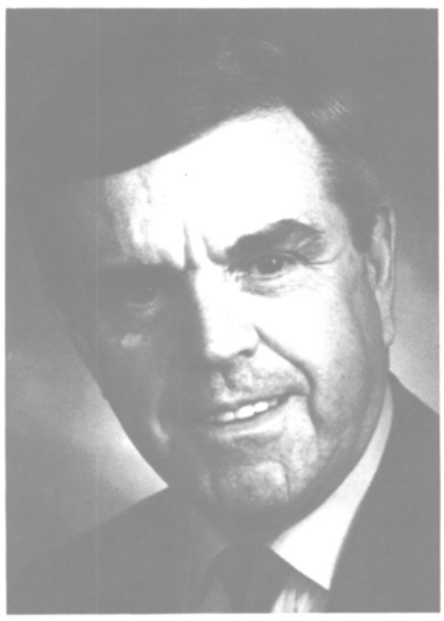
Editor's Note: **J.A. Tinkey** *is president of Mid-America Transportation Company in Fairview Heights, Ill. In April 1989, Captain* **Tinkey** *became chairman of the board of the American Waterways Operators, the national association of the inland and coastal barge industry. During the Drought of '88, he was one of seven barge line executives empowered by the industry to manage the drought crisis.*

In times past, industry survival meant being able to react and adapt to change. That perhaps is no longer completely true. Future survival and growth in the coastal and inland trades will require more than adaptability and reaction. It will require the ability to predict—to recognize—and to manage change—make it work for us, rather than against us. AWO as an association, and the staff working closely with a concerned membership, has a proven ability to do that. The AWO staff are a lean, hard-working, aggressive and highly qualified staff, with superb leadership. They have become a perfect tool to help an industry whose heritage has always been a commitment to hard work—learn to work smart—as well as hard.

On internal association matters, the past years have been strong for AWO. Many challenges successfully met—programs fulfilled—membership growth, and financial goals are being realized, plus many others. However, there's more work ahead. AWO has many changes and programs currently underway. Over the past year and perhaps longer, there have been a number of discussions about the need to revisit the method AWO uses to calculate assessments—and the way directors are apportioned by AWO Region. These discussions for the most part have been informal. I believe that the association is now at the point where we must begin to review and examine both of these important matters. It's a big job—but one we need to get on with.

In preparing for the new responsibility of being AWO's chairman of the board, I've thought about AWO—about this exceptional trade organization that each of its members has helped to shape and to strengthen over the years. I have no concerns about AWO's continuing ability to grow in credibility, strength and representation. If we remain unified. Certainly there will be diversity—an association should never try to avoid it. Diverse opinions are not only healthy and educational, they are a natural human character trait. Differing opinions tend to stimulate us; they cause us to get involved, to ask questions, or to find answers. However, in order for the process to work we must allow the positive effects of careful research, intelligent discussions, open debate and finally board action to prevail—then move on as a unified group. It's imperative. Failing to do this, failing to let the system work, can only put AWO at risk.

On external association matters, perhaps no issue or event better illustrates AWO's and this industry's growing strength and ability to manage change than its handling of the Drought of 1988.



J.A. Tinkey

The river towing industry is young in terms of years; however, in terms of challenge and hardship, we've grown some whiskers. We were tempered during the war years, tested in the floods and ice of the seventies, and suffered severely in the barge industry's terrible economic depression of the eighties. By the beginning of 1988, the industry was finally seeing an end to the difficult six years of low revenues. Most Mississippi operators got a running start in the spring of '88, with strong freight sales, good volumes and normal operating conditions.

Then, in late June, the spring drought hit us with devastating impact.

This industry came of age in the Drought of '88. We stood tall last summer. It was, and still is, a tough time in our business. But standing tall in the tough times has always been a sign of both maturity and professionalism. Both describe our industry last summer. For the first time in our relatively short existence, the towing industry became a pro-active rather than a reactive industry. And it worked. The Corps of Engineers, the Coast Guard and the barging industry—through AWO—mobilized their forces to wage war against the most severe low-water conditions ever encountered on the Lower Mississippi.

In late June, the water was the lowest anyone remembered, with no

prospects for improvement. Between Cairo and Vicksburg over 40 river crossings had less than 10 feet of water, and tows grounded at an astonishing rate. Nearly 2,000 fully loaded barges were stranded up river, unable to move southward to the Gulf. The Drought of '88's navigational impacts could have resulted in a major national transportation crisis, if you consider that the barge industry moves over 57 percent of all export grain, over 40 percent of U.S. petroleum, and one in every five tons of U.S. coal.

In early July, AWO convened a summit in St. Louis of barge line executives representing over 90 percent of the inland fleet. From that historic gathering, seven members were chosen to represent the entire industry. A few days later, in Memphis, AWO brought the highest levels of the Coast Guard and the Corps in to the mix.

This combined force became the River Industry Executive Task Force. We set pro-active goals to keep the rivers open to navigation, protect water supplies, and guard against damage to the environment. We provided centralized navigation information to support the joint effort, and undertook contingency plans through the summer of '89.

As the war effort took shape, the attack force formed up and began the all-out effort necessary to combat the drought's navigational onslaught. This level of mobilization and business-government cooperation was unprecedented. The Corps effectively responded with a dramatic increase in the dredge fleet. At one time a dozen dredges were digging sand. The Coast Guard set up safety zones, called in extra buoy tenders, activated additional manpower, and doubled their buoys. They set up a command post in Memphis to monitor conditions, regulate tow size and draft, and communicate ever-changing vital information to the operators. The industry formed local operational committees with the hands-on expertise to assist the agencies.

There was another critical element to the success of this campaign—the towboat crews. They saw the need, knew the implications of a failed effort, and quickly began adjusting to very marginal operating conditions. Bottom line, they kept the freight moving. These guys waged their part of this war where the battle is always the toughest, in the trenches. Our hats are off to these hard working people who ran the gauntlet every watch and kept commerce flowing. We also owe a tremendous debt to the dredge boat crews and the men and women manning the buoy tenders.

Monetarily, who knows what the outcome will be? The restrictions put in place during this period (and by the way, some still exist) certainly have had their impact. Barges averaged at least 100 tons less per barge—tow sizes were reduced as much as 50 percent, and many times were limited to daylight operations. However, it is an important measure of this industry, I believe, that despite estimated losses of up to $200 million, we turned down a federal handout last August. As **Joe Farrell,** president of AWO, said at the time, "Sometimes you succeed; sometimes you don't. When you don't you shouldn't turn to the federal government to bail you out."

I believe that history will show the Drought of '88 was a step up the ladder for our industry, and for AWO, and will further affirm that both domestically, and abroad, shippers and customers can rely on the world's best inland water transportation system. As for 1989, it's apparent that the farmers have planted fence row to fence row. They will fertilize heavily and, given favorable weather conditions, should produce tremendous volumes. The barge and towing industry, and its national trade association, will be ready. ■

CANADIAN SHIPBUILDING

REVIEW AND OUTLOOK

BY J.Y. CLARKE, PRESIDENT,
CANADIAN MARITIME INDUSTRIES ASSOCIATION

J. Y. Clarke

The bombshell provided by Canada's April 1989 budget completely overshadowed any definitive review of 1988, with respect to Canada's shipyards and associated marine manufacturing and supply industries. I'll return to this dramatic issue after a quick look at the year ending on December 31, 1988.

Our 1988 Shipyard Order Book total, i.e., vessels under construction and on order, declined slightly from 89,309 GT to 85,037 GT, a drop of 4.8 percent. As expected, Government contracts accounted for a majority of this total, i.e., 62 percent, with the commercial component comprising fishing vessels, tugs, barges and component structures. The value of new construction, however, more than doubled.

It should also be noted that the total value of repairs and conversions for 1988 grew from $180 million to $214 million, or by 19 percent, reflecting both a significant increase of commercial refits, particularly on the West Coast, and an increase in the refit value of Government vessels, including the Tribal Class destroyer modernization program, after the effect of a 4.2 percent inflation rate is discounted.

On a discouraging note, the number of foreign-built vessels registered in Canada rose from 7 in 1987 to 18 in 1988, an increase of 257 percent, although the actual gross tonnage increase was only 5.6 percent. Nevertheless, this reflects the failure of the minimal, ineffective Government policies currently in place to protect our industry, the survival of which does not seem to be among Government priorities, in spite of encouraging rhetoric from the bureaucrats of the departments concerned.

Employment in our member shipyards increased by 39 percent during 1988, to an average annual figure of 7,848 from 5,649 a year earlier. Also, at the end of 1988, employment stood at 8,820, the highest level for several years.

All told, 1988 tended to confirm our hopes and expectations that shipyards in Canada had "bottomed-out" from the 1985-86 slump and were now into a gradual recovery phase.

And now for the outlook—aye, there's the rub! On the commercial side, the last delivery of vessels currently under construction is scheduled for January 1990, and very little remains on the order book beyond that date. We believe that the larger fisheries are still planning accelerated fleet renovation programs, although recent reductions in some fish quotas have probably eased their urgency. Our problem is to attract any such orders into Canadian yards.

It is the Federal Government's segment of future new construction, however, that generates real gloom. The 1989 Federal budget, tailored to gain control of the annual deficit, contained staggering news—the Government's project to acquire a fleet of 10-12 nuclear-powered submarines was cancelled. To add insult to injury, cutbacks and delays were announced for other capital acquisitions; and although details are sparse, the mine counter-measures fleet seems vulnerable to shrinkage or deferment. It is the loss of the submarine project, however, that has really hurt. This 27-year project, valued at $8 billion or more in 1987 dollars, represented over 50,000 person-years of work for shipyards and allied industries over its life, not to mention a huge spin-off to the economy at large.

While only one or two shipyards might have been involved in this project, large numbers of manufacturers, system integrators and suppliers were anticipating business opportunities from this project. Millions of dollars have already been spent for purposes of promotion and prepositioning, all now in vain.

Perhaps not as obvious is the qualitative loss to Canadian maritime industries. This project would have resulted in major transfers of new technologies to Canada, as well as causing significant upgrading of existing technologies, all of which would have had a most dramatic positive impact on Canada's industrial base into the next century.

If there is a glimmer of hope in the budget, it is the statement that (somehow or other) the Government will continue to support the 1987 White Paper on Defence, and will act immediately to identify alternatives to the submarine project, to provide Canada with an effective navy. This will undoubtedly prove difficult, given the defense budget cuts of $2.74 billion planned for the next four years.

On the broader issue of shipbuilding policy, the Association will continue to work for realistic incentives to Canadian owners to build in Canada; while pursuing, together with our American colleagues, the reduction of shipyard subsidization by the governments of foreign maritime nations. More than ever, the future of our shipyard industrial sector, far from being assured, must depend on new policies that lead to more commercial orders.

SHIPBUILDING AND SHIP REPAIRING INDUSTRY
STATISTICAL HIGHLIGHTS
AS AT DECEMBER 31, 1985-1988

	No	1985	No	1986	No	1987	No	1988	Change from 1986 %
ORDER BOOK—Vessels Under Construction or on Order As at December 31, 1988									
Commercial (GT)	6	33,850	5	1,650	12	32,509	12	32,222	−0.9
Federal Government (GT)	19	56,360	9	38,700	14	56,800	16	52,815	−7.0
Total (GT)	25	90,210	14	40,350	26	89,309	28	85,037	−4.8
NEW ORDERS—Received in 1988									
Commercial (GT)	7	7,900	9	2,144	15	33,818	9	2,415	−92.9
Federal Government (GT)	2	400	—	—	7	25,700	4	2,872	−88.8
Total (GT)	9	8,300	9	2,144	22	59,518	13	5,287	−91.1
DELIVERIES—During 1988									
Commercial (GT)	11	55,900	10	34,518	8	3,615	10	3,272	−9.5
Federal Government (GT)	4	4,600	10	17,760	2	7,600	3	6,636	−12.7
Total (GT)	15	60,500	20	52,278	10	11,215	13	9,908	−11.7
VALUE OF NEW CONSTRUCTION									
Commercial ($000)	—	160,156	—	25,609	—	21,532	—	109,595	+409.0
Federal Government ($000)	—	302,254	—	306,580	—	125,406	—	221,873	+76.9
Total ($000)	—	462,410	—	332,189	—	146,758	—	331,468	+125.9
VALUE OF REPAIRS AND CONVERSIONS									
Commercial ($000)	—	146,606	—	136,623	—	118,010	—	134,133	+13.7
Federal Government ($000)	—	83,458	—	90,931	—	61,488	—	79,458	+29.2
Total ($000)	—	230,064	—	227,554	—	179,554	—	213,591	+19.0
TOTAL VALUE OF SHIPYARD PRODUCTION —New Construction, Repairs and Conversions									
Commercial ($000)	—	306,762	—	162,232	—	139,362	—	243,727	+74.9
Federal Government ($000)	—	385,712	—	397,511	—	186,894	—	301,332	+61.2
Total ($000)	—	692,474	—	559,743	—	326,256	—	545,059	+67.1
FOREIGN BUILT VESSELS REGISTERED IN CANADA (GT)	8	8,526	10	10,873	7	23,069	18	24,372	+5.6
EMPLOYMENT									
In CMIA Shipyards									
New Construction	—	4,420	—	3,435	—	3,171	—	4,939	+55.8
Repairs	—	3,660	—	3,521	—	2,478	—	2,909	+17.4
Total	—	8,080	—	6,956	—	5,649	—	7,848	+38.9
Dollar Output Per Employee ($)	—	85,702	—	80,469	—	57,755	—	69,452	+20.2

Source: CMIA Shipyard Members

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WORLD SHIPBUILDING

New Orders Up For Second Year In A Row

According to Drewry Shipping Consultants Ltd., London, England, an aging world fleet (27 percent of the fleet is more than 15 years old), should provide the world's shipbuilding industries with a modest increase in work based primarily on replacement tonnage. The major market for builders in the early/middle 1990s will be, according to Drewry, the construction of tankers and, in particular, VLCC tonnage. Tonnage of this size is still the most economic way to move crude oil, and vessels in the 250,000-280,000-dwt range will increasingly be in demand as 1970s-built tonnage is scrapped.

Drewry predicts aggregate newbuilding demand in the period up to 1997 will be 330 million dwt (200 million grt), with tankers accounting for nearly 40 percent of total output. Of this figure, VLCC demand is estimated to be over 70 million dwt, i.e. nearly 300 vessels.

This optimistic view seems to be backed by a recent report entitled "Outlook for the World Shipping Market 1988-2000," published by the City University Business School of London. The report predicts that shipbuilding output in deadweight tons will nearly double in the next five years. The forecast is based on continued world demand for bulk freight, higher average dry cargo time charter rates, and scrapping of more tankers and dry cargo vessels as they become older and world metal prices rise. The report points out that by 1993, more than 55 percent of the tanker fleet will be at least 15 years old, as compared to 18 percent of the world's bulk carrier fleet.

A report published by the Association of Western European Shipbuilders (AWES) also maintains an optimistic outlook. The AWES report forecasts an upward trend in tonnage demand during the next decade as seaborne trade and the world economy continue to grow. According to the report, by the year 2000, world fleet requirements for gross tonnage will be more than double that of mid-1987. Demand for new ships will occur as laid up and surplus tonnage shrinks and as aging and obsolete vessels are scrapped.

The AWES report predicts that 85 percent of overall newbuilding requirements in deadweight tons will be for oil tankers and bulk carriers.

An extensive report issued by U.K.-based Ocean Shipping Consultants entitled "World Shipbuilding & Newbuilding Prices to 2000," also projects an increase in new tonnage demand for the last decade of this century. Although owners will require only about 38.5-million grt in newbuildings between 1991 and 1995, this demand should rise dramatically, according to the report, to over 132-million grt between 1996 to 2000.

Because of the increase in demand for new tonnage, the report forecasts that the cost of newbuildings will also rise substantially, with prices for certain types of vessels doubling (See Table 1).

ALL SHIPS IN THE WORLD ORDER BOOK AT THE END OF THE FOURTH QUARTER, 1988

Where Building	Under Construction No.	Under Construction Gross Tonnage	Not Commenced No.	Not Commenced Gross Tonnage	TOTAL No.	TOTAL Gross Tonnage	TOTAL Percentage of World Tonnage	Total Previous Quarter No.	Total Previous Quarter Gross Tonnage
Argentina	19	110,725	9	31,700	**28**	**142,425**	**0.58**	25	122,099
Australia	14	9,950	15	2,400	**29**	**12,350**	**0.05**	23	12.627
Austria	...	...	...	...	...	...	...	3	6,183
Bangladesh	14	3,355	7	1,725	**21**	**5,080**	**0.02**	21	5,080
Belgium	3	46,000	2	27,000	**5**	**73,000**	**0.30**	6	80,597
Brazil	37	691,109	14	343,300	**51**	**1,034,409**	**4.21**	51	972,468
Bulgaria	4	68,248	13	126,356	**17**	**194,604**	**0.79**	18	197,650
Canada	6	29,416	3	1,921	**9**	**31,337**	**0.13**	9	30,777
Chile	5	1,785	2	900	**7**	**2,685**	**0.01**	9	3,435
†China, People's Republic of	21	293,970	46	701,654	**67**	**995,624**	**4.05**	70	1,008,205
China, Republic of (Taiwan)	6	206,800	8	608,500	**14**	**815,300**	**3.32**	14	759,100
Colombia	1	207	...	...	**1**	**207**	**0.00**	3	608
Denmark	27	187,624	34	607,992	**66**	**797,926**	**3.25**	58	494,008
Faeroes	1	460	4	1,850					
Egypt	5	13,850	2	18,658	**7**	**32,508**	**0.13**	7	32,850
Finland	30	455,053	11	258,720	**41**	**713,773**	**2.91**	46	726,241
France	17	154,479	15	121,080	**32**	**275,559**	**1.12**	30	202,559
†German Democratic Republic	2	27,200	36	381,217	**38**	**408,417**	**1.66**	57	573,305
Germany, Federal Republic of	29	351,657	39	509,583	**68**	**861,240**	**3.51**	71	933.372
Greece	30	42,887	3	12,580	**33**	**55,467**	**0.23**	33	60,512
Guatemala	...	...	1	130	**1**	**130**	**0.00**	1	130
Iceland	...	...	1	200	**1**	**200**	**0.00**	1	200
India	62	244,709	20	109,700	**82**	**354,409**	**1.44**	81	352,409
Indonesia	16	16,994	3	10,500	**19**	**27,494**	**0.11**	23	28,174
Iran	2	2,600	1	200	**3**	**2,800**	**0.01**	5	3,600
Israel	1	496	...	...	**1**	**496**	**0.00**	1	496
Italy	73	587,667	15	319,969	**88**	**907,636**	**3.70**	92	944,532
Japan	220	3,660,090	120	2,299,238	**340**	**5,959,328**	**24.27**	348	6,183,417
Korea (South)	74	2,274,617	66	3,590,543	**140**	**5,865,160**	**23.89**	147	6,483,813
Lebanon	1	300	...	...	**1**	**300**	**0.00**	1	300
Malaysia	3	2,834	1	150	**4**	**2,984**	**0.01**	5	3,538
Malta	8	32,000	...	...	**8**	**32,000**	**0.13**	8	32,000
Mexico	28	74,354	28	17,533	**56**	**91,887**	**0.37**	52	90,287
Morocco	2	755	2	600	**4**	**1,355**	**0.01**	4	1,355
Netherlands	64	78,014	43	140,004	**107**	**218,018**	**0.89**	95	111,129
Norway	25	27,704	14	33,840	**39**	**61,544**	**0.25**	47	47,386
Pakistan	2	395	1	11,000	**3**	**11,395**	**0.05**	3	11,395
Peru	34	16,309	1	340	**35**	**16,649**	**0.07**	16	11,460
Poland	54	316,763	78	664,485	**132**	**981,248**	**4.00**	138	1,009,078
Portugal	37	74,832	11	15,534	**48**	**90,366**	**0.37**	49	95,046
†Romania	4	140,388	35	504,020	**39**	**644,408**	**2.62**	27	625,248
Singapore	13	15,593	7	19,730	**20**	**35,323**	**0.14**	16	19,913
Spain	117	298,146	106	523,703	**223**	**821,849**	**3.35**	228	774,484
Sri Lanka	1	350	...	...	**1**	**350**	**0.00**	1	350
Surinam	...	...	2	1,400	**2**	**1,400**	**0.01**	2	1,400
Sweden	12	13,655	5	1,714	**17**	**15,369**	**0.06**	22	19,264
Thailand	1	100	1	2,500	**2**	**2,600**	**0.01**	2	2,600
Turkey	30	90,799	10	125,200	**40**	**215,999**	**0.88**	35	199,598
†U.S.S.R.	2	37,052	3	55,578	**5**	**92,630**	**0.38**	1	18,526
United Arab Emirates	1	250	...	...	**1**	**250**	**0.00**	...	...
United Kingdom	38	185,560	14	86,975	**52**	**272,535**	**1.11**	57	305,718
United States of America	52	26,496	67	15,032	**119**	**41,528**	**0.17**	115	37,192
Venezuela	6	650	...	...	**6**	**650**	**0.00**	6	650
Yemen, People's Democratic Republic of	1	144	...	...	**1**	**144**	**0.00**	1	144
Yugoslavia	33	706,716	21	624,328	**54**	**1,331,044**	**5.42**	52	1,173,998
WORLD TOTAL	**1,288**	**11,622,107**	**940**	**12,931,282**	**2,228**	**24,553,389**	**100.00**	**2,236**	**24,810,506**

Source: Lloyd's Register

†Information incomplete

Projected Newbuilding Prices* (in millions of 1988 $)

Ship Type	1988	2000
Bulk Carrier		
70,000 dwt	18.5	39.5
120,000 dwt	32.8	51.5
Containership		
2,500 TEU	32.0	52.0
Gas Carrier		
LPG 75,000m^3	57.0	82.5
LNG 125,000m^3	150.0	207.0
General Cargo Carrier		
15,000 dwt	17.3	26.0
Tanker		
85,000 dwt	31.5	54.0
400,000 dwt	70.0	95.0

*Prices shown are on average
Source: Ocean Shipping Consultants

1988 Completions

The latest annual merchant shipbuilding figures published by Lloyd's Register show a fall in the

total tonnage completed to 10.9 million gross tons. This represents a drop of 1.4 million gt from 1987 figures. The number of ships completed, however, increased by 47 to 1,575.

Furthermore, for the second year in succession, new orders exceeded completions, indicating an improved outlook for the world shipbuilding industry. Orders placed in 1988 totaled 12.3 million gt, an increase of 1.4 million gt over the total output. The tonnage ordered in 1987 amounted to 13.8 million gt, 1.5 million gt more than the completions during the same period.

Oil tankers accounted for 4.1 million gt of all completions in 1988, an increase of 1.1 million gt from the previous year. Tanker tonnage represented 37.9 percent of all tonnage completed compared with 24.9 percent in 1987 and 22.4 percent in 1986.

There was a drop in the bulk carrier output to 2.3 million gt from the previous year's total of 4.3 million gt.

Fully cellular container ship completions amounted to 1.5 million gt, up by 347,000 gt from 1987, while the general cargo ship output totaled 1.9 million gt, down by 321,000 gt.

Japan's output, at 4 million gt (down by 1.7 million gt from 1987), represented 37 percent of the world total (46.6 percent in 1987). New orders obtained by Japanese shipyards totaled 4.6 million gt or 37.6 percent of the world total. Of the tonnage completed by Japan, oil tankers accounted for 1.4 million gt and ore/bulk carriers 1.2 million gt.

Number two shipbuilder South Korea increased its total output from 2.1 million gt in 1987 to 3.2 million gt, a jump of over 52 percent. South Korea's share of the world tonnage output increased from 17.1 percent to 29.1 percent. New orders totaled 3 million gt, 0.2 million less than their total output.

Of the other leading shipbuilding nations, the People's Republic of China completed 254,000 gt (down 32,000 gt); Republic of China (Taiwan) 453,000 gt (up 111,000 gt); West Germany, 521,000 gt (up 180,000 gt); Denmark, 377,000 gt (up 134,000 gt); East Germany, 292,000 gt (unchanged) and Poland, 275,000 gt (down 13,000 gt).

The largest ship completed in 1988 was the 305,893-dwt ore/oil carrier Alster Ore, built in Taiwan by **China Shipbuilding Corp.** for Krupp Seeschiffahrt.

During the last quarter of 1988, eight ships of over 200,000 dwt were completed, seven of which were delivered by South Korean shipyards. The largest ships completed, both delivered by **Hyundai Heavy Industries**, were the 265,243 dwt oil tankers World Prelude and World Prince for companies associated with World-Wide Shipping Agency Ltd. of Hong Kong. The largest dry cargo ship completion, the 245,609-dwt bulk carrier Ocean Universe, was delivered by **Daewoo Shipbuilding & Heavy Machinery Ltd.** for Pan Ocean Shipping Ltd.

In the luxury cruise ship sector, the **Turku Shipyard of Wartsila Marine Industries Inc.** delivered the 768-passenger Royal Viking Sun to Kloster Cruise Ltd.The West German yard of **Schichau Seebeckwerft** delivered the 212-passenger Seabourn Pride to Seabourn Cruise Line of San Francisco.

World Orderbook

Lloyd's Register Merchant Shipbuilding Return for the end of 1988, showed the total world orderbook with 2,228 ships of 24.6 million gt.

Far East

Japan regained the leading position in the world orderbook with its 5.96 million gt, overtaking South Korea (5.87 million gt) which had held the lead since the third quarter of 1987. Sixty-one percent of the tonnage in Japan's orderbook was under construction, compared with 39 percent of South Korea's.

The Kobe shipyard of Japan's **Mitsubishi Heavy Industries** recently received an order to build a 164-passenger cruise ship. The order was placed by Frontier Cruises, a new joint venture of Salen Linblad Cruising, Nippon Yusen Kaisha, Mitsubishi Corp., Hapag-Lloyd and MHI. The ship is expected to be delivered in November 1990.

South Korean shipbuilders **Samsung Shipbuilding & Heavy Industries, Co., Ltd.** and **Daewoo Shipbuilding & Heavy Machin-**

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ery, Ltd. have recently joined forces in an effort to bid for Nedlloyd's 15-containership order estimated to be worth over $1 billion. Nedlloyd has already received a proposal for the first five ships from a consortium formed by **NKK Corporation** and **Kawasaki Heavy Industries**.

Despite labor unrest, South Korean shipbuilding giant **Hyundai Heavy Industries**, was able to garner a number of impressive orders. Among the orders were four containerships for West German owners, a 4,300-cubic-meter-capacity LPG carrier for Kosan Tankers of Copenhagen, a RO/RO cargo vessel for Ahlers Lines of Antwerp, five bulkers for Hyundai Merchant Marine (two of 37,000-dwt, two of 200,000 dwt and one of 150,000 dwt), two bulk carriers for Hanjin Container Lines and a bulker for Korea Line Corporation.

Samsung Shipbuilding received a boost when West German shipping company Hapag-Lloyd placed an order for five containerships worth about $347 million. The newbuildings will each have a capacity of 4,400 TEUs and are scheduled for delivery into 1992.

U.S.-based American Telephone & Telegraph (AT&T) awarded two separate contracts worth $100 million to **Far East Levingston Shipbuilding** to build two cable-laying vessels. The 8,000-ton ships will incorporate state-of-the-art technology. FELS also landed a $100-million contract to build a second oil drilling rig for the Santa Fe International Corp. The Universe Class jack-up rig will be based on designs by Friede & Goldman of the U.S.

At present, FELS is completing a $60-million cantilever rig for Santa Fe.

One of the latest export orders won by **China State Shipbuilding Corporation (CSSC)** of the People's Republic of China calls for the construction of two 300-TEU feederships for Neptune Orient Lines of Singapore. The 361-foot vessels will be built at the Qiuxin Shipyard.

Europe

In Europe, a consortium of yards is also bidding for the Nedlloyd order. **Alsthom Chantiers de l'Atlantique** of France, West Germany's **HDW** and **Bremer Vulkan**, and **Van der Giessen de Noord** of the Netherlands have formed a consortium in hopes of winning the first batch of orders due to be placed next month.

Portugal's **Estalieros Navais de Lisboa (LISNAVE)** posted a record-breaking year in the ship-repair sector. With improved productivity and a trimmed workforce, LISNAVE recorded a sales turnover of more than $100 million in ship repair.

Across the border in Spain, state-owned **Astilleros Espanoles S.A. (AESA)** posted an excellent 1988, almost doubling the amount of newbuilding tonnage it acquired in 1987. Boosted by a number of tanker, refrigerated cargo vessel and gas carrier contracts, AESA won orders for 60 vessels totaling 611,914 tons. In 1987, the shipbuilding group won contracts for 19 vessels with an aggregate tonnage of 307,256 tons. One of the latest contracts won by AESA is for two 140,000-dwt Suezmax crude carriers for Seatankers Management.

In the first four months of 1989, West German shipowners increased their orders for new ships, citing an improved shipping outlook and the creation of a second German ship register.

According to the German Shipowners Association, its members ordered 22 vessels totaling 530,500 grt from January to mid-April. The tonnage figure exceeded *all* German ship orders in 1987 and 1988.

At present, 44 ships totaling 913,000 grt are being built for German shipowners, 20 of which are being built in West Germany.

One of the beneficiaries of the increased orders is the West German shipyard **Schichau Seebeckwerft**. Besides being busy with a number of conversions, the yard has an impressive list of new construction. Among its newbuildings, Schichau Seebeckwerft launched the 35,000-grt jumbo-ferry

Olau Hollandia, reportedly the largest vessel of her type operating from Germany. The 528-foot ferry has a passenger capacity of about 1,600, and is expected to be delivered this September. Her sister, the Olau Brittania, is under construction at Schichau Seebeckwerft and is expected to be delivered next year.

In January, Schichau Seebeckwerft also delivered the all-around combicarrier Robin Hood to TT-Line of Hamburg. The sister vessel of the Nils Dacke delivered last year by Schichau, the Robin Hood has an overall length of 581 feet and deadweight tonnage of 8,800.

Lindenau GmbH, Schiffswerft & Maschinenfabrik of Kiel received an order for a 3,500-dwt clean oil tanker from Ethiopian Shipping Lines, Addis Ababa, Ethiopia. Scheduled to be delivered in October 1989, the product/oil tanker will be equipped with 12 loading tanks. Her cargo tank capacity will be about 4,000 m^3.

In the conversion sector, **Blohm & Voss** re-delivered the passenger/car ferry Saga Wind to Swedish owner Sea Wind Line, part of the Silja Line Group, after lengthening and engine refit.

The shipbuilding consortium of **Bremer Vulkan, HDW, Blohm & Voss** and **Thyssen Nordseewerke** is still hoping to construct Knut Kloster's Phoenix World City, a colossal 250,000-grt cruise ship. The project's $1-billion price tag is making financial arrangements difficult.

Finnish shipyard **Rauma-Repola** was recently awarded a $50-million contract to build a second cruise ship for Delfin Cruises. The first ship, the 300-passenger Delfin Clipper, is scheduled to be delivered this month. The second cruise ship, a 330-passenger vessel, is expected to be delivered in the spring of 1990.

In addition, the Finnish builder was also awarded a $71-million turnkey contract to design and supply materials and equipment for the construction of a jack-up drilling rig and construction dock in Iran. Rauma-Repola staff will work in Iran supervising the construction of the rig.

Wartsila Marine Industries, Inc. is nearing the completion of the first of three 70,000-grt cruise ships for Carnival Cruise Lines. The 2,600-passenger Fantasy is expected to be delivered in October of this year. Wartsila's Turku Shipyard expects to deliver the 855-foot Fantasy's sister ships, the Ecstasy and Sensation in 1990 and 1991, respectively. The construction is being performed under a $600-million pact.

In Denmark, **Burmeister & Wain** recently won an order from the Polish Steamship Co. to build two Panamax 70,000-dwt bulk carriers. The deal could be worth $136.6 million to B&W if options for two additional bulk carriers are exercised.

According to the Swedish Shipbuilders Association, Swedish merchant shipbuilding has reached its lowest production and orderbook figures since WWII.

In 1988, Swedish yards completed eight ships of 16,612 grt, not including naval vessels. As of the end of 1988, Sweden's orderbook stood at 11 ships totaling 11,721 tons, including the icebreaker Oden, since delivered to the government by **Gotaverken Arendal**.

Alsthom's Chantiers de l'Atlantique of St. Nazaire, France, is busy constructing the sister ship of the huge 74,000-grt Sovereign of the Seas. The yard expects to deliver the cruise ship in April 1991.

Italian yards experienced a healthy influx of orders in 1988. **Fincantieri's Montefalcone Shipyard** has begun the construction of the first of two 70,000-grt cruise ships for Astramar. The huge luxury liner, which is expected to be delivered in the spring of next year, will have a passenger capacity of 1,950.

Yugoslavia's **Brodogradiliste Treci Maj (3. Maj)** was awarded some important export orders, including two 110,000-dwt crude carriers for Mosvold Rederi and four 22,000-dwt multipurpose cargo ships for Chinese-Polish Joint Stock Shipping Co. 3. Maj also has two 110,000-dwt tankers on order from American owner Teekay Shipping. 3. Maj is also constructing a 6,000-grt, 362-foot luxury cruise ship for Salen Lindblad/Atlas. The 821-passenger vessel is scheduled for delivery this year.

One of the latest contracts won by **Uljanik**, Pula, Yugoslavia, is for the construction of two 40,000-dwt tankers for undisclosed owners. **Brodosplit** is also preparing to deliver the sister vessel of the Baltic super ferry Amorella to SF Line of Mariehamn.

Americas

The ongoing U.S. Navy and government vessel construction program remains the main impetus in the U.S. During 1988, the Navy contracted for 32 ships, which increased the backlog in U.S. yards to $16.6 billion. This was a substantial increase over 1987, which showed a backlog of $9 billion.

One of the bright spots in the U.S. for new vessel construction continues to be in the shallow-draft vessel market, particularly in the cruise boat sector.

However, no new commercial shipbuilding orders were placed in 1988. U.S.-flag operator Hvide Shipping has requested bids from 14 U.S. shipyards for the major reconstruction work of a 41,000-dwt chemical tanker. While Matson Navigation has requested bids from **Avondale Industries, Bethlehem Steel-Sparrows Point** and **National Steel & Shipbuilding Co.** for the construction of a 1,600-TFEU combination containership. The contracts have yet to be awarded for these two projects.

But the fact remains that without a comprehensive maritime promotional package from the government, the U.S. shipbuilding industry will be unable to take advantage of any international increase in demand for new tonnage.

The Canadian shipbuilding industry was rendered a severe blow when the government cancelled its plans to build 10-12 nuclear submarines. As in the case of the U.S., government contracts accounted for most of the tonnage on order, with the remainder comprised of such commercial vessels as fishing boats, tugs, barges, etc. A bright spot was in the repair and conversion sector, where the value of work increased from to $188 million to $214 million.

In Brazil, **Verolme do Brasil** was awarded a $135-million order to build four 68,000-dwt self-unloading bulk carriers. The award increased the value of the yard's orderbook to over $480 million. Two of the ships were for the CSL Group Inc. of Montreal and two for VULICA Shipping Inc. of the Bahamas. Verolme delivered a similar bulk carrier for Canadian Steamship Lines in 1989. The Brazilian yard also converted the ex-Pacific Peace (renamed CSL Innovator) into a 62,732-dwt self-unloading bulk carrier for operation on the U.S. East Coast. ■

ABS PLAYS VITAL ROLE IN OUTSTANDING SAFETY RECORD OF THE GROWING PASSENGER SUB INDUSTRY

By James J. Gaughan, Chief Engineer
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Fascination with the underwater wonders of the sea has prompted more than 700,000 passengers[1] to venture as deep as 250 feet below the water's surface in tourist submersibles. All of these passengers have returned safely to the surface after the ride of a lifetime.

Classification is one of the key factors contributing to this excellent safety record. Almost every tourist sub in operation as well as those currently under construction has been or will be designed, built, and tested in accordance with the requirements detailed in the American Bureau of Shipping's "Rules for Building and Classing Underwater Systems and Vehicles."

Although the majority of tourist-sub passengers have probably never heard of ABS, sub builders and operators alike know how important it is to have the American Bureau of Shipping approve their initial design, survey the construction process, and perform periodic surveys during the operating life of the sub. They know that safety counts; they know that ABS has the technical expertise to make critical evaluations.

The Birth of an Industry

Jacques Piccard is credited with designing the first tourist submersible, the Auguste Piccard, which went into service in 1964 for the Swiss National Exposition, where during a 15-month period she carried 32,000 tourists to depths of almost 1,000 feet in Lake Geneva.

After this initial project, development languished for almost 20 years before a small fleet of oilfield submersibles was converted for tourist use in the Grand Cayman Islands by Research Submersibles Ltd. Limited to two passengers, these subs make 90-minute dives to 800 feet along the famed Cayman Wall to view the wrecked freighter the Kirk Pride.

The first company formed to design, build, and operate tourist submersibles specifically for the tour industry was Sub Aquatics Development Corporation, Vancouver, British Columbia, Canada. Sub Aquatics has designed and constructed all five of the 28- and 46-passenger subs in the Atlantis Submersible Caribbean fleet. Two more 46-passenger subs are under construction, one for work in the Bahamas, the other for Hawaii. All are classed by ABS.

The industry has grown to now include 12 major submersible operations at various locations around the world[2]. Gross revenues from passenger submersible operations totaled almost $16.2 million in 1988, up from $7.9 million in 1987. Revenues for 1989 are estimated to jump to $32.5 million based on 490 available seats in 12 submersibles. The number of passenger seats are expected to increase rapidly. Of the 19 new tourist submersible being built to ABS class, eight could be in operation by the second quarter of 1990, for a worldwide total of 850 seats on 20 submersibles.

The only limit on the phenomenal growth of this industry is the availability of optimum tour sites. The quality of potential sites for 48 -passenger tourist subs is determined by a number of factors according to industry analysts Jones, Matsuo & Associates, Ltd.

- A pool of 500,000 tourists annually, without seasonal highs and lows;
- Coral reefs within three nautical miles of shuttle-boat boarding site (shuttle boats carry passengers from shore to the dive site to speed up the operation, since the cruising speeds of tourist subs are usually around one knot);
- Clear water with good visibility;
- Weather and climate to allow at least 300 operating days per year;
- A harbor deep enough for a submersible that draws 10 feet of water; and
- A nearby drydock capable of hauling a 100-ton vessel for yearly surveys and repairs.

The number of sites meeting these criteria around the world is limited to perhaps 50, and initial investment to start up a tourist-sub operations can reach $4 million. To start up more sites, more economically, on an incremental basis, operators could use 8-, 10-, or 12-passenger subs, rather than 28- or 46-passenger vessels.

Cruise ship operators like to assess the growth potential of their markets based on the number of tourists who have never been on a cruise. Using this same gage—the number of potential riders who have never been on a tourist sub—the market for the tourist-sub industry is indeed huge. Even during this period of rapid growth, the tourist-sub industry continues to recognize the importance of the classification process to provide for the safety of life and property.

Importance of Classification

Builders want technical expertise from a classification society, which is why they have their vessel designs verified and build tourist subs according to ABS's "Rules for Building and Classing Underwater Systems and Vehicles." For owners and operators, safety is essential for profitability. So to extend their profitability, they class their subs with ABS to verify structural and mechanical fitness.

ABS involvement begins with a review of the initial design. ABS engineers perform detailed calculations to assess the hull, mechanical and electrical systems, and life-support systems of a tourist sub. All materials must be specified and certified before construction can begin.

Because of the unique operating

parameters of tourist submersibles, ABS focuses particular attention on critical safety aspects during its plan review such as: *Normal and emergency resurfacing procedures*—tourist subs usually have three methods for quickly and safely returning to the surface even after sustaining significant damage; *sufficient stability and freeboard (the vertical distance from the surface of the water to the level of the deck) after surfacing for safe evacuation during worse case scenario weather conditions; safety measures*—especially life-support systems—to protect passengers from potential hazards during normal operations and emergency resurfacing.

Tourist subs are not self-sufficient, relying heavily on a surface support vessel. For this reason, ABS closely reviews the overall systems of operations, including the maintenance procedures, the environment of operations, the availability of scuba divers, and emergency lift capabilities.

Tourist subs are designed and built to operate in specific water depths. ABS assesses the structural integrity of the design using advanced computer analyses, performs hydrostatic testing at 1.25 times the design depth, and witnesses a test dive to the design depth before classing the unit with an assigned maximum rated depth.

ABS surveyors are in attendance during the construction process to verify the quality of the materials and the construction methods. Their most critical responsibilities include: fabrication survey; witnessing both nondestructive testing on

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components and sections and hydrostatic testing of the main pressure hull, piping systems, gas storage systems, and ballast tanks; performing detailed inspections of critical hull sections in the manufacturing process; verifying the installation and testing of mechanical and electrical systems; checking safety equipment; and verifying the implementation of quality assurance procedures during the fabrication of acrylic viewports.

The technical requirements used by ABS to review acrylic viewpoint designs are based on criteria in the ANSI/ASME (American National Standards Institute/American Society of Mechanical Engineers) publication "Pressure Vessels for Human Occupancy." These criteria were originally developed primarily by Dr. **Jerry Stachiw** working with the U.S. Navy. Dr. **Stachiw's** work consisted of analytic studies and extensive testing to establish the suitability of using acrylics for flat and curved viewpoints on submersibles.

ABS-classed submersibles employ redundant ballast and trim, life-support, propulsion, and electrical systems to ensure the safety of passengers. ABS Rules require that submersibles carry at least a 72-hour reserve supply of oxygen and an equal carbon-dioxide-removal capability for a full complement of crew and passengers.

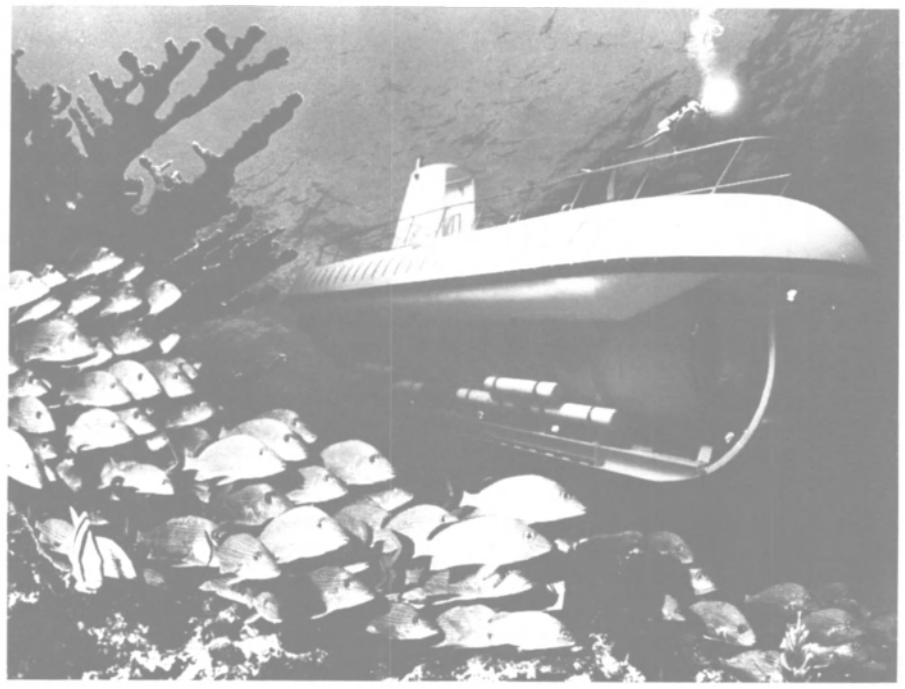
Propulsion systems—usually all electric—have sufficient redundancy to ensure safe operation. All ABS-classed tourist submersibles are equipped with active and passive firefighting systems.

Submerged tourist subs have the capability of maintaining constant contact with a support vessel via dual-frequency telephones. On the surface, subs use VHF marine-band radios.

Submersibles built to meet the stringent requirements of ABS Rules are listed in the ABS Record as A1 Manned Submersible. National administrations, lending institutions, and insurers normally require an A1 classification or an equivalent rating before permitting a tourist submersible to operate.

During their operating life, ABS-classed submersibles undergo annual surveys and special surveys every three years to ensure that all significant systems are properly maintained.

In addition to its own rules, ABS works closely with—and in some cases on the behalf of—the U.S. Coast Guard and the maritime agencies of Greece, Panama, and the Bahamas among others. These agencies stipulate crew requirements and oversee operating procedures.



The 46-passenger submarine Atlantis in operation 150 feet below the sea surface. Atlantis submarines currently operate off the coasts of the Cayman Islands, Hawaii, Barbados and the U.S. Virgin Islands.

New Developments

Maintaining its exemplary safety record while improving the total experience for passengers are the twin goals of the tourist-sub industry. One example of this is the continuing development of acrylic viewing windows—a critical technical design element of tourist subs. These plastic windows must maintain pressure integrity and still provide a crystal-clear view to passengers. One builder—Hyco Technologies Corp., North Vancouver, B.C., Canada, is developing an entire submersible hull composed of acrylic cylinders, which would give sightseers a wraparound view. ABS is working with Hyco and all the builders as they seek new technological innovations. ABS has gained the technical edge in this and other areas, not only through working experience, but also through years of study and participation in technical societies such as ASME and associations with the leading experts in the world.

ABS continues to be a leader in the classification and certification of commercial diving systems, and land-based hyperbaric diver-training centers.

Technical expertise, innovative thinking based on sound engineering principles, and an uncompromising commitment to safety are the reasons why the tourist-sub industry continues to rely on ABS.

As a major classification society, ABS establishes rules for the design, construction, and periodic survey of ships, offshore drilling units, and other marine structures. Classification certifies adherence to these rules, thus representing that a ship or structure is fit for its intended service. The primary purpose of ABS is to promote the safety of life and property as sea through classification and related services. For free literature detailing the wide range of services provided by ABS,

Circle 44 on Reader Service Card

SUBMARINE COMPARISON TABLE

Manufacturer	Model	Type	# Built	Seats	Depth (in feet)	Cost ($ in 000's)	Price/seat ($ in 000's)	Comments
Undersea Adventures	SM-100	E-H	0	48	328	2,850.0	58.3	Advanced & efficient. Built in U.S.
Submarine Oy	SM-100	E-H	0.2	48	328			Built at Belgium's largest yard.
Submarine Oy	SM-30/2	E-H	0.2	2	328			Two models. Under construction
Submarine Oy	SM-50/27	E-H	0	27	165			Designed for cruise ship use.
Sub Aquatics Dev.	Series I	E	2	28	150	2,561.0	91.5	First model. Reliable
Sub Aquatics Dev.	Series II	E	3.5	46	150	2,871.0	62.4	Proven dependable
Sub Aquatics Dev.	Series III	E	0	46	300	N/A	N/A	Added depth capability
Malmari & Winberg	Sunfish	E	0	8	656	1,329.0	166.1	Luxurious and capable
Malmari & Winberg	RR 10	E	0.2	10	328	550.0	55.0	Under construction. Very reasonable $$
Malmari & Winberg	RR 20	E	0	20	328	1,932.0	96.6	Interesting design
Malmari & Winberg	RR 30	E	0	30	328	2,054.0	68.5	Optimum size/weight
Malmari & Winberg	RR 40	E	0	40	328	2,679.0	66.0	All can be US built.
Malmari & Winberg	RR 50	E	0	49	328	2,964.0	60.5	
Hyco	Aries	E	0	46	250	2,893.0	62.9	All acrylic construction
Hyco	Gemini	E	0	8	2580	1,575.0	196.9	Acrylic. Deep diving.
Submarine Safaris	Odyssey	E	0.85	36	150	2,390.0	66.4	Nearing completion by ISE
Tropical Sub Safaris	Model II	E	0	52	150	2,640.0	50.8	Cost effective design
Wartsila AB	RS-250	E	4.5	48	250	3,200.0	66.7	In Saipan, Finland, Korea & Japan
Fluid Energy	LG 50	E	2.5	48	250	N/A	N/A	In St. Thomas & Bermuda
Plongee	Dolphin II	D/E	1	10	200	790.0	79.0	10 knot surface speed
Marlin Engineering	S-1	D/E	1	2	656	125.0	75.0	Streamlined & efficient
Marlin Engineering	S-10	D/E	0	10	656	800.0	80.0	High speed. In production?
International Hardsuits	SeaUrchin	E	1	2	300	40.0	20.0	Small & lightweight at 1600 lbs.
Bruker Meersetechnik	Subtours	D/E	2	18-24	492	4,210.0	230.0	Proven manufacturer
Bruker Meersetechnik	Seamaid	E-H	0	24-48	328	2,000-2,800	83.0-58.0	Modular design is flexible in size.
Bruker Meersetechnik	Subcruise	E-H	0	12	164	1,350.0	112.5	Operated from cruise ships.

U.S. Navy Fleet

AIRCRAFT CARRIERS
Nimitz Class (CVN-68)
Displacement: 91,487 tons; CVN-71, 96,358 tons; Length: 1,040 feet; Beam: 134 feet; Power Plant: Two nuclear reactors, four GE geared steam turbines and four shafts.

Built by Newport News Shipbuilding
USS Nimitz (CVN-68)
USS Dwight D. Eisenhower (CVN-69)
USS Carl Vinson (CVN-70)
USS Theodore Roosevelt (CVN-71)
*USS Abraham Lincoln (CVN-72)**
*USS George Washington (CVN-73)**
*John C. Stennis (CVN-74)**
*Unnamed (CVN-75)**

Enterprise Class (CVN-65)
Displacement: 89,600 tons; Length: 1,040 feet; Beam: 133 feet; Power Plant: Eight nuclear reactors, four geared steam turbines and four shafts.

Built by Newport News Shipbuilding
USS Enterprise (CVN-65)

John F. Kennedy Class (CV-67)
Displacement: 82,000 tons; Length: 1,052 feet; Beam: 130 feet; Power Plant: Eight boilers, four Westinghouse geared steam turbines and four shafts.

Built by Newport News Shipbuilding
USS John F. Kennedy (CV-67)

Kitty Hawk Class (CV-63)
Displacement: 80,800 tons; Length: 1,046 feet; Beam: 130 feet; Power Plant: Eight boilers, four Westinghouse geared steam turbines and four shafts.

Built by New York Shipbuilding
USS Kitty Hawk (CV-63)

Built by New York Naval Shipyard
USS Constellation (CV-64)

Built by Newport News Shipbuilding
USS America (CV-66)

Forrestal Class (CV-59)
Displacement: 75,900-79,300 tons; Length: 1,063-1,086 feet; Beam: 129 feet; Power Plant: Eight boilers, four geared steam turbines and four shafts.

Built by Newport News Shipbuilding
USS Forrestal (CV-59)
USS Ranger (CV-61)

Built by New York Naval Shipyard
USS Saratoga (CV-60)
USS Independence (CV-62)

Midway Class (CV-41)
Displacement: 62,000 tons; Length: 979 feet; Beam: 121 feet; Power Plant: Twelve boilers, four geared steam turbines and four shafts.

Built by Newport News Shipbuilding
USS Midway (CV-41)
USS Coral Sea (CV-43)

AMMUNITION SHIPS
Kilauea Class (AE-26)
Displacement: 18,088 tons; Length: 564 feet; Beam: 81 feet; Power Plant: Three boilers, geared turbines and single shaft.

Built by General Dynamics-Quincy
USS Butte (AE-27)

Built by Bethlehem Steel-Sparrows Point
USS Santa Barbara (AE-28)
USS Mount Hood (AE-29)

Built by Ingalls Shipbuilding
USS Flint (AE-32)
USS Shasta (AE-33)
USS Mount Baker (AE-34)
USS Kiska (AE-35)

Suribachi Class (AE-21)
Displacement: 15,500 tons; Length: 512 feet; Beam: 72 feet; Power Plant: Two boilers, geared turbines and single shaft.

Built by Bethlehem Steel-Sparrows Point
USS Suribachi (AE-21)
USS Mauna Kea (AE-22)

Nitro Class (AE-23)
Same as Suribachi Class.

Built by Bethlehem Steel-Sparrows Point
USS Nitro (AE-23)
USS Pyro (AE-24)
USS Haleakala (AE-25)

AMPHIBIOUS ASSAULT SHIPS
Wasp Class (LHD-1)
Displacement: 40,500 tons; Length: 844 feet; Beam: 106 feet; Power Plant: Two boilers, two geared turbines and two shafts.

Built by Ingalls Shipbuilding
*USS Wasp (LHD-1)**
*USS Essex (LHD-2)**
*USS Kearsage (LHD-3)**
*Unnamed (LHD-4)**

(continued)

Footnotes: Asterisks denote vessel under contract or construction at yard; (1) Scheduled for inactivation and defueling by July 1990; (2) Being jumoized at Avondale Shipyards; (3) Undergoing conversion to (T-AG-195); (4) Under long-term charter; and (5) Scheduled for retirement.

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US Navy Fleet

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Tarawa Class (LHA-1)
Displacement: 39,300 tons; Length: 820 feet; Beam: 106 feet; Power Plant: Two boilers, two geared turbines and two shafts.

Built by Ingalls Shipbuilding
USS Tarawa (LHA-1)
USS Saipan (LHA-2)
USS Belleau (LHA-3)
USS Nassau (LHA-4)
USS Peleliu (LHA-5)

Iwo Jima Class (LPH-2)
Displacement: 18,000 tons; Length: 602 feet; Beam: 84 feet; Power Plant: Two boilers, one geared turbine and one shaft.

Built by Puget Sound Naval Shipyard
USS Iwo Jima (LPH-2)

Built by Philadelphia Naval Shipyard
USS Okinawa (LPH-3)
USS Guadalcanal (LPH-7)
USS Guam (LPH-9)
USS New Orleans (LPH-11)

Built by Ingalls Shipbuilding
USS Tripoli (LPH-10)

AMPHIBIOUS CARGO SHIPS
Charleston Class (LKA-113)
Displacement: 20,700 tons; Length: 575 feet; Beam: 82 feet; Power Plant: Two boilers, one steam turbine and one shaft.

Built by Newport News Shipbuilding
USS Charleston (LKA-113)
USS Durham (LKA-114)
USS Mobile (LKA-115)
USS St. Louis (LKA-116)
USS El Paso (LKA-117)

AMPHIBIOUS COMMAND SHIPS
Blue Ridge Class (LCC-19)
Displacement: 19,000 tons; Length:620 feet; Beam: 82 feet; Power Plant: Two boilers, one geared turbine and one shaft.

Built by Philadelphia Shipyard
USS Blue Ridge (LCC-19)

Built by Newport News Shipbuilding
USS Mount Whitney (LCC-20)

ATTACK SUBMARINES
Seawolf Class (SSN-21)
Displacement: 9,137 tons Length: 353 feet Beam: ? Power Plant: Nuclear reactor, geared turbines and one shaft.

Built by General Dynamics-Electric Boat
*USS Seawolf (SSN-21)**

Los Angeles Class (SSN-688)
Displacement: 6,900 tons; Length: 360 feet; Beam: 33 feet; Power Plant: One nuclear reactor, two GE geared steam turbines and one shaft.

Built by Newport News Shipbuilding
USS Los Angeles (SSN-688)
USS Baton Rouge (SSN-689)
USS Memphis (SSN-691)
USS Cincinnati (SSN-693)
USS Birmingham (SSN-695)
USS San Francisco (SSN-711)
USS Atlanta (SSN-712)
USS Houston (SSN-713)
USS Norfolk (SSN-714)
USS Buffalo (SSN-715)
USS Salt Lake City (SSN-716)
USS Olympia (SSN-717)
USS Honolulu (SSN-718)
USS Chicago (SSN-721)
USS Key West (SSN-722)
USS Oklahoma City (SSN-723)
USS Newport News (SSN-750)
*USS Albany (SSN-753)**
*USS Scranton (SSN-756)**
*USS Asheville (SSN-758)**
*USS Jefferson City (SSN-759)**
*USS Boise (SSN-764)**
*USS Montpelier (SSN-765)**
*USS Charlotte (SSN-766)**

*USS Hampton (SSN-767)**
*USS Toledo (SSN-769)**
*USS Tucson (SSN-770)**

Built by General Dynamics-Electric Boat
USS Philadelphia (SSN-690)
USS Omaha (SSN-692)
USS Groton (SSN-694)
USS New York City (SSN-696)
USS Indianapolis (SSN-697)
USS Bremerton (SSN-698)
USS Jacksonville (SSN-699)
USS Dallas (SSN-700)
USS La Jolla (SSN-701)
USS Phoenix (SSN-702)
USS Boston (SSN-703)
USS Baltimore (SSN-704)
USS City of Corpus Christi (SSN-705)
USS Albuquerque (SSN-706)
USS Portsmouth (SSN-707)
USS Minneapolis-St. Paul (SSN-708)
USS Hyman G. Rickover (SSN-709)
USS Augusta (SSN-710)
USS Providence (SSN-719)
USS Pittsburgh (SSN-720)
USS Louisville (SSN-724)
USS Helena (SSN-725)
USS San Juan (SSN-751)
*USS Pasadena (SSN-752)**
*USS Topeka (SSN-754)**
*USS Miami (SSN-755)**
*USS Alexandria (SSN-757)**
*USS Annapolis (SSN-760)**
*USS Springfield (SSN-761)**
*USS Columbus (SSN-762)**
*USS Santa Fe (SSN-763)**
*USS Hartford (SSN-768)**
*Unnamed (SSN-771)**

Narwhal Class (SSN-671)
Displacement: 5,350 tons; Length: 314 feet; Beam: 38 feet; Power Plant: One nuclear reactor, two steam turbines and one shaft.

Built by General Dynamics-Electric Boat
USS Narwhal (SSN-671)

Glenard P. Lipscomb Class (SSN-685)
Displacement: 6,480 tons; Length: 365 feet; Beam: 32 feet; Power Plant: One nuclear reactor, two geared turbines and one shaft.

Built by General Dynamics-Electric Boat
USS Glenard P. Lipscomb (SSN-685)

Ethan Allen Class
Displacement: 7,880 tons; Length: 410 feet; Beam: 33 feet; Power Plant: One nuclear reactor, two steam turbines and one shaft.

Built by Newport News Shipbuilding
USS Sam Houston (SSN-609)
USS John Marshall (SSN-611)

Sturgeon Class (SSN-637)
Displacement: 4,640 tons; Length: 292 feet; Beam: 32 feet; Power Plant: One nuclear reactor, two steam turbines and one shaft.

Built by General Dynamics-Electric Boat
USS Sturgeon (SSN-637)
USS Pargo (SSN-650)
USS Bergall (SSN-667)
USS Seahorse (SSN-669)
USS Flying Fish (SSN-673)
USS Trepang (SSN-674)
USS Bluefish (SSN-675)
USS Billfish (SSN-676)
USS Archerfish (SSN-678)
USS Silversides (SSN-679)
USS Batfish (SSN-681)
USS Cavalla (SSN-684)

Built by General Dynamics-Quincy
USS Whale (SSN-638)
USS Sunfish (SSN-649)

Built by Ingalls Shipbuilding
USS Tautog (SSN-639)
USS Pogy (SSN-647)
USS Aspro (SSN-648)
USS Puffer (SSN-652)
USS William H. Bates (SSN-680)
USS Tunny (SSN-682)
USS Parche (SSN-683)

Built by Portsmouth Naval Shipyard
USS Grayling (SSN-646)
USS Sand Lance (SSN-660)

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Built by San Francisco Naval Shipyard
USS Gurnard (SSN-662)
USS Guitaro (SSN-665)
USS Hawkbill (SSN-666)
USS Pintado (SSN-672)
USS Drum (SSN-677)

Built by Newport News Shipbuilding
USS Queenfish (SSN-651)
USS Ray (SSN-653)
USS Lapon (SSN-661)
USS Hammerhead (SSN-663)
USS Sea Devil (SSN-664)
USS Spadefish (SSN-668)
USS Finback (SSN-670)
USS L. Mendel Rivers (SSN-686)
USS Richard B. Russell (SSN-687)

Skate Class (SSN-578)
Displacement: 2,500 tons; Length: 268 feet; Beam: 25 feet; Power Plant: One nuclear reactor, two steam turbines and two shafts.

Built by Portsmouth Naval Shipyard
USS Swordfish (SSN-579)

Built by Mare Island Naval Shipyard
USS Sargo (SSN-583)

Skipjack Class (SSN-585)
Displacement: 3,513 tons; Length: 252 feet; Beam: 31 feet; Power Plant: One nuclear reactor, two steam turbines and one shaft.

Buiit by General Dynamics-Electric Boat
USS Skipjack (SSN-585)

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US Navy Fleet

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Built by Mare Island Naval Shipyard
USS Scamp (SSN-588)

Built by Ingalls Shipbuilding
USS Sculpin (SSN-590)

Built by Newport News Shipbuilding
USS Shark (SSN-591)

Permit Class (SSN-594)
Displacement: 4,200 tons; Length: SSN-605, 297 feet; SSN-613-615, 292 feet; others, 278 feet; Beam: 32 feet; Power Plant: One nuclear reactor, two steam turbines and one shaft.

Built by Mare Island Naval Shipyard
USS Permit (SSN-594)
USS Plunger (SSN-595)

Built by Ingalls Shipbuilding
USS Barb (SSN-596)
USS Dace (SSN-607)
USS Haddock (SSN-621)

Built by New York Shipbuilding
USS Pollack (SSN-603)
USS Haddo (SSN-604)
USS Guardfish (SSN-612)

Built by Portsmouth Naval Shipyard
USS Jack (SSN-605)
USS Tinosa (SSN-606)

Built by General Dynamics-Electric Boat
USS Flasher (SSN-613)
USS Greenling (SSN-614)
USS Gato (SSN-615)

AUXILIARY CRANE SHIPS (RRF)
T-ACS-1 Class
Displacement: 25,660 tons; Length: 668-1/2 feet; Beam: 76 feet; Power Plant: Geared steam turbine and single shaft.

Converted by DeFoe Shipbuilding
SS Keystone State (T-ACS-1)
SS Gem State (T-ACS-2)

Converted by Dillingham Ship Repair
SS Grand Canyon State (T-ACS-3)

Converted by Norfolk Shipbuilding
SS Gopher State (T-ACS-4)
SS Flickertail State (T-ACS-5)
SS Cornhusker State (T-ACS-6)

Converted by Tampa Shipyards
*SS Diamond State (T-ACS-7)**
*SS Equality State (T-ACS-8)**

AVIATION LOGISTICS SUPPORT SHIPS (RRF)
Seabridge Class
Displacement: 23,872 tons; Length: 602 feet; Beam: 90 feet; Power Plant: Two boilers, geared steam turbine and one shaft.

Converted by Todd Shipyards-Galveston
USNS Wright (T-AVB-3)
USNS Curtiss (T-AVB-4)

BALLISTIC MISSILE SUBMARINES
Ohio Class (SSBN-726)
Displacement: 18,700 tons; Length: 560 feet; Beam: 42 feet; Power Plant: One nuclear reactor, two geared turbines and one shaft.

Built by General Dynamics-Electric Boat
USS Ohio (SSBN-726)
USS Michigan (SSBN-727)
USS Florida (SSBN-728)
USS Georgia (SSBN-729)
USS Henry M. Jackson (SSBN-730)
USS Alabama (SSBN-731)
USS Alaska (SSBN-732)
USS Nevada (SSBN-733)
USS Tennessee (SSBN-734)
USS Pennsylvania (SSBN-735)
*USS West Virginia (SSBN-736)**
*USS Kentucky (SSBN-737)**
*USS Maryland (SSBN-738)**
*USS Nebraska (SSBN-739)**
*Unnamed (SSBN-740)**

Benjamin Franklin Class (SSBN-640)
Displacement: 8,250 tons; Length: 425 feet; Beam: 33 feet; Power Plant: One nuclear reactor, two geared turbines and one shaft.

Built by General Dynamics-Electric Boat
USS Benjamin Franklin (SSBN-640)
USS George Bancroft (SSBN-643)
USS James K. Polk (SSBN-645)
USS Henry L. Stimson (SSBN-655)
USS Francis Scott Key (SSBN-657)
USS Will Rogers (SSBN-659)

Built by Mare Island Naval Shipyard
USS Kamehameha (SSBN-642)
USS Mariano G. Vallejo (SSBN-658)

Built by Newport News Shipbuilding
USS Simon Bolivar (SSBN-641)
USS Lewis and Clark (SSBN-644)
USS George C. Marshall (SSBN-654)
USS George Washington Carver (SSBN-656)

Lafayette Class (SSBN-616)
Same as Benjamin Franklin Class.

Built by General Dynamics-Electric Boat
USS Lafayette (SSBN-616)
USS Alexander Hamilton (SSBN-617)
USS Daniel Webster (SSBN-626)

Built by Mare Island Naval Shipyard
USS Andrew Jackson (SSBN-619)
USS Woodrow Wilson (SSBN-624)

Built by Portsmouth Naval Shipyard
USS John Adams (SSBN-620)

Built by Newport News Shipbuilding
USS James Monroe (SSBN-622)
USS Henry Clay (SSBN-625)

James Madison Class (SSBN-627)
Same as Benjamin Franklin Class.

Built by Newport News Shipbuilding
USS James Madison (SSBN-627)
USS John C. Calhoun (SSBN-630)
USS Von Steuben (SSBN-632)

Built by General Dynamics-Electric Boat
USS Tecumseh (SSBN-628)
USS Ulysses S. Grant (SSBN-631)
USS Casimir Pulaski (SSBN-633)

Built by Mare Island Naval Shipyard
USS Daniel Boone (SSBN-629)
USS Stonewall Jackson (SSBN-634)

BATTLESHIPS
Iowa Class (BB-61)
Displacement: 58,000 tons; Length: 887 feet; Beam: 108 feet; Power Plant: Eight boilers, four GE geared turbines and four shafts.

Built by New York Navy Yard
USS Iowa (BB-61)
USS Missouri (BB-63)

Built by Philadelphia Navy Yard
USS New Jersey (BB-62)
USS Wisconsin (BB-64)

CABLE REPAIR SHIPS (MSC)
Neptune Class (T-ARC)
Displacement: 7,400 tons; Length: 369 feet; Beam: 47 feet; Power Plant: Turbo-electric, two boilers and two shafts.

Built by Pusey & Jones
USNS Neptune (T-ARC-2)
USNS Albert J. Myer (T-ARC-6)

Zeus Class (T-ARC-7)
Displacement: 14,225 tons; Length: 511-1/2 feet; Beam: 73 feet; Power Plant: Diesel-electric and two shafts.

Built by National Steel & Shipbuilding
USNS Zeus (T-ARC-7)

COMBAT STORES SHIPS
Mars Class (AFS-1)
Displacement: 16,000 tons; Length: 581 feet; Beam: 79 feet; Power Plant: Three boilers, steam turbines and one shaft.

Built by National Steel & Shipbuilding
USS Mars (AFS-1)
USS Sylvania (AFS-2)
USS Niagara Falls (AFS-3)
USS White Plains (AFS-4)
USS Concord (AFS-5)
USS San Diego (AFS-6)
USS San Jose (AFS-7)

COMBAT STORES SHIPS (MSC)
Ex-British Lyness Class
Displacement: 16,792 tons; Length: 524 feet; Beam: 72 feet; Power Plant: One diesel.

Built by Swan Hunter & Wigham Richardson
USNS Sirius (T-AFS-8)
USNS Spica (T-AFS-9)
USNS Saturn (T-AFS-10)

CRUISERS
Ticonderoga Class (CG-47)
Displacement: 9,600 tons; Length: 563 feet; Beam: 55 feet; Power Plant: Four GE gas turbines and two shafts.

Built by Ingalls Shipbuilding
USS Ticonderoga (CG-47)
USS Yorktown (CG-48)
USS Vincennes (CG-49)
USS Valley Forge (CG-50)
USS Bunker Hill (CG-52)
USS Mobile Bay (CG-53)
USS Antietam (CG-54)
USS Leyte Gulf (CG-55)
USS San Jacinto (CG-56)
*USS Lake Champlain (CG-57)**
*USS Princeton (CG-59)**
*USS Chancellorsville (CG-62)**
*USS Chosin (CG-65)**
*USS Hue City (CG-66)**
*USS Anzio (CG-68)**
*Unnamed (CG-69)**
*Unnamed (CG-71)**
*Unnamed (CG-72)**
*Unnamed (CG-73)**

Built by Bath Iron Works
USS Thomas S. Gates (CG-51)
*USS Philippine Sea (CG-58)**
*USS Normandy (CG-60)**
*USS Monterrey (CG-61)**
*USS Cowpens (CG-63)**
*USS Gettysburg (CG-64)**
*USS Shiloh (CG-67)**
*Unnamed (CG-70)**

Virginia Class (CGN-38)
Displacement: 11,000 tons; Length: 585 feet; Beam: 63 feet; Power Plant: Two nuclear reactors, two geared turbines and two shafts.

Built by Newport News Shipbuilding
USS Virginia (CGN-38)
USS Texas (CGN-39)
USS Mississippi (CGN-40)
USS Arkansas (CGN-41)

California Class (CGN-36)
Displacement: 10,450 tons; Length: 596 feet; Beam: 61 feet; Power Plant: Two nuclear reactors, two geared turbines and two shafts.

Built by Newport News Shipbuilding
USS California (CGN-36)
USS South Carolina (CGN-37)

Truxtun Class (CGN-35)
Displacement: 9,127 tons; Length: 564 feet; Beam: 58 feet; Power Plant: Two nuclear reactors, two geared turbines and two shafts.

Built by New York Shipbuilding
USS Truxtun (CGN-35)

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US Navy Fleet

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Bainbridge Class (CGN-25)
Displacement: 8,592 tons; Length: 565 feet; Beam: 58 feet; Power Plant: Two nuclear reactors; two geared turbines and two shafts.

Built by Bethlehem Steel
USS Bainbridge (CGN-25)

Long Beach Class (CGN-9)
Displacement: 17,525 tons; Length: 721 feet; Beam: 73 feet; Power Plant: Two nuclear reactors, two geared turbines and two shafts.

Built by Bethlehem Steel
USS Long Beach (CGN-9)

Belknap Class (CG-26)
Displacement: 7,930 tons; Length: 547 feet; Beam: 55 feet; Power Plant: Two geared turbines and two shafts.

Built by Bath Iron Works
USS Belknap (CG-26)
USS Josephus Daniels (CG-27)
USS Wainwright (CG-28)
USS William H. Standley (CG-32)
USS Biddle (CG-32)

Built by Puget Sound Naval Shipyard
USS Jouett (CG-29)
USS Sterett (CG-31)

Built by San Francisco Naval Shipyard
USS Horne (CG-30)

Built by Todd Shipyards
USS Fox (CG-33)

Leahy Class (CG-16)
Displacement: 7,800 tons; Length: 533 feet; Beam: 55 feet; Power Plant: Four boilers; two geared turbines and two shafts.

Built by Bath Iron Works
USS Leahy (CG-16)
USS Harry E. Yarnell (CG-17)
USS Worden (CG-18)

Built by New York Shipbuilding
USS Dale (CG-19)
USS Richard K. Turner (CG-20)

Built by Puget Sound Naval Shipyard
USS Gridley (CG-21)
USS Reeves (CG-24)

Built by Todd Shipyards
USS England (CG-22)

Built by San Francisco Naval Shipyard
USS Halsey (CG-23)

DESTROYERS
Arleigh Burke Class (DDG-51)
Displacement: 8,300 tons; Length: 466 feet; Beam: 59 feet; Power Plant: Four GE gas turbines and two shafts.

Built by Bath Iron Works
*USS Arleigh Burke (DDG-51)**
*USS John Paul Jones (DDG-53)**
*USS Curtis Wilbur (DDG-54)**
*Unnamed (DDG-56)**
*Unnamed (DDG-58)**

Built by Ingalls Shipbuilding
*USS John Barry (DDG-52)**
*Unnamed (DDG-55)**
*Unnamed (DDG-57)**

Kidd Class (DDG-993)
Displacement: 8,300 tons; Length: 563 feet; Beam: 55 feet; Power Plant: Four GE gas turbine engines and two shafts.

Built by Ingalls Shipbuilding
USS Kidd (DDG-993)
USS Callaghan (DDG-994)
USS Scott (DDG-995)
USS Chandler (DDG-996)

Spruance Class (DD-963)
Displacement: 7,865 tons; Length: 563 feet; Beam: 55 feet; Power Plant: Four GE gas turbine engines and two shafts.

Built by Ingalls Shipbuilding
USS Spruance (DD-963)
USS Paul F. Foster (DD-964)
USS Kinkaid (DD-965)
USS Hewitt (DD-966)
USS Elliott (DD-967)
USS Arthur W. Radford (DD-968)
USS Peterson (DD-969)
USS Caron (DD-970)
USS David R. Ray (DD-971)
USS Oldendorf (DD-972)
USS John Young (DD-973)
USS Comte de Grasse (DD-974)
USS O'Brien (DD-975)
USS Merrill (DD-976)
USS Briscoe (DD-977)
USS Stump (DD-978)
USS Conolly (DD-979)
USS Moosbrugger (DD-980)
USS John Hancock (DD-981)
USS Nicholson (DD-982)
USS John Rodgers (DD-983)
USS Leftwich (DD-984)
USS Cushing (DD-985)
USS Harry W. Hill (DD-986)
USS O'Bannon (DD-987)
USS Thorn (DD-988)
USS Deyo (DD-989)
USS Ingersoll (DD-990)
USS Fife (DD-991)
USS Fletcher (DD-992)
USS Hayler (DD-997)

Charles F. Adams Class (DDG-2)
Displacement: 4,500 tons; Length: 437 feet; Beam: 47 feet; Power Plant: Four boilers, two geared turbines and two shafts.

Built by Bath Iron Works
USS Charles F. Adams (DDG-2)
USS John King (DDG-3)
USS Sampson (DDG-10)
USS Sellers (DDG-11)

Built by New York Shipbuilding
USS Lawrence (DDG-4)
USS Claude V. Ricketts (DDG-5)
USS Barney (DDG-6)
USS Berkley (DDG-15)
USS Joseph Strauss (DDG-16)
USS Conyngham (DDG-17)

Built by Todd Shipyards
USS Towers (DDG-9)
USS Buchanan (DDG-14)
USS Richard E. Byrd (DDG-23)
USS Waddell (DDG-24)

Built by Defoe Shipbuilding
USS Henry B, Wilson (DDG-7)
USS Lynde McCormick (DDG-8)
USS Robison (DDG-12)
USS Hoel (DDG-13)

Built by Avondale Shipyards
USS Semmes (DDG-18)
USS Tattnall (DDG-19)

Built by Puget Sound Bridge & Dry Dock
USS Goldsborough (DDG-20)
USS Cockrane (DDG-21)
USS Benjamin Stoddert (DDG-22)

Farragut Class (DDG-37)
Displacement: 5,800 tons; Length: 512 feet; Beam: 52 feet; Power Plant: Four boilers, two geared turbines and two shafts.

Built by Bethlehem Steel
USS Farragut (DDG-37)
USS Luce (DDG-38)
USS MacDonough (DDG-39)

Built by Puget Sound Naval Shipyard
USS Coontz (DDG-40)
USS King (DDG-41)

Built by San Francisco Naval Shipyard
USS Mahan (DDG-42)
Built by Philadelphia Naval Shipyard
USS Dahlgren (DDG-43)
USS William V. Pratt (DDG-44)

Built by Bath Iron Works
USS Dewey (DDG-45)
USS Preble (DDG-46)

DESTROYER TENDERS
Yellowstone Class (AD-41)
Displacement: 22,500 tons; Length: 644 feet; Beam: 85 feet; Power Plant: Two boilers, steam turbines and single shaft.

Built by National Steel & Shipbuilding
USS Yellowstone (AD-41)
USS Acadia (AD-42)
USS Cape Cod (AD-43)

Samuel Gompers Class (AD-37)
Same as Yellowstone Class.

Built by Puget Sound Naval Shipyard
USS Samuel Gompers (AD-37)
USS Puget Sound (AD-38)

Dixie Class
Displacement: 18,000 tons; Length: 530 feet; Beam: 73 feet; Power Plant: Four boilers, geared turbines and two shafts.

Built by New York Shipbuilding
USS Prarie (AD-15)

Built by Tampa Shipbuilding
USS Sierra (AD-18)
USS Yosemite (AD-19)

DOCK LANDING SHIPS
Whidbey Island Class (LSD-41)
Displacement: 15,726 tons; Length: 609 feet; Beam: 84 feet; Power Plant: Four medium-speed diesel engines and two shafts.

Built by Lockheed Shipbuilding
USS Whidbey Island (LSD-41)

USS Germantown (LSD-42)
USS Fort McHenry (LSD-43)

Built by Avondale Shipyards
USS Gunston Hall (LSD-44)
*USS Comstock (LSD-45)**
*USS Tortuga (LSD-46)**
*USS Rushmore (LSD-47)**
*USS Ashland (LSD-48)**
*Unnamed (LSD-49)**

Anchorage Class (LSD-36)
Displacement: 13,600 tons; Length: 553 feet; Beam: 84 feet; Power Plant: Two boilers, two steam turbines and two shafts.

Built by Ingalls Shipbuilding
USS Anchorage (LSD-36)

Built by General Dynamics-Quincy
USS Portland (LSD-37)
USS Pensacola (LSD-38)
USS Mount Vernon (LSD-39)
USS Fort Fisher (LSD-40)

Thomaston Class
Displacement: 12,000 tons; Length: 510 feet; Beam: 84 feet; Power Plant: Two boilers, two steam turbines and two shafts.

Built by Ingalls Shipbuilding
USS Spiegel Grove (LSD-32)
USS Alamo (LSD-33)
USS Hermitage (LSD-34)
USS Monticello (LSD-35)

FAST COMBAT SUPPORT SHIPS
Supply Class (AOE-6)
Displacement: 48,500 tons; Length: 753 feet; Beam: 107 feet; Power Plant: Four GE gas turbine engines.

(continued)

U.S. Navy Fleet

(continued)

Built by National Steel & Shipbuilding
*USS Supply (AOE-6)**
*Unnamed (AOE-7)**

Sacramento Class (AOE-1)
Displacement: 53,000 tons; Length: 793 feet; Beam: 107 feet; Power Plant: Four boilers, geared turbines and two shafts.

Built by Puget Sound Naval Shipyard
USS Sacramento (AOE-1)
USS Seattle (AOE-3)
USS Detroit (AOE-4)

Built by New York Shipbuilding
USS Camden (AOE-2)

FAST SEALIFT SHIPS
Algol Class
Displacement: 41,127 tons; Length: 946 feet; Beam: 106 feet; Power Plant: Two steam turbines, two boilers and two shafts.

Converted by National Steel & Shipbuilding
USNS Algol (T-AKR-287)
USNS Bellatrix (T-AKR-288)
USNS Regulus (T-AKR-292)

Converted by Pennsylvania Shipbuilding
USNS Denebola (T-AKR-289)
USNS Capella (T-AKR-293)

Converted by Avondale Shipyards
USNS Pollux (T-AKR-290)
USNS Altair (T-AKR-291)
USNS Antares (T-AKR-294)

FBM RESUPPLY SHIPS
Norwalk Class
Displacement: 11,500 tons; Length: 455 feet; Beam: 28-1/2 feet; Power Plant: Steam turbine, two boilers and one shaft.

Built by Oregon Shipbuilding
USNS Furman (T-AK-280)
USNS Marshfield (T-AK-282)

Northern Light Class
Displacement: 18,365 tons; Length: 483 feet; Beam: 68 feet; Power Plant: Steam turbine, two boilers and one shaft.

Built by Sun Shipbuilding & Drydock
USNS Vega (T-AK-266)

FLEET OCEAN TUGS (MSC)
Powhatan Class
Displacement: 2,260 tons; Length: 226 feet; Beam: 42 feet; Power Plant: two diesel engines and two shafts.

Built by Marinette Marine
USNS Powhatan (T-ATF-166)
USNS Narragansett (T-ATF-167)
USNS Catawaba (T-ATF-168)
USNS Navajo (T-ATF-169)
USNS Mohawk (T-ATF-170)
USNS Sioux (T-ATF-171)
USNS Apache (T-ATF-172)

FLEET OILERS
Cimarron Class (AO-177)
Displacement: 27,500 tons; Length: 592 feet; Beam: 88 feet; Power Plant: Two boilers, one steam turbine and one shaft.

Built by Avondale Shipyards
USS Cimarron (AO-177)[2]
USS Monogahela (AO-178)[2]
USS Merrimack (AO-179)[2]
USS Willamette (AO-180)[2]
USS Platte (AO-186)

Astabula Class (AO-51)
Displacement: 34,750 tons; Length: 644 feet; Beam: 75 feet; Power Plant: Four boilers, steam turbine and two shafts.

Built by Bethlehem Steel-Sparrows Point
USS Caloosahatchee (AO-98)
USS Canisteo (AO-99)

FRIGATES
Oliver Hazard Perry Class (FFG-7)
Displacement: 3,585 tons; Length: 445 feet; Beam: 45 feet; Power Plant: Two GE gas turbine engines and one shaft.

Built by Bath Iron Works
USS Oliver Hazard Perry (FFG-7)
USS McInerney (FFG-8)
USS Clark (FFG-11)
USS Samuel Eliot Morison (FFG-13)
USS Estocin (FFG-15)
USS Clifton Sprague (FFG-16)
USS Flatley (FFG-21)
USS Jack Williams (FFG-24)
USS Gallery (FFG-26)
USS Stephen W. Groves (FFG-29)
USS John J. Hall (FFG-32)
USS Aubrey Fitch (FFG-34)
USS Underwood (FFG-36)
USS Doyle (FFG-39)
USS Klakring (FFG-42)
USS Dewert (FFG-45)
USS Nicholas (FFG-47)
USS Robert G. Bradley (FFG-49)
USS Taylor (FFG-50)
USS Hawes (FFG-53)
USS Elrod (FFG-55)
USS Simpson (FFG-56)
USS Samuel B. Roberts (FFG-58)
USS Kauffman (FFG-59)

Built by Todd Shipyards-Seattle
USS Duncan (FFG-10)
USS Antrim (FFG-20)
USS Fahrion (FFG-22)
USS Boone (FFG-28)
USS Stark (FFG-31)
USS Crommelin (FFG-37)
USS Halyburton (FFG-40)
USS Vandergrift (FFG-48)
USS Carr (FFG-52)

Built by Todd Shipyards-San Pedro
USS Wadsworth (FFG-9)
USS George Philip (FFG-12)
USS Sides (FFG-14)
USS John A. Moore (FFG-19)
USS Lewis B. Puller (FFG-23)
USS Copeland (FFG-25)
USS Mahlon S. Tisdale (FFG-27)
USS Reid (FFG-30)
USS Jarrett (FFG-33)
USS Curts (FFG-38)
USS McClusky (FFG-41)
USS Thach (FFG-43)
USS Rentz (FFG-46)
USS Gary (FFG-51)
USS Ford (FFG-54)
USS Reuben James (FFG-57)
USS Rodney M. Davis (FFG-60)
*USS Ingraham (FFG-61)**

Brooke Class (FFG-1)
Displacement: 3,426 tons; Length: 414 feet; Beam: 44 feet; Power plant: Two boilers, two geared turbines and one shaft.

Built by Lockheed Shipbuilding
USS Brooke (FFG-1)[5]
USS Ramsey (FFG-2)[5]
USS Schofield (FFG-3)[5]

Built by Bath Iron Works
USS Talbot (FFG-4)[5]
USS Richard L. Page (FFG-5)[5]
USS Julius A. Furer (FFG-6)[5]

Glover Class (FF-1098)
Displacement: 3,426 tons; Length: 414 feet; Beam: 44 feet; Power plant: Two boilers, two geared turbines, and one shaft.

Built by Bath Iron Works
USS Glover (FF-1098)

Knox Class (FF-1052)
Displacement: 3,877 tons (FF-1052-1077); 4,200 tons, all others; Length: 438 feet; Beam: 47 feet; Power plant: Two boilers, two geared turbines and one shaft.

Built by Todd Shipyards-Seattle
USS Knox (FF-1052)
USS Roark (FF-1053)
USS Whipple (FF-1062)
USS Lockwood (FF-1064)
USS Marvin Shields (FF-1066)
USS Downes (FF-1070)
USS Badger (FF1071)

Built by Todd Shipyards-San Pedro
USS Hepburn (FF-1055)
USS Meyerkord (FF-1058)
USS Francis Hammond (FF-1067)
USS Harold E. Holt (FF-1074)
USS Fanning (FF-1076)

Built by Lockheed Shipbuilding
USS Rathburne (FF-1057)
USS Reasoner (FF-1063)
USS Stein (FF-1065)
USS Bagley (FF-1069)
USS Robert E. Perry (FF-1073)

Built by Avondale Shipyards
USS Connole (FF-1056)
USS W. S. Sims (FF-1059)
USS Vreeland (FF-1068)
USS Trippe (FF-1075)
USS Quellet (FF1077)
USS Joseph Hewes (FF-1078)
USS Bowen (FF-1079)
USS Paul (FF-1080)
USS Aylwin (FF-1081)
USS Elmer Montgomery (FF-1082)
USS Cook (FF-1083)
USS McCandless (FF-1084)
USS Brewton (FF-1086)
USS Kirk (FF-1087)
USS Barbey (FF-1088)
USS Jesse L. Brown (FF-1089)
USS Ainsworth (FF-1090)
USS Thomas C. Hart (FF-1092)
USS Capodanno (FF-1093)
USS Pharris (FF-1094)
USS Truette (FF-1095)

Garcia Class (FF-1040)
Displacement: 3,403 tons; Length: 414 feet; Beam: 44 feet; Power plant: Two boilers, two geared and one shaft.

Built by Bethlehem Steel-San Francisco
USS Garcia (FF-1040)[5]
USS Bradley (FF-1041)[5]

Built by Avondale Shipyards
USS Edward McDonnell (FF-1043)[5]
USS Brumby (FF-1044)[5]
USS Davidson (FF-1045)[5]

Built by Defoe Shipbuilding
USS Voge (FF-1047)[5]
USS Koelsch (FF-1049)[5]
USS O'Callahan (FF-1051)[5]

Built by Lockheed Shipbuilding
USS Sample (FF-1048)[5]
USS Albert David (FF-1050)[5]

Bronstein Class (FF-1037)
Displacement: 2,650 tons; Length:371 feet; Beam: 40 feet; Power Plant: Two boilers, two geared turbines and one shaft.

Built by Avondale Shipyards
USS Bronstein (FF-1037)
USS McCloy (FF-1038)

HOSPITAL SHIPS (MSC)
Mercy Class (T-AH-19)
Displacement: 69,360 tons; Length: 894 feet; Beam: 106 feet; Power Plant: GE geared steam turbine, two Foster-Wheeler boilers and one shaft.
Converted by
National Steel & Shipbuilding
USNS Mercy (T-AH-19)
USNS Comfort (T-AH-20)

MINE COUNTERMEASURES SHIPS
Avenger Class (MCM-1)
Displacement: 1,350 tons; Length: 224 feet;

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(continued)

Beam: 39 feet; Power Plant: Four Waukesha diesels in MCM-1 and MCM-2; four Isotta Fraschini diesels in others; and two shafts.

Built by Peterson Builders
USS Avenger (MCM-1)
USS Sentry (MCM-3)
*USS Guardian (MCM-5)**
*USS Devastator (MCM-6)**
*USS Scout (MCM-8)**
*USS Pioneer (MCM-9)**
*USS Warrior (MCM-10)**
*USS Gladiator (MCM-11)**

Built by Marinette Marine
USS Defender (MCM-2)
USS Champion (MCM-4)
*USS Patriot (MCM-7)**

MINEHUNTER SHIPS
Osprey Class (MHC-51) (Based on Italian Lerici Class)
Displacement: 785 tons; Length: 188 feet; Beam: 36 feet; Power Plant: Two diesels, two with Voith-Schneider propulsion systems.

Built by Intermarine USA
*USS Osprey (MHC-51)**

MINESWEEPERS, OCEAN
Aggressive Class (MSO-422)
Displacement: 720 tons; Length: 172 feet; Beam: 36 feet; Power Plant: Four diesels and two shafts.

Built by Higgins
USS Fidelity (MSO-443)

Built by Martinolich Shipbuilding
USS Illusive (MSO-448)

Built by J.M. Martinac Shipbuilding
USS Leader (MSO-490)

OCEANOGRAPHIC RESEARCH SHIPS
(MSC)Conrad Class
Displacement: 1,300 tons; Length: 208 feet; Beam: 39 feet; Power Plant: Diesel-electric and one shaft.

Built by Marietta Manufacturing
USNS Lynch (T-AGOR-7)

Built by Northwest Marine Iron Works
USNS DeSteigeur (T-AGOR-12)
USNS Bartlett (T-AGOR-13)

Converted Eltanin Class
Displacement: 4,942 tons; Length: 262 feet; Beam: 51-1/2 feet; Power Plant: Diesel electric and two shafts.

Built by Avondale Shipyards
USNS Mizar (T-AGOR-11)

Hayes Class
Displacement: 3,320 tons; Length: 246 feet; Beam: 75 feet; Power Plant: Geared diesels and two shafts.

Converted by Tacoma Boatbuilding
USNS Hayes (T-AGOR-16)[3]

OCEANOGRAPHIC SURVEY SHIPS
Maury Class (T-AGS-39)
Displacement: 15,821 tons; Length: 500 feet; Beam: 72 feet; Power Plant: Two medium-speed diesels.

Built by Bethlehem Steel-Sparrows Point
*USNS Maury (T-AGS-39)**
*USNS Tanner (T-AGS-40)**

H.H. Hess Class (T-AGS-38)
Displacement: 21,235 tons; Length: 536 feet; Beam: 76 feet; Power Plant: Steam turbine, two boilers and one shaft.

Built by National Steel & Shipbuilding
USNS H.H. Hess (T-AGS-38)

Silas Bent Classs (T-AGS-26)
Displacement: 2,800 tons; Length: 285 feet; Beam: 48 feet; Power Plant: Diesel electric and one shaft.

Built by American Shipbuilding
USNS Silas Bent (T-AGS-26)

Built by Christy Corporation
USNS Kane (T-AGS-27)

Wilkes Class (T-AGS-33)
Same as Silas Bent Class.

Built by Defoe Shipbuilding
USNS Wilkes (T-AGS-33)
USNS Wyman (T-AGS-34)

Chauvenet Class (T-AGS-29) Displacement: 4,350 tons; Length: 393 feet; Beam: 54 feet; Power Plant: Geared diesel and one shaft.

Built by Upper Clyde Shipbuilders (UK)
USNS Chauvenet (T-AGS-29)
USNS Harkness (T-AGS-32)
Converted Victory Class
Displacement: 13,050 tons; Length: 455 feet; Beam: 62 feet; Power Plant: Steam turbine and one shaft.

Built by Oregon Shipbuilder
USNS Bowditch (T-AGS-21)
USNS Dutton (T-AGS-22)

OCEAN SURVEILLANCE SHIPS (MSC)
Stalwart Class (T-AGOS-1)
Displacement: 2,285 tons; Length: 224 feet; Beam: 43 feet; Power Plant: Four diesel generators and two shafts.

Built by Tacoma Boatbuilding
USNS Stalwart (T-AGOS-1)
USNS Contender (T-AGOS-2)
USNS Vindicator (T-AGOS-3)
USNS Triumph (T-AGOS-4)
USNS Assurance (T-AGOS-5)
USNS Persistent (T-AGOS-6)
USNS Indomitable (T-AGOS-7)
USNS Prevail (T-AGOS-8)
USNS Assertive (T-AGOS-9)
USNS Invincible (T-AGOS-10)
*USNS Audacious (T-AGOS-11)**
*USNS Bold (T-AGOS-12)**

Built by Halter Marine
*USNS Adventurous (T-AGOS-13)**
*USNS Worthy (T-AGOS-14)**
*USNS Titan (T-AGOS-15)**
*USNS Capable (T-AGOS-16)**
*USS Intrepid (T-AGOS-17)**
*USS Relentless (T-AGOS-18)**

Victorious Class
(Small Waterplane Area Twin-Hull)
Displacement: 3,380 tons; Length: 232 feet; Beam: 94 feet; Power Plant: Diesel electric.
Built by McDermott Shipyard
*USNS Victorious (T-AGOS-19)**
*Unnamed (T-AGOS-20)**
*Unnamed (T-AGOS-21)**
*Unnamed (T-AGOS-22)**

OILERS (MSC)
Henry J. Kaiser Class (T-AO-187)
Displacement: 40,700 tons; Length: 677-1/2 feet; Beam: 97-1/2 feet; Power Plant: Two Colt-Pielstick diesels and twin shafts.

Built by Avondale Shipyards
USNS Henry J. Kaiser (T-AO-187)
USNS Joshua Humphreys (T-AO-188)
USNS John Lenthall (T-AO-189)
USNS Andrew J. Higgins (T-AO-190)
USNS John Ericcson (T-AO-194)
USNS Leroy Grumman (T-AO-195)
*Unnamed (T-AO-197)**
*Unnamed (T-AO-198)**
*Unnamed (T-AO-200)**
*Unnamed (T-AO-202)**
*Unnamed (T-AO-204)**

Built by Pennsylvania Shipbuilding
*USNS Benjamin Isherwood (T-AO-191)**
*USNS Henry Eckford (T-AO-192)**

Mispillion Class (Jumboized) (T-AO-105)
Displacement: 35,000 tons; Length: 644 feet; Beam: 75 feet; Power Plant: Geared turbines, four boilers and two shafts.

Built by Sun Shipbuilding
USNS Mispillion (T-AO-105)
USNS Navasota (T-AO-106)
USNS Passumpsic (T-AO-107)
USNS Pawcatuck (T-AO-108)
USNS Waccanaw (T-AO-109)

Neosho Class (T-AO-143)
Displacement: 26,840 tons; Length: 655 feet; Beam: 86 feet; Power Plant: Geared turbines, two boilers and two shafts.

Built by Bethlehem Steel-Quincy
USNS Neosho (T-AO-143)

Built by New York Shipbuilding
USNS Mississinewa (T-AO-144)
USNS Hassayampa (T-AO-145)
USNS Kawashiwi (T-AO-146)
USNS Truckee (T-AO-147)
USNS Ponchatoula (T-AO-148)

PATROL COMBATANTS MISSILESHIPS (Hydrofoil)
Pegasus Class (PHM-1)
Displacement: 255 tons; Length: w/foils, 133 feet; w/o foils, 145 feet; Beam: 28 feet; Power Plant: Foilbourne, one GE gas turbine and waterjet units; hullbourne, two diesels and waterjet units.

Built by Boeing Marine Systems
USS Pegasus (PHM-1)
USS Hercules (PHM-2)
USS Taurus (PHM-3)
USS Aquila (PHM-4)
USS Aries (PHM-5)
USS Gemini (PHM-6)

REPAIR SHIPS
Vulcan Class (AR-5)
Displacement: about 16,270 tons; Length: 529 feet; Beam: 73 feet; Power Plant: Four boilers, steam turbines and two shafts.

Built by New York Shipbuilding
USS Vulcan (AR-5)
Built by L.A. Shipbuilding & Drydock
USS Jason (AR-8)

REPLENISHMENT OILERS
Wichita Class (AOR-1)
Displacement: 38,100 tons; Length: 659 feet; Beam: 96 feet; Power Plant: Three boilers, steam turbines and two shafts.

Built by General Dynamics-Quincy
USS Wichita (AOR-1)
USS Milwaukee (AOR-2)
USS Kansas City (AOR-3)
USS Savannah (AOR-4)
USS Wabash (AOR-5)
USS Kalamazoo (AOR-6)

Built by National Steel & Shipbuilding
USS Roanoke (AOR-7)

RESCUE, SALVAGE & TOWING SHIPS
Safeguard Class (ARS-50)
Displacement: 2,880 tons; Length: 255 feet; Beam: 50 feet; Power Plant: Four Caterpillar diesels and two shafts.

Built by Peterson Builders
USS Safeguard (ARS-50)
USS Grasp (ARS-51)
USS Salvor (ARS-52)
USS Grapple (ARS-53)

Edenton Class (ATS-1)
Displacement: 2,929 tons; Length: 282 feet; Beam: 50 feet; Power Plant: Four diesels and two shafts.

Built by Brooke Marine (UK)
USS Edenton (ATS-1)
USS Beaufort (ATS-2)
USS Brunswick (ATS-3)

Bolster Class (ARS-38)
Displacement: 2,045 tons; Length: 213 feet; Beam: 44 feet; Power Plant: Diesel electric and two shafts.

Built by Basalt Rock
USS Bolster (ARS-38)
USS Conserver (ARS-39)
USS Hoist (ARS-40)
USS Opportune (ARS-41)
USS Reclaimer (ARS-42)
USS Recovery (ARS-43)

SUBMARINE RESCUE SHIPS
Pigeon Class (ASR-21)
Displacement: 4,200 tons; Length: 251 feet; Beam: 86 feet; Power Plant: Four diesels and two shafts.

Built by Alabama Drydock & Shipbuilding
USS Pigeon (ASR-21)
USS Ortolan (ASR-22)

Chanticleer Class
Displacement: 2,320 tons; Length: 251 feet; Beam: 42 feet; Power Plant: Diesel electric and one shaft.

Built by Moore Shipbuilding & Drydock
USS Florikan (ASR-9)

Built by Savannah Machine & Foundry
USS Kittiwake (ASR-13)
USS Petrel (ASR-14)
USS Sunbird (ASR-15)

SUBMARINE TENDERS
L.Y. Spear Class (AS-36)
Displacement: 23,000 tons; Length: 644 feet; Beam: 85 feet; Power Plant: Two boilers, steam turbines and one shaft.

Built by General Dynamics-Quincy
USS L.Y. Spear (AS-36)
USS Dixon (AS-37)

Emory S. Land Class (AS-39)
Same as L.Y. Spear Class.

Built by Lockheed Shipbuilding
USS Emory S. Land (AS-39)
USS Frank Cable (AS-40)
USS McKee (AS-41)

Simon Lake Class (AS-33)
Displacement: AS-33, 19,934 tons; AS-34, 21,089 tons; Length: 644 feet; Beam: 85 feet; Power Plant: Two boilers, steam turbines and one shaft.

Built by Puget Sound Naval Shipyard
USS Simon Lake (AS-33)

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US Navy Fleet

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Built by Ingalls Shipbuilding
USS Canopus (AS-34)

Hunley Class (AS-31)
Displacement: 19,000 tons; Length: 599 feet; Beam: 83 feet; Power Plant: Diesel electric and one shaft.

Built by Newport News Shipbuilding
USS Hunley (AS-31)

Built by Ingalls Shipbuilding
USS Holland (AS-32)

Fulton Class (AS-11)
Displacement: 16,230 tons; Length: 530-1/2 feet; Beam: 73 feet; Power Plant: N/A.

Built by Mare Island Naval Yard
USS Fulton (AS-11)

Built by Moore Shipbuilding & Drydock
USS Orion (AS-18)

Proteus Class (AS-19)
Displacement: 19,200 tons; Length: 575 feet; Beam: 73 feet; Power Plant: N/A.

Built by Moore Shipbuilding & Drydock
USS Proteus (AS-19)

TANKERS (MSC)
T-5 Replacement Class
Displacement: 39,000 tons; Length: 615 feet; Beam: 90 feet; Power Plant: Diesel engine and one shaft.

Built by American Shipbuilding
MV Gus M. Darnell
MV Paul Buck
MV Samuel L. Cobb
MV Richard G. Matthiesen
MV Lawrence H. Gianella

Falcon Leader Class
Displacement: 42,514 tons; Length: 668 feet; Beam: 84 feet; Power Plant: Two turbocharged diesel engines and one shaft.

Built by Bath Iron Works
MV Falcon Leader[4]
MV Falcon Champion[4]

Sealift Class
Displacement: 34,100 tons; Length: 587 feet; Beam: 84 feet; Power Plant: Two turbocharged diesel and one shaft.

Built by Todd Shipyards
USNS Sealift Pacific (T-AOT-168)
USNS Sealift Arabian Sea (T-AOT-169)
USNS Sealift China Sea (T-AOT-170)
USNS Sealift Indian Ocean (T-AOT-171)

Built by Bath Iron Works
USNS Sealift Atlantic (T-AOT-172)
USNS Sealift Mediterranean (T-AOT-173)
USNS Sealift Caribbean (T-AOT-174)
USNS Sealift Arctic (T-AOT-175)
USNS Sealift Antarctic (T-AOT-176)

Patriot Class
Displacement: 44,150 tons; Length: 711 feet; Beam: 84 feet; Power Plant: Two turbocharged diesel engines and one shaft.

Built by Todd Shipyards
MV Ranger[4]
MV Rover[4]
MV Courier[4]
MV Patriot[4]

TANK LANDING SHIPS
Newport Class (LST-1179)
Displacement: 8,450 tons; Length: 522 feet; Beam: 69 feet; Power Plant: Six diesels and two shafts.

Built by Philadelphia Naval Yard
USS Newport (LST-1179)
USS Manitowac (LST-1183)
USS Frederick (LST-1184)
USS Schenectady (LST-1185)
USS Cayuga (LST-1186)
USS Tuscaloosa (LST-1187)
USS Saginaw (LST-1188)
USS San Bernadino (LST-1189)
USS Boulder City (LST-1190)-NRF
USS Racyne (LST-1191)-NRF
USS Spartanburg County (LST-1192)
USS Fairfax County (LST-1193)
USS LaMoure County (LST-1194)
USS Barbour County (LST-1195)
USS Harlan County (LST-1196)
USS Barnstable County (LST-1197)
USS Bristol County (LST-1198)

NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION FLEET

The ships of the National Oceanic and Atmospheric Administration (NOAA) fleet are the vessels which serve the needs of the Department of Commerce and the nation. They operate off the Atlantic and Pacific Coasts, in the Gulfs of Mexico and Alaska, and in the Great Lakes.

The duties assigned to the ships range from service with the National Ocean Survey's (NOS) nautical charting program to scientific endeavors of the National Marine Fisheries Service or research activities of the Environmental Research Laboratories.

CIRCULATORY STUDIES VESSELS
"Ferrel Class"
Displacement: 360 tons; Gross tonnage: 349 tons; Length: 133 feet; Beam: 32 feet; Propulsion Plant: Two 375-hp Caterpillar geared diesel engines and two fixed-pitch propellers; Auxiliary propulsion: Through-hull GE 100-hp bowthruster.

Footnotes: (1)Originally designed and outfitted for hydrographic survey operations. McArthur is now assigned to operations involving circulatory studies; (2)Converted from U.S. Army. Powered barge built by Maritime Builders.

Built by Zigler Shipyards
Ferrel (S-492)

FISHERY/LIVING MARINE RESOURCES RESEARCH VESSELS
"Miller Freeman Class"
Displacement: 1,920 tons; Gross tonnage: 1,515 tons; Length: 215 feet; Beam: 42 feet; Propulsion Plant: One 2,200-hp GM geared diesel engine and one Bird-Johnson CP propeller.

Built by American Shipbuilding
Miller Freeman (S-223)

"Oregon II Class"
Displacement: 952 tons; Gross tonnage: 703 tons; Length: 170 feet; Beam: 34 feet; Propulsion Plant: Two 800-hp Fairbanks Morse geared diesel engines and one Bird-Johnson CP propeller.

Built by Ingalls Shipbuilding
Oregon II (S-332)

"Albatross IV Class"
Displacement: 1,089 tons; Gross tonnage: 931 tons; Length: 187 feet; Propulsion Plant: Two 565-hp Caterpillar geared diesel engines and one Liaaen CP propeller with Kort nozzle.

Built by Southern Shipbuilding
Albatross IV (R-342)

"Townsend Cromwell Class"
Displacement: 652 tons; Gross tonnage: 564 tons; Length: 163 feet; Beam: 33 feet; Propulsion Plant: Two 400-hp White-Superior geared diesel engines and two Liaaen propellers.

Built by J. Ray McDermott
Townsend Cromwell (R-443)

"David Starr Jordan Class"
Displacement: 993 tons; Gross tonnage: 873 tons; Length: 171 feet; Beam: 36-1/2 feet; Propulsion Plant: Two 543-hp White-Superior geared diesel engines and two Bird-Johnson propellers.

Built by Christy Corporation
David Starr Jordan (R-444)

"Delaware II Class"
Displacement: 758 tons; Gross tonnage: 483 tons; Length: 155 feet; Beam: 30 feet; Propulsion Plant: One 1,230-hp GM geared diesel engine and one fixed-pitch propeller.

Built by South Portland Engineering
Delaware II (R-445)

"Chapman Class"
Displacement: 520 tons; Gross tonnage: 427 tons; Length: 127 feet; Beam: 30 feet; Propulsion Plant: One 1,250-hp Caterpillar geared diesel engine and one CP propeller.

Built by Bender Shipbuilding & Repair
Chapman (R-446)

"John N. Cobb Class"
Displacement: 250 tons; Gross tonnage: 185 tons; Length: 93 feet; Beam: 26 feet; Propulsion Plant: One 325-hp Fairbanks Morse geared diesel engine and one fixed pitch propeller.

Built by Western Boatbuilding
John N. Cobb (R-552)

FISHERY RESEARCH/ CARGO SHIPMENT VESSEL
"Murre II Class"
Displacement: 295 tons; Length: 86 feet; Beam: 27 feet; Propulsion Plant: Two 165-hp Caterpillar geared diesel engines and two fixed propellers.

Built by Maritime Builders[2]
Murre II (R-663)

HYDROGRAPHIC SURVEY VESSELS
"Fairweather Class"
Displacement: 1,800 tons; Gross tonnage: 1,591 tons; Length: 231 feet; Beam: 42 feet; Propulsion plant: Two 1,200-hp GM diesel engines and two Bird-Johnson CP propellers.

Built by Aerojet-General Shipyards
Fairweather (S-220)
Rainier (S-221)
Mt. Mitchell (S-222)

"Peirce Class"
Displacement: 907 tons; Gross tonnage: 696 tons; Length: 163 feet; Beam: 33 feet; Propulsion Plant: Two 800-hp GM geared diesel engines and two Bird-Johnson CP propellers.

Built by Marietta Manufacturing
Peirce (S-328)
Whiting (S-329)

"McArthur Class"
Displacement: 995 tons; Gross tonnage: 854 tons; Length: 175 feet; Beam: 38 feet; Propulsion Plant: Two 800-hp GM geared diesel engines and two Bird-Johnson propellers.

Built by Norfolk Shipbuilding & Drydock
McArthur (S-330)[1]
Davidson (S-331)

OCEANOGRAPHIC RESEARCH VESSELS
"Oceanographer Class"
Displacement: 4,033 tons; Gross tonnage: 3,701 tons; Length: 303 feet; Beam: 52 feet; Propulsion Plant: Diesel-electric, two 2,500-hp Westinghouse propulsion motors, four 1,150-kw Westinghouse propulsion generators, and two fixed-pitch propellers.

Built By Aerojet-General Shipyards
Oceanographer (R-101)
Discoverer (R-102)

"Researcher Class"
Displacement: 2,963 tons; Gross tonnage: 2,802 tons; Length: 278 feet; Beam: 51 feet; Propulsion Plant: Two Alco geared 1,600-hp diesel engines and two Bird-Johnson CP propellers.

Built by American Shipbuilding
Researcher (R-103)

"Surveyor Class"
Displacement: 3,440 tons; Gross tonnage: 2,653 tons; Length: 292 feet; Beam: 46 feet; Propulsion plant: Two Delaval 3,200-hp steam turbines, two Combustion Engineering boilers and one fixed-pitch propeller.

Built by National Steel & Shipbuilding
Surveyor (S-132)

WIRE DRAG SURVEY VESSELS
"Rude Class"
Displacement: 220 tons; Gross tonnage: 150 tons; Length: 90 feet; Beam: 22 feet; Propulsion Plant: Two 400-hp Cummins geared diesel engines and two fixed-pitch propellers.

Built by Jakobson Shipyard
Rude (S-590)
Heck (S-591) ■

U.S.-FLAG OCEANGOING FLEET

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
ALOHA PACIFIC CRUISES					
510 King Street, Suite 501, Alexandria, VA 22341					
S.S. Monterey	Cruise	21,051	12,800	N/A	52/88
AMERICAN AUTOCARRIERS, INC.					
C/O Wallenius Motorships, Inc., P.O. Box 1157, 900 Sylvan Avenue, Engelwood Cliffs, NJ 07632					
Faust	PCC	51,858	28,070	D-16,980	85
AMERICAN AUTOMAR INC.					
1025 Thomas Jefferson Street, Suite 308, Washington, D.C. 20007					
Advantage	Breakbulk	12,755	21,990	D-14,000	77
American Cormorant	Semisub Hvylft	10,196	47,230	D-19,900	75/82
American Eagle	RO/RO	15,952	20,450	D-21,600	81
American Kestrel	LASH	24,406	39,130	S-35,000	72
AMERICAN HAWAII CRUISES					
550 Kearny Street, San Francisco, CA 94108					
Constitution	Cruise	30,090	7,100	T-55,000	51/88
Independence	Cruise	30,090	7,100	T-55,000	50/88
AMERICAN HEAVY LIFT SHIPPING CO.					
15355 Vantage Parkway West, Suite 110, Houston, Texas 77032					
King	Tanker	20,138	34,723	T-13,600	57
Knight	Tanker	20,026	34,723	T-13,600	58
Solar	Tanker	18,116	30,806	T-13,600	59
Spray	Tanker	18,150	30,806	T-13,600	60
AMERICAN OVERSEAS MARINE CORPORATION					
116 East Howard Street, Quincy, MA 02169					
2nd Lt. John P. Bobo	RO/RO	41,700	22,700	D-26,400	85
Pfc. Dewayne T. Williams	RO/RO	41,700	22,700	D-26,400	85
1st Lt. Baldomero Lopez	RO/RO	41,700	22,700	D-26,400	85
1st Lt. Jack Lummus	RO/RO	41,700	22,700	T-26,400	86
Sgt. William R. Button	RO/RO	41,700	22,700	D-26,400	86
***Lake**	Cargo	9,259	12,476	T-12,100	61
***Pride**	Cargo	9,252	12,412	T-12,100	60
***Scan**	Cargo	9,259	12,483	T-12,100	61
***Southern Cross**	Cargo	9,259	12,519	T-12,100	62
***Cape Carthage**	Cargo	9,397	12,684	T-11,000	63
***Cape Catoche**	Cargo	9,397	12,684	T-11,000	63
***Cape Canaveral**	Cargo	9,397	12,684	T-11,000	64
***Aide**	Cargo	7,846	10,986	T-13,750	61
***Cape Ann**	Cargo	11,309	12,728	T-18,150	62
***Cape Avinof**	Cargo	11,309	12,728	T-18,150	63
***Curtiss**	T-AVB	23,255	13,651	T-30,000	69
***Wright**	T-AVB	23,255	13,651	T-30,000	70

*under contract from MSC

AMERICAN PRESIDENT LINES, LTD.					
1800 Harrison Street, Oakland, CA 94612					
President Adams	Conbulk	42,276	54,565	D-57,000	88
President Arthur	Container	36,799	44,256	D-28,800	87
President Buchanan	Container	36,799	44,256	D-28,800	87
President Eisenhower	Container	36,900	45,900	D-43,200	80/84
President F.D. Roosevelt	Container	36,200	45,900	D-43,200	80/84
President Garfield	Container	36,799	44,256	D-28,800	87
President Grant	Container	26,700	37,300	T-32,000	71/78/83
President Harding	Container	36,799	44,256	D-28,800	87
President Harrison	Container	28,163	33,970	T-32,000	71/78
President Hoover	Container	26,700	37,300	T-32,000	71/78/83
President Jackson	Conbulk	42,276	54,565	D-57,000	88
President Jefferson	Container	21,500	18,500	T-28,500	73
President Johnson	Container	21,500	18,500	T-28,500	74
President Kennedy	Conbulk	42,276	54,565	D-57,000	88
President Lincoln	Container	40,600	29,800	D-43,200	82
President Madison	Container	21,500	18,500	T-28,500	73
President Monroe	Container	40,600	29,800	D-43,200	83
President Pierce	Container	21,500	18,500	T-28,500	73
President Polk	Conbulk	42,276	54,565	D-57,000	88
President Taft	Container	17,800	17,500	T-24,500	67/72
President Truman	Conbulk	42,276	54,565	D-57,000	88
President Tyler	Container	26,700	37,300	T-32,000	72/78/83
President Washington	Container	40,600	29,800	T-43,200	82
President Wilson	Container	16,500	19,300	T-22,000	64/72

AMERICAN TRADING TRANSPORTATION COMPANY, INC.					
555 Fifth Avenue, New York, NY 10017					
Baltimore Trader	Tanker	27,269	57,884	T-15,000	55/71
Chesapeake Trader	Tanker	24,669	50,116	D-11,400	82
Delaware Trader	Tanker	24,669	50,057	D-11,400	82
Pennsylvania Trader	Tanker	20,046	34,124	T-13,750	62
Potomac Trader	Tanker	24,669	50,057	D-11,400	83
AMERICAN TRANSPORT LINES, INC.					
9487 Regency Square Blvd., North Regency II, Jacksonville, Fla. 32203					
American Condor	RO/RO-LO/LO	15,952	20,641	D-10,800	81
American Falcon	RO/RO-LO/LO	15,952	20,641	D-10,800	81
Sea Fox	Con/RO/LO	34,318	33,670	D-23,040	84
Sea Lion	Con/RO/LO	34,318	33,670	D-23,040	85
Sea Wolf	Con/RO/LO	34,318	33,670	D-23,040	84
APEX MARINE CORPORATION					
2001 Marcus Avenue, Lake Success, NY 11042					
Adonis	Tanker	38,297	80,422	D-20,700	56/82
American Heritage	Tanker	44,000	91,849	T-24,500	78
Baltimore	ITB	23,913	47,247	D-18,200	83
Charleston	Tanker	21,649	39,366	T-12,000	56/80
Golden Monarch	Tanker	44,900	91,388	T-24,500	75
Groton	ITB	23,913	47,247	D-18,200	82
Jacksonville	ITB	23,913	47,247	D-18,200	82
Mobile	ITB	23,913	47,247	D-18,200	84
New York	ITB	23,913	47,247	D-18,200	83
Philadelphia	ITB	23,913	47,247	D-18,200	84
ARCO MARINE, INC. (ATLANTIC RICHFIELD COMPANY)					
300 OceanGate, Long Beach, CA 90802-4341					
Arco Alaska	Tanker	83,675	188,436	T-28,000	79
Arco Anchorage	Tanker	57,691	120,266	T-26,000	73
Arco California	Tanker	83,675	188,697	T-28,000	80
Arco Fairbanks	Tanker	57,691	120,319	T-26,000	74
Arco Independence	Tanker	117,515	262,376	T-35,000	77
Arco Juneau	Tanker	57,691	120,266	T-26,000	74
Arco Prudhoe Bay	Tanker	35,646	70,278	T-20,000	71
Arco Sag River	Tanker	35,646	70,215	T-20,000	72
Arco Spirit	Tanker	117,515	262,376	T-35,000	77
Arco Texas	Tanker	39,664	89,950	T-20,000	73/81
ATLANTIC TANKSHIPS, INC.					
5 Koger Executive Center, P.O. Box 13348, Norfolk, VA 23506					
Sea Venture	Chemical Tanker	9,993	18,924	D- 8,680	72/73
BAY TANKERS INCORPORATED					
270 Sylvan Avenue, Englewood Cliffs, NJ 07632					
Bay Ridge	VLCC Tanker	103,812	224,428	T-50,000	79
Stuyvesant	VLCC Tanker	103,812	224,670	T-50,000	77
***USNS Altair**	SL-7	48,142	25,595	T-120,000	73
***USNS Denabola**	SL-7	48,142	25,595	T-120,000	73
***USNS Pollux**	SL-7	48,142	25,595	T-120,000	73
***USNS Regulus**	SL-7	48,142	25,595	T-120,000	73

*under contract from MSC

BELCHER TOWING CO.					
8700 West Flagler Street, Miami, Fla. 33102					
Port Everglades/Barge 101	ITB	17,634	36,846	D-15,200	79/81
J.A. Belcher Sr./Barge 23	ITB	6,231	12,600	D-3,700	71/77
CENTRAL GULF LINES, INC.					
650 Poydras Street, Suite 1700, Poydras Center, New Orleans, La. 70130					
Dawn	Cargo	11,309	12,932	T-18,150	63
Rover	RO/RO	11,757	15,946	T-30,000	69
Green Valley	LASH	28,487	46,908	T-32,000	74
Green Island	LASH	28,487	46,908	T-32,000	75
Green Harbour	LASH	28,487	49,908	T-32,000	74
Green Wave	Cargo	9,521	12,487	D-10,000	81
Green Bay	PCC	38,659	13,491	D-11,600	87
Green Lake	PCC	46,950	14,104	D-13,120	87
CHESAPEAKE SHIPPING CO.					
c/o Prentice-Hall Corp., 229 S. State Street, Dover, Del. 19901					
Bridgeton	Tanker	210,065	407,823	T-45,000	77
Chesapeake City	Tanker	44,313	82,572	D-17,000	81
†Gas King	Gas Carr./Tanker	43,604	47,471	D-26,800	79

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
†Gas Prince	Gas Carr./Tanker	43,604	47,471	D-26,800	79
†Gas Princess	Gas Carr./Tanker	39,807	47,471	D-26,800	79
†Gas Queen	Gas Carr./Tanker	43,604	47,471	D-26,800	78
†Middletown	Tanker	127,967	294,739	D-34,000	83
Ocean City	Tanker	55,620	82,572	D-17,000	81
Sea Isle City	Tanker	55,454	81,283	D-12,720	81
Surf City	Tanker	44,542	81,283	D-12,720	81
†Townsend	Tanker	127,967	290,133	D-34,000	82
†To be transferred to Kuwaiti flag					
CHEVRON SHIPPING COMPANY					
555 Market Street, San Francisco, CA 94105					
Chevron Arizona	Product Carrier	16,941	39,207	GT/E-12,500	77
Chevron California	Tanker	35,588	70,213	T-20,000	72
Chevron Colorado	Product Carrier	16,941	39,213	GT/E-12,500	76
Chevron Louisiana	Product Carrier	16,941	39,167	GT/E-12,500	77
Chevron Mississippi	Tanker	35,589	70,213	T-20,000	72
Chevron Oregon	Product Carrier	16,941	39,218	GT/E-12,500	75
Chevron Washington	Product Carrier	16,941	39,167	GT/E-12,500	76
COASTAL TANKSHIPS USA					
9 Greenway Plaza, Houston, TX 77046					
Coastal Manatee	Tanker	19,030	40,806	S-13,600	60
Mobile Bay	Tanker	18,810	31,828	S-14,850	54
COVE SHIPPING INC.					
200 Virginia Street, Mobile, Ala. 36603					
Cove Leader	Tanker	40,511	71,054	T-25,000	59/79/80
Cove Liberty	Tanker	33,596	69,306	T-22,000	54/74/81
Cove Trader	Tanker	28,310	49,339	T-15,000	59/79/82
CREST TANKERS INC.					
7930 Clayton Road, St. Louis, Mo. 63117					
Chablis	Tanker	19,030	30,806	T-15,000	60
Montrachet	Tanker	18,047	30,806	T-15,000	59
Pomerol	Tanker	18,347	31,857	T-13,500	58
St. Emilion	Tanker	19,474	34,779	T-13,000	56
CROWLEY CARIBBEAN TRANSPORT					
2801 N.W. 74th Avenue, Miami, Fla. 33122					
Ambassador	RO/RO	13,498	8,995	D-10,000	80
Senator	RO/RO	13,498	8,995	D-10,000	81

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
DOCK EXPRESS CONTRACTORS					
3040 Post Oak Boulevard, Suite 1600, Houston, Texas 77056					
Dock Express Texas	Hvylft/RO-RO	1,383	2,804	D-2,500	76
Dock Express Virginia	Hvylft/RO-RO	N/A	N/A	N/A	N/A
ENERGY TRANSPORTATION CORPORATION					
1185 Avenue of the Americas, New York, NY 10036					
Energy Altair	Tug	262.6	—	D- 4,800	82
Energy Ammonia	LPG Barge	11,438	12,110	—	82
LNG Aquarius	LNG	95,084	71,475	T-43,000	77
LNG Aries	LNG	95,084	71,466	T-43,000	77
LNG Capricorn	LNG	95,084	71,409	T-43,000	78
LNG Gemini	LNG	95,084	71,327	T-43,000	78
LNG Leo	LNG	95,084	71,409	T-43,000	78
LNG Libra	LNG	95,084	71,503	T-43,000	79
LNG Taurus	LNG	95,084	71,495	T-43,000	79
LNG Virgo	LNG	95,084	71,482	T-43,000	79
EXXON SHIPPING COMPANY					
P.O. Box 1512, Houston, TX 77001					
Exxon Baltimore	Tanker	26,198	51,015	T-19,000	60
Exxon Baton Rouge	Tanker	34,266	75,600	T-19,000	69
Exxon Baytown	Tanker	32,136	57,720	D-16,800	84
Exxon Benicia	Tanker	75,272	172,775	T-26,700	79
Exxon Boston	Tanker	23,299	51,314	T-19,000	60
Exxon Charleston	Products Tanker	27,798	48,075	D-16,800	83
Exxon Galveston	Tanker	12,769	26,923	D- 7,000	70/78
Exxon Houston	Tanker	31,697	72,056	T-19,000	64
Exxon Jamestown	Tanker	19,734	40,631	T-26,500	57
Exxon Long Beach	Tanker	95,000	211,469	D-31,200	87
Exxon Lexington	Tanker	19,734	40,631	T-26,500	58
Exxon New Orleans	Tanker	32,035	72,056	T-19,000	65
Exxon North Slope	Tanker	75,272	172,775	T-26,700	79
Exxon Philadelphia	Tanker	38,144	76,160	T-19,000	70
Exxon Princeton*	Tanker	21,446	42,595	D-11,200	82
Exxon San Francisco	Tanker	34,266	75,600	T-19,000	69
Exxon Valdez	Tanker	95,000	211,469	D-31,200	86
Exxon Washington	Tanker	19,734	40,631	T-26,500	57
Exxon Wilmington	Products Tanker	27,508	48,011	D-16,800	84
Exxon Yorktown*	Tanker	21,446	42,954	D-11,200	83

*Bareboat chartered

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
FALCON SHIPPING GROUP					
801 Travis Street, Suite 2000, Houston, TX 77002					
Falcon Champion	Tanker	17,735	33,542	D-14,500	84
Falcon Countess	Tanker	20,751	37,276	D-15,000	72
Falcon Dutchess	Tanker	20,751	37,276	D-15,000	71
Falcon Leader	Tanker	17,735	33,542	D-14,500	83
Falcon Princess	Tanker	20,751	37,276	D-15,000	72
Pride of Texas	Bulk	24,384	36,500	D-15,600	81
Spirit of Texas	Bulk	24,384	36,500	D-15,600	82
Star of Texas	Bulk	24,384	36,500	D-15,600	82
FARRELL LINES, INC.					
One Whitehall Street, New York, NY 10004					
Argonaut	Container	17,904	16,205	T-17,500	79
Export Freedom	Container	17,904	16,230	T-17,500	72
Export Patriot	Container	17,904	16,345	T-17,500	73
Austral Rainbow*	LASH	26,456	29,749	T-32,000	72
American Resolute	Container	17,904	16,205	T-17,500	80
*chartered by MSC					
HVIDE SHIPPING INCORPORATED					
1900 S.E. 17th Street Causeway, Fort Lauderdale, FL 33316					
Frances Hammer/Oxy 4103	ITB	17,126	45,313	D-18,200	81
Julius Hammer/Oxy 4101	ITB	17,126	45,313	D-18,200	81
Seabulk Challenger/STL 3901	ITB	20,982	39,345	D-14,000	75
Seabulk Magnachem/ SCC 3902	ITB	18,671	39,344	D-14,000	77
INTERNATIONAL SHIP OPERATING SERVICES, INC.					
305 Broadway, New York, NY 10007					
Louisiana Brimstone	Chemical	13,118	24,559	T-7,000	45
Louisiana Sulphur	Chemical	9,987	16,653	T-7,000	45
INTEROCEAN MANAGEMENT CORPORATION					
Three Parkway, Philadelphia, PA 19102					
Brooks Range	Tanker	74,250	165,037	T-26,700	78
Thompson Pass	Tanker	74,250	165,037	T-26,700	78
U.S.T. Atlantic	Tanker	189,416	398,143	T-45,000	79
U.S.T. Pacific	Tanker	189,416	398,143	T-45,000	79

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
***Austral Lightning**	LASH	26,406	29,800	T-28,000	71
***Cape Bon**	Breakbulk	N/A	14,700	N/A	67
***Cape Ducato**	RO/RO	N/A	23,400	N/A	72
***Cape Edmont**	RO/RO	N/A	7,400	N/A	71
***Cape Nome**	Breakbulk	N/A	N/A	N/A	N/A
***Cape Henry**	RO/RO	N/A	32,000	N/A	79
***Cape Horn**	RO/RO	N/A	31,800	N/A	79
***Cape Hudson**	RO/RO	N/A	31,900	N/A	79
***Cornhusker State**	T-ACS	16,189	17,500	T-19,250	69/88
***Diamond State**	T-ACS	16,189	17,500	T-19,250	?/89
***Equality State**	T-ACS	16,189	17,500	T-19,250	?/89
***Flickertail State**	T-ACS	16,189	17,500	T-19,250	?/88
***Gem State**	T-ACS	16,189	17,500	T-19,250	66/84
***Gopher State**	T-ACS	16,189	17,500	T-19,250	?/87
***Grand Canyon State**	T-ACS	16,189	17,500	T-19,250	66/87
***Keystone State**	T-ACS	16,189	17,500	T-19,250	66/84
***Marsea 15**	Supply	N/A	N/A	N/A	N/A
***Meteor**	RO/RO	N/A	12,300	N/A	67
*under contract from MarAd					
KEYSTONE SHIPPING COMPANY					
313 Chestnut Street, Philadelphia, PA 19106					
Atigun Pass	Crude/Products	74,251	173,380	T-26,700	77
Chelsea	Crude/Products	22,358	39,235	T-15,000	75
Cherry Valley	Crude/Products	22,385	39,230	T-15,000	74
Chestnut Hill	Crude/Products	44,875	91,295	T-24,500	76
Chilbar	Chemical Tanker	21,937	39,363	T-20,460	59/81
Coronado	Crude/Products	22,358	39,237	T-15,000	73
Edgar M. Queeny	Chemical Tanker	19,047	37,106	T-15,000	70
Energy Independence	Collier	24,901	38,234	T-12,000	83
Fredericksburg	Crude/Products	21,557	39,374	T-20,460	58/80
Golden Gate	Crude/Products	27,899	61,952	T-20,000	70
Kenai	Crude/Products	60,385	123,113	T-30,000	79
Keystone Canyon	Crude/Products	74,251	173,380	T-26,700	78
Keystoner	Chemical Tanker	11,369	18,384	T- 7,700	53
Kittanning	Crude/Products	44,875	91,344	T-24,500	77
Tonsina	Crude/Products	60,385	122,781	T-30,000	78
Valley Forge	Chemical Tanker	20,572	37,753	T-15,000	66
LACHMAR CORPORATION, INC.					
P.O. Box 51949, Lafayette, LA 70501					
Lake Charles	LNG	87,000	68,600	T-43,000	80
Louisiana	LNG	87,000	68,600	T-43,000	80

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
LIBERTY MARITIME CORPORATION					
1979 Marcus Avenue, Suite 200, Lake Success, NY 11042					
Liberty Belle	Tanker	44,900	91,849	T-24,500	78
Liberty Sea	Bulk	33,784	63,739	D-12,300	84
Liberty Spirit	Bulk/Container	33,337	64,152	D-15,800	86
Liberty Star	Bulk/Container	33,337	64,152	D-15,800	86
Liberty Sun	Bulk/Container	33,337	64,162	D-15,800	86
Liberty Wave	Bulk	33,784	63,463	D-12,300	84
LYKES BROS. STEAMSHIP COMPANY					
300 Poydras Street, New Orleans, LA 70130					
Adabelle Lykes	Container	16,800	15,200	D-15,750	68/73
Ashley Lykes	Cargo/Cont.	11,900	14,300	T-11,000	63/73
Charlotte Lykes	Container	16,800	15,200	D-15,750	68/73
Cygnus	RO/RO	13,100	14,500	D-19,000	77
Elizabeth Lykes	Cargo/Cont.	11,000	14,700	T-15,500	65
Genevieve Lykes	Cargo	10,700	14,700	T-15,500	68
James Lykes	Cargo/Cont.	11,900	14,300	T-9,900	60/72
Jean Lykes	Cargo/Cont.	11,900	14,300	T-9,900	61/72
John Lykes	Cargo/Cont.	11,900	14,300	T-9,900	60/72
Joseph Lykes	Cargo/Cont.	11,900	14,300	T-9,900	60/71
Leslie Lykes	Cargo/Cont.	11,900	14,300	T-9,900	62/72
Letitia Lykes	Cargo/Cont.	10,700	14,700	T-15,500	68
Louise Lykes	Cargo/Cont.	11,000	14,700	T-15,500	65
Lyra	RO/RO	12,200	14,900	D-19,000	77
Margaret Lykes	Container	16,225	15,200	T-15,750	68/73
Majorie Lykes	Cargo/Cont.	11,900	14,300	T-11,000	62/73
Nancy Lykes	Cargo/Cont.	11,900	14,300	T-9,900	61/71
Ruth Lykes	Cargo/Cont.	11,000	14,700	T-15,500	66
Sheldon Lykes	Container	16,375	15,200	D-15,750	69/73
Thompson Lykes	Cargo/Cont.	11,900	14,300	T-9,900	60/71
Zoella Lykes	Cargo/Cont.	11,900	14,300	T-9,900	60/71
Allison Lykes	Container	14,082	15,288	T-17,500	64
Almeria Lykes	Container	17,801	22,307	T-21,000	68
Howell Lykes	Container	17,801	22,307	T-21,000	67
Mallory Lykes	Container	14,082	15,288	T-17,500	65
Mason Lykes	Container	17,801	22,307	T-21,000	68
Magallangs	Container	14,082	15,288	T-17,500	64
Sue Lykes	Cargo/Cont.	16,000	22,200	T-24,000	69
Stella Lykes	Cargo/Cont.	16,000	22,200	T-24,000	69
MAERSK LINE, LTD.					
Giralda Farms, Madison Avenue, P.O. Box 884, Madison, NJ 07940-0884					
***Cpl. Louis J. Hauge Jr.**	RO/RO	38,412	23,068	D-16,800	84
***1st Lt. Alexander Bonnyman Jr.**	RO/RO	38,412	23,068	D-16,800	85
Maersk Constellation	RO/RO	21,799	29,750	D-16,500	80
***Pfc. William B. Baugh**	RO/RO	38,412	23,068	D-16,800	84
***Pfc. James Anderson Jr.**	RO/RO	38,412	23,068	D-16,800	85
***Pvt. Harry Fisher**	RO/RO	38,412	23,068	D-16,800	85

* under contract to MSC

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
MARINE TRANSPORT LINES, INC.					
P.O. Box 1550, Secaucus, NJ 07094					
B.T. Alaska	Tanker	83,650	188,099	T-28,000	78
B.T. San Diego	Tanker	83,650	188,099	T-28,000	78
Chemical Pioneer	Chemical tanker	18,500	35,000	T-15,000	83
Marine Chemist	Chemical tanker	20,237	35,949	T-15,000	70
Marine Duval	Sulfur tanker	11,080	24,693	TE-7,000	44/70
Marine Floridian	Sulfur tanker	11,150	24,838	TE-7,000	44/67
Marine Princess	Bulk carrier	26,060	51,355	D-13,800	79
Marine Reliance	Pure car carrier	35,700	11,400	D-11,700	87
Sealift Antarctic	Tanker	17,158	27,221	D-14,000	75
Sealift Arabian Sea	Tanker	17,134	27,202	D-14,000	75
Sealift Arctic	Tanker	17,158	27,222	D-14,000	75
Sealift Atlantic	Tanker	17,158	27,214	D-14,000	74
Sealift Caribbean	Tanker	17,158	27,223	D-14,000	75
Sealift China Sea	Tanker	17,134	25,200	D-14,000	75
Sealift Indian Ocean	Tanker	17,134	27,500	D-14,000	75
Sealift Mediterranean	Tanker	17,158	27,717	D-14,000	74
Sealift Pacific	Tanker	17,134	25,200	D-14,000	74
MATSON NAVIGATION COMPANY					
333 Market Street, San Francisco, CA 94105					
Haleakala	Container barge	3,562	4,500	—	84
Islander	Barge	3,403	4,834	—	63
Kauai	Container	23,800	22,539	T-32,000	80
Lurline	Container-RO/RO	23,477	21,321	T-30,000	73/82
Manukai	Container	23,800	27,100	T-32,000	70
Manulani	Container	23,800	27,100	T-32,000	70
Matsonia	Container-RO/RO	21,784	24,252	T-30,000	73/87
Maui	Container	23,800	27,100	T-32,000	78
Maunalei	Container	17,500	17,900	T- 9,900	44/65
Mauna Loa	Container barge	3,562	4,500	—	84
MOBIL OIL CORPORATION					
150 East 42nd Street, New York, NY 10017					
Mobil Arctic	Tanker	57,834	124,999	T-30,000	72
Mobil Meridian	Tanker	28,218	49,298	T-15,000	61
Syosset	Tanker	18,348	30,293	T-14,850	58
MORMAC MARINE TRANSPORT INC.					
Three Landmark Square, Stamford, Conn. 06901					
Mormacsky	Tanker	22,354	39,232	T-15,000	77
Mormacstar	Tanker	22,354	39,232	T-15,000	75
Mormacsun	Tanker	22,354	39,232	T-15,000	76
OCEAN SHIPHOLDINGS, INC.					
13105 Northwest Freeway, Suite 700, Houston, TX 77040					
Gus W. Darnell	Tanker	19,037	30,127	D-15,300	85
Lawrence H. Gianella	Tanker	19,037	30,127	D-15,300	86
Paul Buck	Tanker	19,037	30,127	D-15,300	85
Samuel L. Cobb	Tanker	19,037	30,127	D-15,300	85

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
OMI CORPORATION					
280 Park Avenue, New York, NY 10017					
Courier	Product tanker	21,572	35,100	D-14,000	77
OMI Champion	Product tanker	20,858	37,874	T-15,000	69
OMI Charger	Product tanker	20,877	37,807	T-15,000	69
OMI Columbia	Crude tanker	75,549	136,507	D-27,300	74/83
OMI Dynachem	Chemical tanker	32,328	50,852	D-14,100	81
OMI Hudson	Chemical tanker	32,328	50,852	D-14,100	81
OMI Leader	Product tanker	20,877	37,807	T-15,000	69
OMI Missouri	Bulk carrier	26,800	48,890	D-11,100	83
OMI Sacramento	Bulk carrier	26,800	48,890	D-11,100	83
OMI Wabash	Product tanker	20,884	37,853	T-15,000	69
OMI Willamette	Product tanker	20,884	37,853	T-15,000	69
Patriot	Product tanker	21,572	35,100	D-14,000	76
Ranger	Product tanker	21,572	35,100	D-14,000	76
Rover	Product tanker	21,572	35,100	D-14,000	77
OSG BULK SHIPS					
511 Fifth Avenue, New York, NY 10017					
Overseas Alaska	Tanker	28,250	62,000	T-20,000	70
Overseas Alice	Tanker	20,900	37,800	T-15,000	68
Overseas Arctic	Tanker	28,250	62,000	T-20,000	71
Overseas Boston	Tanker	61,200	121,150	D-26,000	74
Overseas Chicago	Tanker	44,850	90,600	T-24,500	77
Overseas Harriette	Bulk	14,300	25,550	D-11,200	78
Overseas Joyce	PCC	48,017	16,141	D-13,150	87
Overseas Juneau	Tanker	57,700	120,500	T-25,000	73
Overseas Marilyn	Bulk	14,300	25,500	D-11,200	78
Overseas Natalie	Tanker	35,596	68,900	T-23,000	61
Overseas New York	Tanker	44,850	90,400	T-24,500	77
Overseas Ohio	Tanker	44,850	90,550	T-24,500	77
Overseas Valdez	Tanker	20,900	37,800	T-15,000	68
Overseas Vivian	Tanker	20,900	37,800	T-15,000	69
Overseas Washington	Tanker	44,900	90,500	T-24,500	78

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
PACIFIC-GULF MARINE, INC.					
P.O. Box 6479, 3010 Gen. DeGaulle Drive, Suite 100, New Orleans, LA 70114					
American Cormorant	Semi-Sub	10,195	55,092	D-19,700	75/82
American Eagle	RO/RO	15,632	20,972	D-21,600	81
Moku Oahu/HSTC 1	ITB	17,286	37,107	D-14,000	81
Nosac Ranger	RO/RO	17,646	16,568	D-20,500	78
Sugar Islander	Bulk carrier	15,544	29,984	D-12,000	73
THE PHOENIX COMPANIES					
801 Travis Street, Suite 2000, Houston, TX 77002					
Golden Phoenix	Bulk/Oil	78,164	129,017	T-17,000	79
Jade Phoenix	Bulk/Oil	78,164	129,017	T-17,000	80
PUERTO RICO MARINE MANAGEMENT, INC.					
P.O. Box 3170, Raritan Plaza I, Edison, NJ 08818					
Atlantic Spirit	RO/RO	17,525	16,144	T-30,000	76/84
Carolina	Container	19,127	20,100	T-26,000	71
Caguas	RO/RO	17,513	16,943	T-30,000	74
Fortaleza	RO/RO	15,135	13,969	T-32,000	72
Guayama	Container	18,877	20,600	T-26,000	69
Humacao	Container	18,765	22,200	T-26,000	68
Mayaguez	Container	18,878	20,600	T-26,000	68
Nuevo San Juan	Container	19,127	20,000	T-26,000	70
Ponce	RO/RO	17,513	16,943	T-32,000	68/81
Puerto Rico	RO/RO	14,770	14,090	T-30,000	75
RAINBOW NAVIGATION, INC.					
15355 Vantage Parkway West, Suite 200, Houston, TX 77032					
Rainbow Hope	Con/Breakbulk	983	2,000	D-3,000	84

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
SABINE TOWING & TRANSPORTATION COMPANY					
P.O. Box 1528, Groves, TX 77619					
Colorado	Tanker	16,822	30,590	T- 7,240	44/72
Concho	Tanker	18,682	32,741	T- 7,000	45
Guadalupe	Tanker	17,985	30,369	T- 7,240	45/78
Neches	Tanker	20,066	34,930	T- 7,240	43
Pecos	Tanker	17,291	28,749	T-13,750	50
Sabine	Tanker	20,020	33,010	T-15,000	57
SEA-LAND SERVICE, INC.					
379 Thornall Street, Edison, NJ 08837					
Achiever	Container	57,075	58,892	D-28,000	84
Adventurer	Container	17,736	15,298	D-17,400	63/80
Anchorage	Container	20,965	20,833	D-22,540	87
Atlantic	Container	57,075	58,892	D-28,000	85
Challenger	Container	19,168	25,508	T-27,300	68
Commitment	Container	57,075	58,992	D-28,000	85
Consumer	Container	23,764	25,206	T-32,000	73/74
Crusader	Container	18,389	24,938	T-27,300	69
Defender	Container	30,086	29,861	D-30,150	80/85
Developer	Container	30,086	29,818	D-30,150	80/85
Discovery	Container	18,876	20,269	T-27,300	68
Endurance	Container	30,086	29,738	D-30,150	80/85
Enterprise	Container	30,686	30,982	T-28,500	80/83
Expedition	Container	13,000	21,694	T-28,500	73/81
Explorer	Container	30,086	29,811	D-30,150	80/85
Express	Container	30,086	29,943	D-30,150	80/85
Freedom	Container	30,086	29,831	D-30,150	80/85
Galveston Bay	Container	57,075	58,992	D-28,000	85
Hawaii	Container	13,000	21,564	T-28,500	73/81
Independence	Container	30,086	29,790	D-30,150	80/85
Innovator	Container	30,086	29,862	D-30,150	80/85
Integrity	Container	57,075	58,992	D-28,000	84
Kodiak	Container	20,965	20,833	D-22,540	87
Leader	Container	17,736	15,298	D-17,400	62/80
Liberator	Container	30,086	29,764	D-30,150	80/85
Mariner	Container	30,086	29,903	D-30,150	80/85
Navigator	Container	30,990	30,610	T-28,500	72/84
Nedlloyd Holland	Container	57,075	58,992	D-28,000	84
Nedlloyd Hudson	Container	57,075	58,992	D-28,000	84
Newark Bay	Container	57,075	58,992	D-28,000	84
Pacer	Container	17,736	15,298	D-17,400	63/80
Pacific	Container	30,685	30,776	T-28,500	79/83
Patriot	Container	30,086	29,748	D-30,150	80/85
Performance	Container	57,075	58,992	D-28,000	85
Pioneer	Container	17,736	15,298	D-17,400	62/80
Producer	Container	23,764	25,206	D-32,000	74
Quality	Container	57,075	58,992	D-28,000	85
Raleigh Bay	Container	57,075	58,992	D-28,000	85
Tacoma	Container	20,965	20,833	D-22,540	87
Trader	Container	30,990	31,158	T-28,500	73/83
Value	Container	57,075	58,992	D-28,000	85
Voyager	Container	30,086	29,911	D-30,150	80/85
SEALIFT, INC.					
68 West Main Street, Oyster Bay, NY 11771					
Bravado	Tanker	2,110	4,400	D- 2,880	77
Cleveland	Cargo	16,000	22,200	T-24,000	69
Inger	Bulker	14,192	23,977	T- 7,240	45/62
Noble Star	Multi-Bulk	15,922	18,230	D-13,100	77
SUN REFINING & MARKETING INC., MARINE OPERATIONS					
P.O. Box 2224, Aston, PA 19014					
America Sun	Tanker	37,300	80,700	T-24,000	69
Eastern Sun	Tanker	1,571	3,396	D- 3,000	85
New York Sun	Tanker	19,500	34,400	D-14,200	80
Northern Sun	Tanker	1,533	2,654	D- 1,900	80
Philadelphia Sun	Tanker	19,500	34,400	D-14,200	81
Prince Wm. Sound	Tanker	60,084	123,936	T-30,000	75
Texas Sun	Tanker	26,300	53,453	T-18,500	60
Tropic Sun	Tanker	20,177	34,700	T-13,600	57
TEXACO MARINE SERVICES INC.					
P.O. Box 1028, Port Arthur, TX 77641					
Texaco California	Tanker	23,460	39,249	T-15,000	54/73
Texaco Connecticut	Tanker	23,459	39,366	T-15,000	53/71
Texaco Florida	Tanker	23,459	41,948	T-15,000	56/72
Texaco Georgia	Tanker	16,514	26,333	T-15,000	64
Texaco Massachusetts	Tanker	16,515	26,547	T-15,000	63
Texaco Minnesota	Tanker	12,171	19,683	TE-7,000	43/64
Texaco Mississippi	Tanker	15,688	26,588	TE-7,000	44/64
Texaco Montana	Tanker	16,584	26,547	T-15,000	65
Texaco New York	Tanker	23,461	39,363	T-15,000	53/72
Texaco Rhode Island	Tanker	16,584	26,547	T-15,000	64
TOSCO CORPORATION					
P.O. Box 2401, 2401 Colorado Avenue, Suite 200, Santa Monica, CA 90406					
Lion of California	Tanker	10,473	16,692	T-7,000	54
TOPGALLANT GROUP, INC.					
510 Thornall Street, Edison, NJ 08837-2204					
Chesapeake Bay	Container	30,642	36,004	D-19,740	85
Delaware Bay	Container	30,642	36,004	D-19,740	85
TOTEM OCEAN TRAILER EXPRESS, INC.					
500 Alexander Ave., Tacoma, WA 98421					
Great Land	RO/RO	17,527	18,115	T-30,000	75
Westward Venture	RO/RO	17,527	18,411	T-30,000	77
TRINIDAD CORPORATION					
8182 Maryland Ave., St. Louis, MO 63117					
Admiralty Bay	Tanker	37,800	80,773	T-24,000	71
Aspen	Tanker	37,800	80,569	T-24,000	71
Glacier Bay	Tanker	38,400	80,968	T-24,000	70
UNION OIL COMPANY OF CALIFORNIA					
911 Wilshire Boulevard, Los Angeles, CA 90017					
Blue Ridge	Tanker	21,359	42,268	T-13,000	81
VESSEL CHARTERS, INC.					
One World Trade Center, Suite 2511, New York, NY 10048					
Santa Adela	Cargo	11,039	13,695	T-18,750	65
Santa Juana	Cargo	11,039	13,695	T-18,750	65
Santa Victoria	Cargo	8,542	13,074	T-24,000	69
WATERMAN STEAMSHIP CORPORATION					
120 Wall Street, New York, NY 10005					
Major Stephen W. Pless	RO/RO-container	29,091	25,073	T-30,000	83/85
Pfc. Eugene A. Obregon	RO/RO-container	29,091	25,073	T-30,000	83/84
Robert E. Lee	LASH	32,269	40,921	T-32,000	74
Sam Houston	LASH	32,269	40,921	T-32,000	74
Sgt. Matej Kocak	RO/RO-container	29,091	25,073	T-30,000	83/84
Stonewall Jackson	LASH	32,269	40,921	T-32,000	74
WEST COAST SHIPPING COMPANY					
911 Wilshire Blvd., Los Angeles, CA 90017					
Coast Range	Tanker	21,257	39,990	T-13,000	81
Cornucopia	LPG/Tanker	21,688	21,717	T-13,600	58/78
Sansinena II	Tanker	35,634	71,459	T-18,200	71
Sierra Madre	Tanker	21,357	39,990	T-13,600	81

U.S. Parent Company Foreign Flag Merchant Ships
As of July 1, 1988

SUMMARY

	TOTAL			FREIGHTERS*			BULK & OIL CARRIERS			TANKERS		
Flag of	No. Ships	Gross Tons	Deadweight Tons	No. Ships	Gross Tons	Deadweight Tons	No. Ships	Gross Tons	Deadweight Tons	No. Ships	Gross Tons	Deadweight Tons
Registry	341	16,885,991	33,079,564	53	617,656	526,869	42	1,247,403	2,425,560	246	15,020,932	30,127,135
Liberia	172	8,604,793	17,141,659	18	310,179	288,351	20	594,301	1,230,618	134	7,700,313	15,622,690
United Kingdom	36	2,613,183	5,198,749				4	46,620	66,797	32	2,566,563	5,131,952
Panama	53	1,908,431	3,599,371	26	239,705	167,007	8	102,065	169,688	19	1,566,661	3,262,676
Bahamas	23	1,521,064	2,906,434				1	71,208	128,320	22	1,449,856	2,778,114
France	8	751,803	1,489,211							8	751,803	1,489,211
Saudi Arabia	4	557,096	1,110,130							4	557,096	1,110,130
British Colonies	11	398,959	723,663	4	26,052	23,974	7	372,907	699,689			
Singapore	8	120,091	206,641	2	20,763	26,202				6	99,328	180,439
Australia	3	126,409	200,512							3	126,409	200,512
Argentina	8	92,010	167,098							8	92,010	167,098
Netherlands	2	60,302	130,448				2	60,302	130,448			
Norway	4	66,197	113,303							4	66,197	113,303
South Africa	1	18,939	31,102							1	18,939	31,102
Honduras	3	20,957	21,335	3	20,957	21,335						
Canada	2	13,583	16,653							2	13,583	16,653
West Germany	1	6,444	13,339							1	6,444	13,339
Finland	1	4,370	6,954							1	4,370	6,954
Japan	1	1,360	2,962							1	1,360	2,962

*Includes ten passenger ships.
Source: Maritime Administration

U.S. PARENT COMPANY FOREIGN FLAG MERCHANT SHIPS UNDER CONSTRUCTION AND/OR ON ORDER

As of July 1, 1988

SUMMARY

Flag of Registry	TOTAL No. Ships	TOTAL Gross Tons	TOTAL Deadweight Tons	FREIGHTERS No. Ships	FREIGHTERS Gross Tons	FREIGHTERS Deadweight Tons	BULK & OIL CARRIERS No. Ships	BULK & OIL CARRIERS Gross Tons	BULK & OIL CARRIERS Deadweight Tons	TANKERS No. Ships	TANKERS Gross Tons	TANKERS Deadweight Tons
34	1,282,900	2,453,908	11	175,800	110,000	5	254,200	511,900	18	852,900	1,832,008
Australia	1	16,000	31,750							1	16,000	31,750
Bahamas	2	91,900	213,958							2	91,900	213,958
Italy	2	18,800	23,600	2	18,800	23,600						
Liberia	19	924,200	1,952,300				4	179,200	366,000	15	745,000	1,586,300
Panama	10	232,000	232,300	9	157,000	86,400	1	75,000	145,900			

U.S. Parent Company Foreign Flag Merchant Ships Under Construction and/or On Order

As of July 1, 1988

U.S. Parent Company / Direct Owner / Hull No. and/or Name	No. Ships	Class	Where Building	Gross Tons	Deadweight Tons	Flag of Registry	Due Date
Grand Total:	**34**			**1,282,900**	**2,453,908**		
Amoco Corporation							
Amoco Transport Co.	**2**			**100,000**	**170,000**		
N2008 (Mitsubishi)		Tanker	Japan	50,000	85,000	Liberia	12/88
N2009 (Mitsubishi)		Tanker	Japan	50,000	85,000	Liberia	11/88
Carnival Cruise Lines Inc.	**3**			**105,000**	**21,000**		
479 - (Wartsila Marine) FANTASY		Passenger	Finland	35,000	7,000	Panama	10/89
1299 (Wartsila Marine) ECSTACY		Passenger	Finland	35,000	7,000	Panama	00/90
1300 (Wartsila Marine) SENSATION		Passenger	Finland	35,000	7,000	Panama	00/91
Chemical Tankers Inc.	**2**			**7,400**	**17,600**		
2585 (Kurushima Dkyd.)		Tanker	Japan	3,700	8,800	Liberia	03/89
2586 (Kurushima Dkyd.)		Tanker	Japan	3,700	8,800	Liberia	05/89
Chevron Corporation							
Chevron Transport Co.	**1**			**33,900**	**78,958**		
N1998 - R. HAL DEAN (Mitsubishi)		Tanker	Japan	33,900	78,958	Bahamas	09/88
Consolidated Maritime	**1**			**58,000**	**135,000**		
5024 (Daewoo Sb.)		Tanker	South Korea	58,000	135,000	Bahamas	06/88
Del-Monte Corporation							
Del-Monte Fresh Fruit Co.	**6**			**52,000**	**65,400**		
V270 - (Ast. Espanoles)		Reefer	Spain	8,000	10,000	Panama	05/89
V271 - (Ast. Espanoles)		Reefer	Spain	8,000	10,000	Panama	06/89
V272 - (Ast. Espanoles)		Reefer	Spain	8,000	10,000	Panama	07/89
V273 - (Ast. Espanoles)		Reefer	Spain	8,000	10,000	Panama	08/89
N50 - (Ast. Espanoles)		Reefer	Spain	10,000	12,700	Panama	07/89
N51 - (Ast. Espanoles)		Reefer	Spain	10,000	12,700	Panama	09/89
Mobil Oil Corporation							
Mobil Oil Australia Ltd.	**1**			**16,000**	**31,750**		
392 - (Brod. Uljanik)		Tanker	Yugoslavia	16,000	31,750	Australia	03/90
OMI Corporation	**4**			**300,000**	**583,700**		
N2010 (Mitsubishi)		Tanker	Japan	75,000	146,000	Liberia	07/89
N2021 (Mitsubishi)		Tanker	Japan	75,000	146,000	Liberia	09/89
(Mitsubishi)		Tanker	Japan	75,000	145,900	Panama	03/90
(Mitsubishi)		Tanker	Japan	75,000	145,900	Liberia	03/91
Overseas Shipholding Group Inc.	**12**			**591,800**	**1,326,900**		
608 (Hyundai H.I.) URANUS		Tanker	South Korea	17,000	39,800	Liberia	02/89
609 (Hyundai H.I.)		Tanker	South Korea	17,000	39,700	Liberia	03/89
610 (Hyundai H.I.)		Tanker	South Korea	17,000	39,700	Liberia	00/89
611 (Hyundai H.I.)		Tanker	South Korea	17,000	39,700	Liberia	00/89
618 (Hyundai H.I.)		Bulk/Ore	South Korea	29,600	63,000	Liberia	00/89
619 (Hyundai H.I.)		Bulk/Ore	South Korea	29,600	63,000	Liberia	00/89
620 (Hyundai H.I.)		Tanker	South Korea	62,300	145,000	Liberia	00/89
621 (Hyundai H.I.)		Tanker	South Korea	62,300	145,000	Liberia	00/89
640 (Hyundai H.I.)		Bulk/Ore	South Korea	60,000	120,000	Liberia	00/90
641 (Hyundai H.I.)		Bulk/Ore	South Korea	60,000	120,000	Liberia	00/90
A4837 (Hitachi Zosen)		Tanker	Japan	110,000	256,000	Liberia	03/89
A4838 (Hitachi Zosen)		Tanker	Japan	110,000	256,000	Liberia	05/89
United Brands Company							
Dole Fresh Fruit	**2**			**18,800**	**23,600**		
5829 (Fincantieri)		Container	Italy	9,400	11,800	Italy	10/88
5830 (Fincantieri)		Container	Italy	9,400	11,800	Italy	12/88

U.S. PARENT COMPANY REPORT OF FOREIGN FLAG MERCHANT SHIPS
As Of July 1, 1988

Parent Company / Direct Owner	No. Ships	Name of Ship	Class	Where Built	Year Built	Gross Tons	Dwt Tons	Flag of Registry
Grand Total	**341**					**16,885,991**	**33,079,564**	
Alcoa Steamship Co. Inc.	**5**					**105,702**	**172,522**	
Lib-Ore SS Co. Inc.	3					47,752	77,427	
		MARLIN	Ore/Bulk/Oil	Japan	1977	9,402	15,000	Liberia
		SENTINEL II	Bulk	Japan	1982	28,948	47,503	Liberia
		TARPON	Ore/Bulk/Oil	Japan	1977	9,402	14,924	Liberia
Pan Ore Transportation Inc.	2					57,950	95,095	
		PATHFINDER II	Bulk	Japan	1982	28,975	47,560	Panama
		PROSPECTOR II	Bulk	Japan	1982	28,975	47,535	Panama
AMAX Inc.	2					**67,876**	**232,636**	
Merchants & Miners Transport Inc.		BROCKMAN	Ore Carrier	Japan	1974	33,938	116,342	Liberia
		MARRA MAMBA	Ore Carrier	Japan	1975	33,938	116,294	Liberia
Amerada Hess Corp.	3					**361,598**	**777,936**	
Seal Island Shipping Corp.		SEAL ISLAND	Tanker	Sweden	1973	114,710	259,042	Liberia
Serpentsea Corp.		MT. CABRITE	Tanker	Sweden	1971	123,444	259,447	Liberia
Swansea Corp.		SAINT LUCIA	Tanker	Sweden	1972	123,444	259,447	Liberia
Amoco Corporation	**11**					**543,213**	**1,048,119**	
Amoco Ocean Tanker Co.	4					148,610	246,012	
		OCEAN CHALLENGER	Tanker	Japan	1987	24,584	39,729	Liberia
		OCEAN CONQUEROR	Tanker	Japan	1987	24,584	40,000	Liberia
		OCEAN EXPLORER	Tanker	Japan	1988	49,279	85,000	Liberia
		OCEAN VICTOR	Tanker	Japan	1981	50,163	81,283	Liberia
Amoco Transport Co.	7					394,603	802,107	
		BALTIMORE SEA	Tanker	Japan	1969	38,715	79,314	Liberia

Parent Company Direct Owner	No. Ships	Name of Ship	Class	Where Built	Year Built	Gross Tons	Dwt Tons	Flag of Registry
		OCEAN SEAFARER	Tanker	Japan	1974	126,895	258,054	Liberia
		OCEAN VOYAGER	Tanker	Japan	1973	35,315	72,347	Liberia
		SAVANNAH SEA	Tanker	Japan	1970	39,246	78,680	Liberia
		TEXAS CITY SEA	Tanker	Japan	1970	39,246	78,696	Liberia
		WHITING SEA	Tanker	Japan	1975	76,472	155,703	Liberia
		YORKTOWN SEA	Tanker	Japan	1969	38,714	79,313	Liberia
Bahamas Line SA	**7**					**26,716**	**42,227**	
Atlantic Express Corp.		ATLANTIC EXPRESS	Bulk	Norway	1985	15,284	23,500	Panama
Carib Trader Corp.		CARIB TRADER	Freighter	Holland	1975	1,560	3,001	Panama
Florida Star Corp.		FLORIDA STAR	Freighter	Spain	1976	1,600	3,000	Panama
Miami Super Corp.		MIAMI SUPER	Freighter	Spain	1976	1,600	3,000	Panama
Ocean Fleet Corp.		OCEAN FLEET	Freighter	Holland	1975	1,550	3,016	Panama
Rio Haina Corp.		RIO HAINA	Freighter	So. Korea	1988	2,566	3,382	Panama
Rio Miami		RIO MIAMI	Freighter	So. Korea	1988	2,556	3,328	Panama
Bank of California N.A. (Trustee)	**5**					**591,078**	**1,341,581**	
		C. W. KITTO	Tanker	Japan	1974	118,334	268,334	Liberia
		CHARLES PIGOTT	Tanker	Japan	1973	118,221	268,373	Liberia
		CHEVRON COPENHAGEN	Tanker	Japan	1974	118,179	268,226	Liberia
		CHEVRON FELUY	Tanker	Japan	1973	118,197	268,418	Liberia
		CHEVRON NAGASAKI	Tanker	Japan	1974	118,147	268,230	Liberia
CSX Corporation	**7**					**65,514**	**88,065**	
Marine RO-RO Feedships Corp.	2					17,308	24,168	
		SANDYS BAY	Container	Japan	1984	8,654	12,085	Liberia
		SOMERS BAY	Container	Japan	1983	8,654	12,083	Liberia
Sandy Steamship Co. SA	1	SEAWARD BAY	Container	Japan	1983	8,423	12,066	Panama
Shelly Bay Ltd.	1	SHELLY BAY	Container	Japan	1983	8,635	12,067	Panama
World Feedship Inc.	3					31,148	39,764	
		WORLD LYNX	Container	Japan	1979	10,385	13,562	Liberia
		WORLD LION	Container	Japan	1978	10,381	13,101	Singapore
		WORLD TIGER	Container	Japan	1978	10,382	13,101	Singapore
Carnival Cruise Lines Inc.	**7**					**227,341**	**61,765**	
AVL Maritime Inc.		TROPICALE	Passenger	Denmark	1981	22,919	6,654	Liberia
Carnival Cruise Lines Inc.		MARDI GRAS	Passenger	U.K.	1961	18,261	9,551	Panama
Celebration Cruises Inc.		CELEBRATION	Passenger	Sweden	1986	47,262	6,405	Liberia
Fairweather Int'l Corp.		CARNIVALE	Passenger	Scotland	1956	18,953	8,912	Panama
Festivale Maritime Corp.		FESTIVALE	Passenger	Scotland	1961	26,632	16,604	Panama
Jubilee Cruises Inc.		JUBILEE	Passenger	Sweden	1986	47,262	6,453	Liberia
Sunbury Assets Inc.		HOLIDAY	Passenger	Denmark	1985	46,052	7,186	Panama
Castle and Cooke Inc.	**4**					**20,820**	**23,282**	
Mahele Reefer Ltd.		LIMON	Reefer	Norway	1968	6,709	7,244	Liberia
		TROPICAL QUEEN	Reefer	W. Germany	1968	4,662	5,270	Liberia
		TROPICAL SEA	Reefer	W. Germany	1969	4,787	5,384	Liberia
		TROPICAL SUN	Reefer	W. Germany	1968	4,662	5,384	Liberia
Chagents Inc.	**2**					**22,124**	**38,561**	
Sarah Linden Shipping L.P.		SARAH	Bulk	Japan	1971	11,055	19,544	Liberia
Rachael V Shipping L.P.		RACHEL V	Freighter	Spain	1972	11,069	19,017	Liberia
Chevron Corporation	**27**					**2,185,110**	**4,465,819**	
Chevron Tankers (Bermuda) Ltd.	3					522,410	1,094,086	
		CHEVRON EDINBURGH	Tanker	Japan	1974	118,179	268,333	U.K.
		CHEVRON NORTH AMERICA	Tanker	Japan	1976	207,897	412,595	U.K.
		CHEVRON SOUTH AMERICA	Tanker	Japan	1976	196,334	413,158	U.K.
Chevron Transport Corp.	**22**					**1,462,835**	**2,951,923**	
		ALDEN W. CLAUSEN	Tanker	Japan	1981	21,582	35,587	Liberia
		CARLA A. HILLS	Tanker	Japan	1981	21,582	35,596	Liberia
		CHARLES B. RENFREW	Tanker	Japan	1988	44,900	68,010	Bahamas
		CHEVRON ANTWERP	Tanker	Japan	1975	122,627	276,796	Liberia
		CHEVRON BURNABY	Tanker	Japan	1975	122,627	276,775	Liberia
		CHEVRON EQUATOR	Tanker	U.K.	1978	56,337	112,745	Liberia
		CHEVRON HORIZON	Tanker	Japan	1974	60,491	123,969	Liberia
		CHEVRON LONDON	Tanker	Sweden	1972	96,523	149,494	Liberia
		CHEVRON METEOR	Tanker	Japan	1975	60,886	127,505	Liberia
		CHEVRON PACIFIC	Tanker	Japan	1983	21,583	35,596	Liberia
		CHEVRON PERTH	Tanker	Japan	1975	122,627	276,837	Liberia
		CHEVRON SKY	Tanker	Japan	1976	77,588	154,932	Liberia
		CHEVRON STAR	Tanker	Japan	1977	76,547	156,304	Liberia
		CHEVRON STREAM	Tanker	Japan	1975	61,372	130,348	Liberia
		CHEVRON SUN	Tanker	Japan	1977	76,547	156,304	Liberia
		D. L. BOWER	Tanker	Sweden	1970	71,080	152,383	Liberia
		DAVID PACKARD	Tanker	Japan	1977	196,334	413,098	Liberia
		GEORGE H. WEYERHAEUSER	Tanker	Japan	1981	21,582	35,904	Bahamas
		KENNETH E. HILL	Tanker	Japan	1979	43,428	81,273	Bahamas
		KENNETH T. DERR	Tanker	Japan	1982	21,582	35,587	Bahamas
		SAMUEL H. ARMACOST	Tanker	Japan	1982	21,582	35,607	Bahamas
		WILLIAM E. MUSSMAN	Tanker	Japan	1979	43,428	81,273	Liberia
Chevron International Ltd.	2					199,865	419,810	
		AFRAN OCEAN	Tanker	Spain	1974	151,220	323,094	Liberia
		AFRAN ZENITH	Tanker	Spain	1972	48,645	96,716	Liberia
Citizens Trust Co. (Trustee)	**2**					**38,550**	**64,460**	
		FELANIA	Tanker	Norway	1975	19,275	32,230	Liberia
		FULGUR	Tanker	Norway	1974	19,275	32,230	Liberia
Connecticut Bank & Trust (Trustee)	**2**					**240,041**	**550,824**	
		EUROPE	Tanker	Japan	1975	122,395	276,050	Liberia
		VENTURE INDEPENDENCE	Tanker	Japan	1976	117,646	274,774	Liberia
Del Monte Corp.	**6**					**31,025**	**31,178**	
Del Monte Fresh Fruit Int'l Inc.		BANANA CARRIER	Reefer	Italy	1967	6,955	5,761	Panama
		BANANA TRADER	Reefer	Italy	1967	5,493	5,667	Panama
		BANANERA	Reefer	Italy	1964	5,170	3,766	Panama

Parent Company Direct Owner	No. Ships	Name of Ship	Class	Where Built	Year Built	Gross Tons	Dwt Tons	Flag of Registry
		CORAL REEFER	Reefer	Norway	1968	4,211	6,061	Panama
		ISADORE HECHT	Reefer	Norway	1964	4,128	6,198	Panama
		LORD CARIBICO	Reefer	Italy	1964	5,068	3,725	Panama
Equili Company and Equitable Life	**1**					**42,175**	**79,996**	
		KENTUCKY	Tanker	Japan	1980	42,175	79,996	Panama
Equili Company II	**1**					**42,175**	**81,279**	
U.S. Trust Co. of N.Y. (Trustee)		WEST VIRGINIA	Tanker	Japan	1981	42,175	81,279	Panama
Equitable Life Assurance Soc.	**2**					**142,160**	**304,808**	
		H. J. HAYNES	Tanker	Sweden	1970	71,080	152,404	Liberia
		JOHN A. McCONE	Tanker	Sweden	1969	71,080	152,404	Liberia
Exxon Corporation	**63**					**3,374,970**	**6,651,985**	
A/S Norske Esso	1	ESSO SLANGEN	Tanker	Sweden	1968	11,059	18,797	Norway
Esso Eastern Marine Ltd.	5					941,712	1,908,923	
		ESSO ATLANTIC	Tanker	Japan	1977	259,532	516,895	U.K.
		ESSO GENEVA	Tanker	Japan	1975	150,622	302,382	U.K.
		ESSO HAWAII	Tanker	Japan	1975	146,309	278,801	U.K.
		ESSO KAWASAKI	Tanker	Japan	1974	150,622	302,577	U.K.
		ESSO PACIFIC	Tanker	Japan	1977	234,627	508,268	U.K.
Esso Exploration & Prod. U.K.	2					106,322	198,949	
		ESSO ABERDEEN	Tanker	Japan	1967	58,273	112,834	U.K.
		ESSO WARWICKSHIRE	Tanker	W. Germany	1962	48,049	86,115	U.K.
Esso Int'l Shipping Bahamas Ltd.	28					1,583,263	3,102,923	
		ESSO AFRICA	Tanker	France	1975	137,166	270,133	Bahamas
		ESSO ALBANY	Tanker	Japan	1973	12,806	23,694	Liberia
		ESSO BAHAMAS	Tanker	W. Germany	1974	126,192	256,695	Bahamas
		ESSO BANGKOK	Tanker	Japan	1968	12,994	19,997	Liberia
		ESSO BAYONNE	Tanker	Japan	1974	17,211	29,634	Liberia
		ESSO BAYWAY	Tanker	Japan	1978	27,439	50,915	Liberia
		ESSO BERMUDA	Tanker	W. Germany	1974	126,192	256,705	Bahamas
		ESSO BOMBAY	Tanker	Japan	1968	12,994	21,113	Bahamas
		ESSO CARIBBEAN	Tanker	Japan	1976	208,060	449,934	U.K.
		ESSO CORAL GABLES	Tanker	Japan	1975	19,568	38,691	Liberia
		ESSO FREEPORT	Tanker	W. Germany	1974	126,943	260,831	Bahamas
		ESSO GIPPSLAND	Tanker	Australia	1972	15,579	24,102	Australia
		ESSO GUATEMALA	Tanker	Japan	1973	17,218	29,364	Liberia
		ESSO HONOLULU	Tanker	Japan	1974	146,309	278,922	Bahamas
		ESSO JURONG	Tanker	Japan	1981	3,266	5,200	Singapore
		ESSO KAOHSIUNG	Tanker	Taiwan	1983	32,918	88,649	Bahamas
		ESSO MEDITERRANEAN	Tanker	Japan	1976	202,798	450,390	Liberia
		ESSO MELBOURNE	Tanker	Japan	1974	17,211	29,591	Singapore
		ESSO MEXICO	Tanker	Taiwan	1982	45,799	87,170	Liberia
		ESSO NASSAU	Tanker	Taiwan	1982	57,858	88,429	Bahamas
		ESSO ORIENT	Tanker	W. Germany	1974	50,853	99,900	Singapore
		ESSO PALM BEACH	Tanker	Japan	1978	27,439	50,801	Liberia
		ESSO PORT DICKSON	Tanker	Japan	1969	12,994	21,117	Singapore
		ESSO PROVIDENCE	Tanker	Japan	1974	13,503	22,711	Liberia
		ESSO PUERTO RICO	Tanker	Japan	1975	21,961	38,721	Bahamas
		ESSO SAINT PETERSBURG	Tanker	Japan	1974	13,503	22,691	Liberia
		ESSO WESTERNPORT	LPG Tanker	France	1977	63,495	65,717	Bahamas
		ESSO YOKOHAMA	Tanker	Japan	1969	12,994	21,106	Singapore
Esso Petroleum Co. Ltd.	12					206,444	394,457	
		ESSO AVON	Tanker	Holland	1981	1,599	3,134	U.K.
		ESSO CLYDE	Tanker	U.K.	1972	12,317	20,776	U.K.
		ESSO DEMETIA	Tanker	Sweden	1973	125,293	258,979	U.K.
		ESSO FAWLEY	Tanker	Sweden	1967	11,064	18,377	U.K.
		ESSO INVERNESS	Tanker	U.K.	1971	2,178	3,419	U.K.
		ESSO MERSEY	Tanker	U.K.	1972	12,323	20,510	U.K.
		ESSO MILFORD HAVEN	Tanker	Sweden	1967	10,902	18,377	U.K.
		ESSO PENZANCE	Tanker	U.K.	1971	2,178	3,402	U.K.
		ESSO PLYMOUTH	Tanker	U.K.	1980	1,421	2,162	U.K.
		ESSO SEVERN	Tanker	U.K.	1975	12,316	20,776	U.K.
		ESSO TEES	Tanker	Japan	1970	12,683	21,116	U.K.
		ESSO TENBY	Tanker	U.K.	1970	2,170	3,429	U.K.
Esso S.A. Petrolera Argentina	8					92,010	167,098	
		ESSO BAHIA BLANCA	Tanker	Japan	1974	12,806	22,861	Argentina
		ESSO FORMOSA	Tanker	Argentina	1970	1,944	4,684	Argentina
		ESSO PARANA	Tanker	Argentina	1960	1,007	2,568	Argentina
		ESSO RIO GRANDE	Tanker	Argentina	1982	11,503	15,450	Argentina
		ESSO RIO NEGRO	Tanker	Japan	1975	19,568	38,711	Argentina
		ESSO SAN LORENZO	Tanker	Argentina	1970	1,944	4,850	Argentina
		ESSO SAN SEBASTIAN	Tanker	Canada	1976	21,619	38,987	Argentina
		ESSO SANTA CRUZ	Tanker	Canada	1975	21,619	38,987	Argentina
Esso Senpaku K.K.	1	ESSO YOSHINO MARU	Tanker	Japan	1984	1,360	2,962	Japan
Esso Soc. Anon. Francaise	5					428,430	850,922	
		ESSO LANGUEDOC	Tanker	W. Germany	1973	126,186	256,699	France
		ESSO NORMANDIE	Tanker	France	1974	137,578	274,333	France
		ESSO PARENTIS	Tanker	Japan	1973	13,544	22,697	France
		ESSO PICARDIE	Tanker	France	1976	137,578	274,467	France
		ESSO PORT JEROME	Tanker	Japan	1972	13,544	22,726	France
o/y Esso A.B.	1	ESSO FINLANDIA	Chem. Tanker	Finland	1981	4,370	6,954	Finland
Fairfield-Maxwell Ltd.	**6**					**38,765**	**52,087**	
Eurus Maritime S.A.	5					27,318	39,357	
		GAFU	Freighter	Japan	1987	5,548	7,000	Panama
		KEIFU	Chem. Tanker	Japan	1987	7,178	12,742	Panama
		OAHU REX	Reefer	Japan	1986	4,693	6,553	Panama

Parent Company Direct Owner	No. Ships	Name of Ship	Class	Where Built	Year Built	Gross Tons	Dwt Tons	Flag of Registry
		OTARU REX	Reefer	Japan	1986	4,963	6,530	Panama
		SHOFU	Reefer	Japan	1986	4,936	6,532	Panama
Great American Lines Inc.	1	SUNBELT DIXIE	Car Carrier	Japan	1978	11,447	12,730	Liberia
Greyhound Corporation	**3**					**43,837**	**18,445**	
Compania Dep Vap Realma S.A.	1	DOLPHIN IV	Passenger	W. Germany	1956	8,854	4,036	Panama
Premier Cruise Line Ltd.	2					34,983	14,409	
		ROYALE	Passenger	Italy	1958	15,483	5,671	Panama
		STARSHIP OCEANIC	Passenger	Italy	1965	19,500	8,738	Panama
Halliburton Co.	**2**					**6,274**	**9,379**	
Halliburton Ltd.		HALLIBURTON 601	Cement Carrier	Japan	1971	4,906	7,168	Panama
		HALLIBURTON 603	Cement Carrier	Denmark	1968	1,368	2,211	Panama
International Controls Corp.	**1**					**2,887**	**2,251**	
Tropigas Carriers Inc.		FRED H. BILLUPS	LPG Tanker	Netherlands	1960	2,887	2,251	Liberia
International Shipholding Corp.	4					**104,806**	**152,664**	
Lash Carriers Inc.		RHINE FOREST	Barge Carrier	U.S.	1972	36,974	44,799	Liberia
		ACADIA FOREST	Barge Carrier	Japan	1969	33,231	49,835	Liberia
		ATLANTIC FOREST	Barge Carrier	Japan	1970	33,221	49,858	Liberia
		SPRUCE	Barge Carrier	Japan	1975	1,380	8,172	Liberia
Kaiser Cement Corporation	**1**					**3,771**	**5,939**	
Norman Shipping Inc.		NORMAN	Cement Carrier	Japan	1968	3,771	5,939	Panama
Keystone Shipping Co.	**2**					**35,047**	**60,635**	
Timbo Shipping Ltd.		SASSTOWN	Tanker	U.S.	1943	17,498	30,331	Liberia
		TIMBO	Tanker	U.S.	1943	17,549	30,304	Liberia
Levin Metals Corporation	**1**					**16,382**	**27,112**	
Hana Maui Corp.		HANA MAUI	Bulk	Japan	1971	16,382	27,112	Liberia
Loews Corporation	**7**					**1,216,188**	**2,493,158**	
Dale Operating Corp.		PARADISE	Tanker	Denmark	1975	160,423	315,697	Panama
Hill Operating Corp.		ORPHEUM	Tanker	Denmark	1975	160,423	315,695	Panama
T.T. Capitol Corp.		CAPITOL	Tanker	Japan	1976	188,634	388,119	Bahamas
T.T. Grand Corp.		GRAND	Tanker	Japan	1976	203,869	421,681	Liberia
T.T. Oriental Corp.		EMBASSY	Tanker	Japan	1976	209,788	413,553	Liberia
T.T. Paramount Corp.		PARAMOUNT	Tanker	Japan	1977	173,086	381,810	Panama
T.T. State Corp.		STATE	Tanker	U.K.	1975	119,965	256,603	Liberia
Manubank Leasing Corp.	**1**					**6,417**	**5,656**	
		RIO SULACO	Reefer	Poland	1978	6,417	5,656	Honduras
Manufacturers Hanover Trust (Trustee)	**5**					**197,598**	**399,278**	
		GEORGIA S.	Ore Carrier	Japan	1981	15,486	30,187	Panama
		TEXACO AFRICA	Tanker	Japan	1974	126,974	274,585	Panama
		TEXACO BALTIC	Tanker	Norway	1976	18,381	31,502	Norway
		TEXACO BERGEN	Tanker	Norway	1977	18,379	31,502	Norway
		TEXACO STOCKHOLM	Tanker	Norway	1977	18,378	31,502	Norway
Marine Transport Lines Inc.	**6**					**92,163**	**147,634**	
L & C II Ltd.	1	HARBEL CUTLASS	Freighter	Japan	1980	8,753	11,733	Liberia
L & C III Ltd.	1	HARBEL TAPPER	Freighter	Japan	1981	8,148	11,683	Liberia
Oswego Chemical Carriers Corp.	3					33,379	37,375	
		SAVONETTA	LPG Tanker	Netherlands	1964	9,942	10,947	Liberia
		M. P. GRACE	LPG Tanker	Japan	1967	13,483	15,506	Liberia
		WILLIAM R. GRACE	LPG Tanker	Netherlands	1964	9,954	10,922	Liberia
Oswego Erie Corp.	1	MARINE RENAISSANCE	Tanker	Spain	1983	41,883	86,843	France
Maru Shipping Co. Inc.	**1**					**17,959**	**30,853**	
		BILLIE FAY	Bulk	Japan	1977	17,959	30,853	Liberia
Mobil Oil Corporation	**39**					**2,165,835**	**4,277,704**	
Matco Tankers (U.K.) Ltd.	1	MATCO CLYDE	Tanker	Japan	1981	54,172	81,944	U.K.
Mobil Oil Australia Ltd.	1	MOBIL AUSTRALIS	Tanker	Australia	1972	16,890	27,175	Australia
Mobil Oil Francaise	2					281,490	551,446	
		ATHOS	Tanker	Japan	1974	140,745	276,221	France
		D'ARTAGNAN	Tanker	Japan	1974	140,745	275,225	France
Mobil Oil Reederie GMBH	1	MOBIL JADE	Tanker	W. Germany	1975	6,444	13,339	W. Germany
Mobil Oil Singapore PTE Ltd.	1	MOBIL SINGAPURA	Tanker	Japan	1979	2,010	3,525	Singapore
Mobil Overseas Shipping (Bermuda)	3					322,083	670,729	
		MOBIL ACME	Tanker	Japan	1971	63,129	136,304	U.K.
		MOBIL FALCON	Tanker	Japan	1975	125,394	253,997	U.K.
		MOBIL PETREL	Tanker	Japan	1973	133,560	280,428	U.K.
Mobil Producing North Sea Ltd.	2					95,094	168,341	
		MATCO AVON	Tanker	W. Germany	1964	43,622	78,943	U.K.
		MATCO THAMES	Tanker	Japan	1975	51,472	89,398	U.K.
Mobil Shipping & Transport. Co.	26					1,366,633	2,726,793	
		AL NISR AL ARABI	Tanker	Japan	1976	144,264	284,091	Saudi Arabia
		AL SAQR AL ARABI	Tanker	Japan	1976	144,264	285,452	Saudi Arabia
		CONASTOGA	Tanker	Italy	1972	17,506	29,931	Liberia
		CORSICANA	Tanker	Italy	1973	17,505	29,931	Liberia
		MOBIL ALADDIN	Tanker	Sweden	1974	74,134	140,803	Liberia
		MOBIL ASTRAL	Tanker	Japan	1975	60,946	127,505	Liberia
		MOBIL CHALLENGE	Tanker	Yugoslavia	1983	22,587	39,371	Liberia
		MOBIL COURAGE	Tanker	Yugoslavia	1983	22,587	39,776	Liberia
		MOBIL ENDEAVOUR	Tanker	Japan	1982	19,580	38,481	Liberia
		MOBIL ENDURANCE	Tanker	Japan	1982	19,580	38,529	Liberia
		MOBIL ENGINEER	Tanker	Norway	1973	18,843	32,590	Liberia

Parent Company / Direct Owner	No. Ships	Name of Ship	Class	Where Built	Year Built	Gross Tons	Dwt Tons	Flag of Registry
		MOBIL ENTEPRISE	Tanker	Japan	1983	19,580	38,452	Liberia
		MOBIL FLINDERS	Tanker	Japan	1982	93,940	149,235	Australia
		MOBIL KESTREL	Tanker	Japan	1971	104,362	227,756	Liberia
		MOBIL MARKETER	Tanker	Finland	1974	18,258	31,102	Liberia
		MOBIL NAVIGATOR	Tanker	Norway	1973	18,843	32,590	Liberia
		MOBIL PRODUCER	Tanker	Finland	1974	18,258	31,102	Liberia
		MOBIL SWIFT	Tanker	Japan	1973	119,969	272,494	Liberia
		MOBIL VALIANT	Tanker	Japan	1982	41,135	81,282	Liberia
		MOBIL VANGUARD	Tanker	Japan	1982	41,135	81,283	Liberia
		OWL TRANSPORTER	Chem. Tanker	Yugoslavia	1983	22,587	39,742	Liberia
		PETROS	Chem. Tanker	Yugoslavia	1984	22,589	39,724	Liberia
		SACHEM	Tanker	Italy	1972	18,245	29,905	Liberia
		SATUCKET	Tanker	Italy	1971	18,245	29,889	Liberia
		SAUDI GLORY	Tanker	Japan	1974	122,297	275,199	Liberia
		SAUDI SPLENDOUR	Tanker	Japan	1975	125,394	280,578	Liberia
Mobil Shipping Co. Ltd	1	MOBIL LUBCHEM	Chem. Tanker	Spain	1973	2,080	3,310	U.K.
Petroleum Transport Int'l Ltd.	1	MOBIL REFINER	Tanker	Finland	1975	18,939	31,102	So. Africa
Morton-Thiokol Inc.	**1**					**3,300**	**5,588**	
Inagua Transports Inc.		CECILE ERICKSON	Salt Carrier	Japan	1957	3,300	5,588	Panama
Occidental Petroleum Corp.	**1**					**32,759**	**60,763**	
Oxy TCI Inc.		ARMAND HAMMER	Chem. Tanker	Japan	1967	32,759	60,763	Liberia
OMI Corporation	**7**					**271,429**	**491,437**	
		SOKOLICA	Tanker	Japan	1975	81,197	145,648	Liberia
Ebro Transport Inc.		EBRO	Ore/Bulk/Oil	Japan	1978	39,167	71,882	Liberia
Loire Transport Inc.		LOIRE	Tanker	Japan	1981	29,791	65,535	Liberia
Nile Transport Inc.		NILE	Tanker	Japan	1981	33,932	65,755	Liberia
Oriental Transport Inc.		EXPORTER	Bulk	Japan	1966	15,601	27,129	Liberia
Tagus Transport Inc.		GENERAL	LPG Tanker	Japan	1975	37,809	49,799	Liberia
Volga Transport Inc.		VOLGA	Tanker	Japan	1981	33,932	65,689	Liberia
Overseas Shipholding Group	**44**					**2,263,363**	**4,480,226**	
Amity Products Carriers Inc.		JULIE N.	Tanker	Japan	1982	18,965	29,994	Liberia
Anglomar Shipping Co. Ltd.		TROPICAL LION	Tanker	U.K.	1972	125,916	256,387	Liberia
Atlantia Tanker Corp.		ATLANTIA	Tanker	Japan	1979	42,155	81,278	Liberia
Canopus Tankers Inc.		CANOPUS	Tanker	So. Korea	1981	18,402	31,309	Liberia
Caribbean Tanker Corp.		REBECCA	Tanker	Japan	1984	45,799	94,236	Liberia
Chrismir Shipping Corp.		CHRISMIR	Bulk	So. Korea	1980	31,243	62,185	Liberia
Commonwealth Shipping Co. Ltd.		ULLA	Bulk	So. Korea	1985	17,228	29,399	Br. Colonies
Concord Tanker SA		CONCORDIA C.	Tanker	Japan	1976	61,111	132,594	Panama
Conti-OSG Associates III		CONTINENTAL RELIANCE	Bulk	So. Korea	1983	30,151	65,224	Netherlands
Conti-OSG Associates IV		CONTINENTAL SPIRIT	Bulk	So. Korea	1983	30,151	65,224	Netherlands
Corrientes Ore Carriers Ltd.		GARDEN GREEN	Ore/Oil	Japan	1973	81,263	169,140	Liberia
Diane Tanker Corp.		DIANE	Tanker	Japan	1987	31,000	64,140	Liberia
Edinburgh Bulk Carriers Inc.		ENDEAVOR	Bulk	W. Germany	1975	56,949	122,933	Br. Colonies
Enterprise Shipping Co. Ltd.		ENTERPRISE	Bulk	Sweden	1973	64,741	117,955	Br. Colonies
First and Second Pacific Corp.		PACIFIC HUNTER	Tanker	Japan	1979	18,736	32,109	Liberia
First Aframax Tanker Corp.		BERYL	Tanker	Poland	1986	52,518	84,406	Liberia
First Product Tankers SA		LUCY	Tanker	So. Korea	1986	38,300	64,000	Liberia
First Shipco Inc.		CONTINENTAL FRIENDSHIP	Bulk	Japan	1977	33,200	61,270	Liberia
First United Shipping Corp.		WESTERN LION	Tanker	Japan	1974	126,795	269,117	Liberia

Parent Company / Direct Owner	No. Ships	Name of Ship	Class	Where Built	Year Built	Gross Tons	Dwt Tons	Flag of Registry
Glasgow Bulk Carriers Co. Ltd.		TRUDY	Bulk	So. Korea	1985	17,228	29,432	Br. Colonies
Granreunion Co.		REUNION	Tanker	Japan	1970	103,508	226,953	Liberia
Intercnt'l Coal Transport Ltd.		EQUINOX	Bulk	So. Korea	1982	76,449	138,500	Br.Colonies
International Seaways Inc.		CONTINENTAL CARRIER	Bulk	Japan	1977	14,925	26,450	Liberia
Interocean Tankers Corp.		SOUTHERN LION	Tanker	Japan	1975	126,850	269,085	Liberia
Island Tanker SA		SHIRLEY	Tanker	Japan	1975	60,815	130,286	Panama
ITI Shipping SA		RUTH M.	Tanker	Japan	1975	60,815	130,257	Panama
Jostelle Shipping Co. Ltd.		JOSTELLE	Bulk	W. Germany	1975	63,863	122,970	Br. Colonies
Kaigai Shipping Corp.		JARRAH	Ore/Oil	Japan	1974	82,786	164,990	Liberia
Loire Carbulk Carriers Inc.		ARGUS TRAVELER	Bulk	Japan	1975	20,515	33,013	Liberia
Marina Tanker Corp.		MARY ANN	Tanker	Japan	1986	38,241	64,239	Liberia
Normar Tanker Corp.		JUPITER	Tanker	Sweden	1975	18,269	32,116	Liberia
Oleron Tanker SA		VESTA	Tanker	So. Korea	1980	42,048	81,282	Panama
Overseas Coal Transport Ltd.		ESPLANADE	Bulk	So. Korea	1982	76,449	138,500	Br. Colonies
Pluto Tankers Inc.		PLUTO	Tanker	So. Korea	1981	18,402	31,303	Liberia
Saturn Bulk Carriers Inc.		SATURN	Bulk	So. Korea	1980	31,243	62,212	Liberia
Scanmar Tanker Corp.		MERCURY	Tanker	Sweden	1974	18,269	32,116	Liberia
Second Aframax Tanker Corp.		ELIANE	Tanker	Poland	1987	52,524	84,323	Liberia
Second Products Tankers Inc.		SUZANNE	Tanker	So. Korea	1986	36,512	65,000	Liberia
Second United Shipping Corp.		NORTHERN LION	Tanker	Japan	1974	126,851	269,077	Liberia
Third United Shipping Corp.		EASTERN LION	Tanker	Japan	1973	126,796	269,164	Liberia
Tiber Carbulk Carriers Inc.		ARGUS EXPLORER	Bulk	Japan	1975	20,513	33,047	Liberia
Timor Navigation Ltd.		NORTHERN LIGHT	Bulk	So. Korea	1981	31,007	65,592	Liberia
Trader Shipping Corp.		ESPERANZA	Bulk	Japan	1973	31,814	66,136	Liberia
Venus Tankers SA		VENUS V	Tanker	So. Korea	1981	42,048	81,283	Panama
Phillips Petroleum Co.	**7**					**284,510**	**514,046**	
Arctic LNG Transportation Co.	1	ARCTIC TOKYO	LNG Tanker	Sweden	1969	44,089	32,878	Liberia
Philtankers Inc.	5					196,332	448,290	
		PHILLIPS ARKANSAS	Tanker	Japan	1980	26,974	54,026	Liberia
		PHILLIPS ENTERPRISE	Tanker	Sweden	1973	88,439	232,112	Liberia
		PHILLIPS MEXICO	Tanker	Japan	1979	26,973	54,057	Liberia
		PHILLIPS OKLAHOMA	Tanker	Japan	1979	26,973	54,046	Liberia
		PHILLIPS VENEZUELA	Tanker	Japan	1979	26,973	54,049	Liberia
Polar LNG Shipping Corp.	1	POLAR ALASKA	LNG Tanker	Sweden	1969	44,089	32,878	Liberia
Sun Company Inc.	**1**					**11,781**	**19,980**	
Welland Shipping Inc.		NORDIC SUN	Chem. Tanker	Japan	1981	11,781	19,980	Liberia
Texaco Inc.	**21**					**1,305,330**	**2,597,276**	
Texaco Panama Inc.	14					912,015	1,873,034	
		TEXACO ALABAMA	Tanker	Sweden	1971	63,234	135,236	Bahamas
		TEXACO BOGOTA	Tanker	Sweden	1960	13,623	22,455	Bahamas
		TEXACO CARIBBEAN	Tanker	Japan	1977	125,857	274,347	Panama
		TEXACO DELAWARE	Ore/Bulk/Oil	Sweden	1979	71,208	128,320	Bahamas
		TEXACO HANNOVER	Tanker	Japan	1968	48,106	103,490	Panama
		TEXACO HOUSTON	Tanker	Sweden	1975	65,287	133,950	Liberia
		TEXACO KANSAS	Tanker	Sweden	1976	55,973	115,826	Bahamas
		TEXACO MAINE	Tanker	U.S.	1959	23,660	47,187	Panama
		TEXACO SKANDINAVIA	Tanker	Norway	1962	13,222	21,539	Bahamas
		TEXACO SOUTH AMERICA	Tanker	Spain	1976	130,959	272,526	Panama
		TEXACO TEXAS	Tanker	Portugal	1975	55,973	124,987	Bahamas
		TEXACO TULSA	Tanker	Sweden	1971	64,961	131,350	Liberia
		TEXACO WILMINGTON	Tanker	Brazil	1983	54,095	87,656	Bahamas
		TEXACO VERAGAUS	Tanker	Japan	1976	125,857	274,165	Panama
Refineria Panama SA	1	TABOGA	Tanker	Japan	1971	2,978	5,723	Panama
Saudi Int'l Petroleum Carriers	2					268,568	540,587	
		ASIR	Tanker	Japan	1974	136,718	267,848	Saudi Arabia
		BISHAH	Tanker	Spain	1976	131,850	272,739	Saudi Arabia
Texaco Canada Ltd.	2					13,583	16,653	
		A.G. FARQUHARSON	Tanker	Canada	1969	5,038	6,996	Canada
		LE BRAVE	Tanker	Japan	1977	8,545	9,657	Canada
Texaco Overseas Tankship Ltd.	2					108,186	161,279	
		TEXACO WESTMINISTER	Tanker	Japan	1981	54,076	81,282	U.K.
		TEXACO WINDSOR	Tanker	Japan	1980	54,110	79,997	U.K.
Texas Commerce Bank N.A. (Trustee)	**1**					**129,973**	**267,732**	
		TEXACO JAPAN	Tanker	Japan	1975	129,973	267,732	Panama
United Brands Company	**5**					**34,187**	**33,997**	
Balboa Shipping Co. Inc.		CONDATA	Reefer	Norway	1968	8,135	10,023	Honduras
Barrydale Ltd.		BARRYDALE	Reefer	Japan	1973	6,513	5,818	Br. Colonies
Bluestream Ltd.		BLUESTREAM	Reefer	Japan	1973	6,513	6,118	Br. Colonies
Fleetway		FLEET WAVE	Reefer	Japan	1972	6,513	6,127	Br. Colonies
Skyrama Ltd.		SKY CLIPPER	Reefer	Japan	1972	6,513	5,911	Br. Colonies
USG Corporation	**4**					**46,620**	**66,797**	
Gypsum Transportation Ltd.		A.V. KASTNER	Bulk	So. Korea	1987	12,702	19,000	U.K.
		GYPSUM BARON	Bulk	Canada	1976	12,839	18,314	U.K.
		GYPSUM COUNTESS	Bulk	France	1960	8,240	11,169	U.K.
		GYPSUM KING	Bulk	Canada	1975	12,839	18,314	U.K.
USX Inc.	**5**					**298,252**	**597,192**	
Hancock Shipping Co. Ltd.		BRAE TRADER	Tanker	Japan	1975	44,989	89,730	Liberia
		CELTIC TRADER	Tanker	Japan	1975	48,292	89,479	Liberia
		GARYVILLE	Tanker	Japan	1972	65,599	138,232	Liberia
		HOUSTON TRADER	Tanker	Japan	1974	70,741	140,778	Liberia
		YATES TRADER	Tanker	Japan	1975	68,631	138,973	Liberia
U.S. Trust Co. of N.Y. (Trustee)	**6**					**115,650**	**193,380**	
		FELIPES	Tanker	Norway	1975	19,275	32,230	Liberia
		FICUS	Tanker	Norway	1976	19,275	32,230	Liberia

Parent Company Direct Owner	No. Ships	Name of Ship	Class	Where Built	Year Built	Gross Tons	Dwt Tons	Flag of Registry
		FLAMMULINA	Tanker	Norway	1976	19,275	32,230	Liberia
		FOSSARINA	Tanker	Norway	1976	19,275	32,230	Liberia
		FOSSARUS	Tanker	Norway	1976	19,275	32,230	Liberia
		FUSUS	Tanker	Norway	1975	19,275	32,230	Liberia
Wells Fargo Leasing Corporation	2					**12,720**	**11,312**	
		RIO CUYAMEL	Reefer	Poland	1978	6,405	5,656	Honduras
		RIO SIXAOLA	Reefer	Poland	1979	6,315	5,656	Panama

OCEANGOING CRUISE SHIPS DEPARTING FROM U.S. PORTS
(2,000 gross tons & over)

OWNER/OPERATOR Ship	GT	Length (feet)	# of Passengers	Year Built
ADMIRAL CRUISES Miami, Fla.				
Azure Seas	14,623	603	780	53
Emerald Seas	24,458	622	980	44
Stardancer	26,747	606	1,000	82
ALOHA PACIFIC CRUISES Alexandria, Va.				
Monterey	21,051	563	635	52/88
AMERICAN HAWAII CRUISES San Francisco, Calif.				
Constitution	30,090	682	798	51/88
Independence	30,090	682	798	50/88
AMERICAN STAR LINES New York, N.Y.				
Betsy Ross*	6,268	436	496	53/84
*Operated by Dolphin Hellas Shipping				
BERMUDA STAR LINE Teaneck, N.J.				
Bermuda Star	23,500	616	830	57
Queen of Bermuda	23,500	616	830	57
Veracruz I	10,500	485	730	57
CARNIVAL CRUISE LINES Miami, Fla.				
Carnivale	27,250	640	950	56
Celebration	47,262	733	1,486	87
Festivale	26,632	757	1,400	86
Holiday	46,052	728	1,452	85
Jubilee	47,262	733	1,486	86
Mardi Gras	18,261	597	906	61
Tropicale	22,919	639	1,022	56
CHANDRIS FANTASY CRUISES New York, N.Y.				
Amerikanis	16,485	576	649	52
Azur	19,000	466	700	71
Britanis	26,000	642	1,150	32
Galileo	29,000	700	1,100	66
Victoria	11,885	572	566	39
COMMODORE CRUISE LINES Miami, Fla.				
Caribe	23,000	610	900	53
COSTA CRUISES Miami, Fla.				
Carla Costa	20,477	600	770	68
Costa Riviera	31,000	700	984	63
Danae	9,603	531	464	55
Daphne	9,436	531	464	55
CROWN CRUISE LINES Boca Raton, Fla.				
Crown del Mar			600	67/88
Viking Princess	6,421	421	366	64/85
CUNARD LINE LTD. New York, N.Y.				
Cunard Countess	17,593	534	800	75
Cunard Princess	17,586	534	947	74
Queen Elizabeth 2	67,139	961	1,810	69
Sagafjord	24,800	616	588	65
Sea Goddess I	4,253	341	116	84
Sea Goddess II	4,260	341	116	85
Vistafjord	24,116	626	736	73
DISCOVERY CRUISES Fort Lauderdale, Fla.				
Discovery I	12,244	489	446	70/85
DOLPHIN CRUISE LINE Miami, Fla.				
Dolphin	13,007	501	586	56
ex-Starship Royale	15,483	603	1,255	58
EPIROTIKI LINES New York, N.Y.				
Jason	3,719	318	325	65
World Renaissance	8,665	492	516	66
EXPLORATION CRUISE LINES Seattle, Wash.				
North Star	3,095	295	156	66
HAPAG-LLOYD New York, N.Y.				
Europa	33,819	652	758	81
HOLLAND AMERICA LINE Seattle, Wash.				
Nieuw Amsterdam	33,930	702	1,214	83
Noordam	33,930	702	1,214	84
Rotterdam	38,644	748	1,114	59
Westerdam	42,000	669	1,030	86
IVARAN AGENCIES INC. New York, N.Y.				
Americana	20,000	580	110	87
NORWEGIAN CRUISE LINE Coral Gables, Fla.				
Norway	70,202	1,035	1,800	61
Seaward	42,000	700	1,534	88
Skyward	16,254	525	728	69
Southward	16,607	541	750	71
Starward	16,107	525	750	68
Sunward II	14,110	485	696	71
OCEAN CRUISE LINES/PEARL CRUISES Ft. Lauderdale, Fla.				
Ocean Islander	3,570	364	250	56
Ocean Pearl	12,456	502	425	67
Ocean Princess	12,218	488	550	67
OCEAN QUEST INTERNATIONAL New Orleans, La.				
Ocean Spirit	8,496	457	350	66/88
PAQUET FRENCH CRUISES Palm Beach, Fla.				
Mermoz	13,804	531	530	57
P&O/PRINCESS CRUISES Los Angeles, Calif.				
Canberra	44,807	816	1,702	61
Island Princess	19,907	554	600	72
Pacific Princess	20,636	551	626	71
Royal Princess	44,348	754	1,200	84
Sea Princess	27,670	659	720	66
PREMIER CRUISE LINES Cape Canaveral, Fla.				
ex-Sun Princess	17,370	534	700	72
S/S Atlantic	19,337	669	1,600	82/88
S/S Oceanic	19,500	780	1,562	65
REGENCY CRUISES New York, N.Y.				
Regent Sea	22,000	631	722	57
Regent Star	24,413	642	950	57
Regent Sun	25,000	627	816	64
ROYAL CARIBBEAN CRUISE LINE Miami, Fla.				
Nordic Prince	23,200	637	1,038	71
Song of America	37,584	705	1,575	82
Song of Norway	23,005	637	1,196	70
Sovereign of the Seas	74,000	874	2,600	87
Sun Viking	18,556	563	740	71
ROYAL CRUISE LINE San Francisco, Calif.				
Crown Odyssey	40,000	616	1,221	88
Golden Odyssey	10,250	426	509	74

OWNER/OPERATOR Ship	GT	Length (feet)	# of Passengers	Year Built
ROYAL VIKING LINE San Francisco, Calif.				
Royal Viking Sea	28,018	676	710	73
Royal Viking Sky	28,078	676	710	73
Royal Viking Star	28,221	672	710	72
Royal Viking Sun	36,000	669	740	88
SEABOURN CRUISES San Francisco, Calif.				
Seabourn Pride	10,000	440	212	88
SEA CLOUD CRUISES Coconut Grove, Fla.				
Sea Cloud	2,517	360	69	31/88
SEAESCAPE LTD. Miami, Fla.				
Scandinavian Saga	5,259	433	900	74/88
Scandinavian Sky	8,200	416	926	72
Scandinavian Star	10,513	465	1,000	71
Scandinavian Sun	9,902	441	1,100	68
SITMAR CRUISES Los Angeles, Calif.				
Dawn Princess	25,000	606	925	57
Fair Princess	25,000	606	925	56/84
Fairstar	23,764	609	1,390	57/83
Sky Princess	46,000	788	1,200	84

OWNER/OPERATOR Ship	GT	Length (feet)	# of Passengers	Year Built
SOCIETY EXPEDITIONS Seattle, Wash.				
Society Explorer	2,398	250	100	69
World Discoverer	3,153	285	140	74
SUN LINE CRUISES New York, N.Y.				
Stella Maris	3,500	300	180	53
Stella Oceanis	5,500	350	300	65
Stella Solaris	18,000	540	620	53
TROPICANA CRUISES Miami, Fla.				
Tropicana	5,000	400	1,000	66/88
WINDJAMMER BAREFOOT CRUISES Miami, Fla.				
Fantome	2,400	282	126	27
WINDSTAR SAIL CRUISES Miami, Fla.				
Wind Song	5,307	440	150	87
Wind Spirit	5,307	440	150	88
Wind Star	5,307	440	150	86
WORLD EXPLORER CRUISES San Francisco, Calif.				
Universe	13,950	563	626	59/83

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When two-way communication is critical, on shore and at sea, nothing can keep your people in touch like a Magnavox MX 2400. And nothing can help you manage more efficiently.

Because with Magnavox, you can use the right combination of secure voice, fax, data and telex. You can alter course instantly to take advantage of the latest market information. And you can get in and out of port while your satcom takes care of the paperwork.

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To see how you can get your fleet communicating efficiently, contact Marketing Manager, Magnavox MSS, 2829 Maricopa St., Torrance, CA 90503, U.S.A. Telephone (213) 618-1200, Telex 696101, Fax (213) 618-7001.

Magnavox

Magnavox Advanced Products and Systems Company

8218/3/89

MOBILE RIGS UNDER CONSTRUCTION—MAY 1989

RIG OWNER	RIG NAME	DESIGN	WATER DEPTH	SHIPYARD	ESTIMATED COST ($MM)	DELIVERY DATE	CONTRACT
			JACKUPS				
ONGC	Sagar Uday	Baker Marine BMC 300 IC, Independent leg, Class M, cantilever.	300′	Mazagon Dock - Bombay, India	$ 45.0	11/89	ONGC - owner operated - India
Santa Fe	Galaxy	Friede & Goldman L-780, Mod 6, 3 Triangular legs, cantilever	360′	Far East Levingston Singapore		Mid-1991	Available
Santa Fe	Santa Fe Monitor	Friede & Goldman L-780, Mod 5, 3 triangular legs, cantilever.	350′	Far East Levingston - Singapore	$ 60.0e	10/89	Available
U.S.S.R.	U.S.S.R. Unnamed Jackup 01	Arctic Class	300′	Rauma Repola Mantyluoto - Finland	$ 67.0	09/89	U.S.S.R. - owner operated - Arctic
U.S.S.R.	U.S.S.R. Unnamed Jackup 02	Arctic Class	300′	Vyborg Shipyard - U.S.S.R.	$ 67.0	10/89	U.S.S.R. - owner operated - Arctic
			SEMISUBMERSIBLES				
Drillmar	Drillmar 01	Friede & Goldman L-1033, Enhanced Pacesetter, self-propelled, thruster assist.	1,500′	Astano - El Ferrol, Spain	$ 96.0	06/90	Drillmar - owner operated
S A N A	M&S Unnamed Semi 01	Friede & Goldman L-1020, Trendsetter, drilling/production.	5,000′	Fincantieri - Genoa, Italy	$120.0	05/89	Available
Saipem	Scarabeo 05	Maritime Engineering, ME-4500, dynamic positioning capability, self propelled	3,000′	Fincantieri - Genoa, Italy	$110.0	08/89	Available
U.S.S.R.	Shelf 05	Friede & Goldman Enhanced Pacesetter, 6 columns, self propelled	650′	Astrakhan Shipyard - Astrakhan, U.S.S.R.	$ 65.0e	Undet	U.S.S.R. - owner operated
Yatzy N V (EXMAR Mgr)	Yatzy	Dyvl Super Yatzy, self propelled, dynamic positioning capability, 6 columns.	2,500′	Boelwerf - Temse, Belgium	$ 65.0	06/89	Available
			SHIPS				
U.S.S.R.	U.S.S.R. Unnamed Ship 01	Soviet design, dynamic positioning, drill to 21,235′	1,000′	Kherson - Ukraine, U.S.S.R.	$ 60.0e	08/89	U.S.S.R. - owner operated

OFFSHORE MOBILE DRILLING UNITS UNDER CONSTRUCTION OR ORDERED

MOBILE RIGS UNDER CONSTRUCTION BY AREA OF WORLD (Location of Shipyard)

	ARCTIC	JACKUPS	BARGES	SEMISUBMERSIBLES	SHIPS	SUBMERSIBLES	TENDERS	TOTAL
NORTH SEA	0	0	0	1	0	0	0	1
EUROPE OTHER	0	0	0	1	0	0	0	1
MEDITERRANEAN	0	0	0	2	0	0	0	2
INDIA	0	1	0	0	0	0	0	1
SOUTHEAST ASIA	0	2	0	0	0	0	0	2
U.S.S.R.	0	2	0	1	1	0	0	4
TOTAL	0	5	0	5	1	0	0	11

MOBILE RIGS UNDER CONSTRUCTION BY DELIVERY DATE

	ARCTIC	JACKUPS	BARGES	SEMISUBMERSIBLES	SHIPS	SUBMERSIBLES	TENDERS	TOTAL
1989	0	4	0	3	1	0	0	8
1990	0	0	0	1	0	0	0	1
1991	0	1	0	0	0	0	0	1
1992	0	0	0	0	0	0	0	0
UNDETERMINED	0	0	0	1	0	0	0	1
TOTAL	0	5	0	5	1	0	0	11

MOBILE RIGS UNDER CONSTRUCTION BY DELIVERY DATE

	ARCTIC	JACKUPS	BARGES	SEMISUBMERSIBLES	SHIPS	SUBMERSIBLES	TENDERS	TOTAL
1989	0	1	0	3	0	0	0	4
1990	0	0	0	0	0	0	0	0
1991	0	1	0	0	0	0	0	1
1992	0	0	0	0	0	0	0	0
UNDETERMINED	0	0	0	0	0	0	0	0
TOTAL	0	2	0	3	0	0	0	5

(The listing includes all units on order or with letters of intent to shipyards.)

Source: Offshore Data Services, Inc., Houston, Texas: *The Offshore Rig Locator*—published the first week of each month. Subscriptions are available from Offshore Rig Data Services, P.O. Box 19909, Houston, TX 77224. For full details on this and other publications and services from Offshore Data Services, contact **Loran R. Sheffer**, president, or **Jerry Goldberg**, editor, at 3200 Wilcrest #170, Houston, TX 77042. Telephone: (713) 781-2713. Telefax: 713-781-9594.

John I. Ykema Named Chief Technical Officer At SPD Technologies

John I. Ykema

John I. Ykema has been elected vice president and chief technical officer for SPD Technologies.

In his new capacity, Mr. **Ykema's** responsibilities include the evaluation and marketing of SPD's technical program capabilities. He is also responsible for technical review and oversight of the company's development programs.

Mr. **Ykema** previously served as vice president of engineering, a position held since the 1987 management buyout of Gould Inc.'s Systems Protection Division Unit to create SPD Technologies. SPD Technologies is one of the largest producers of military circuit breakers and a world leader in advanced electrical protection equipment designed for harsh operating environments. Headquartered in Philadelphia, the company has service, repair and overhaul facilities across the U.S. and serves military markets throughout the world.

Two More VLCCs Ordered By Tokyo Tanker

The Tokyo Tanker Company has placed an order for two 250,000-dwt tankers, one with Mitsubishi Heavy Industries and the other with Ishikawajima-Harima Heavy Industries.

Tokyo Tanker's fleet of VLCCs will be brought up to five with these two vessels. These orders follow the delivery of the 254,108-dwt Nisseki Maru in April of last year.

AWSC Elects New Officers At Tampa, Fla., Meeting

The American Waterways Shipyard Conference (AWSC) recently held its first membership meeting for 1989 in Tampa, Fla. At this meeting, the shipyard conference elected its officers for 1989.

C.H. Walters, National Maintenance & Repair, Inc., was elected to serve as chairman for 1989, and **John L. Roper IV,** Norshipco Brambleton, was elected to serve as vice chairman. The members also elected the following to serve as members of the Shipyard Steering Committee, terms to expire in 1991: **Collins Brent,** Superior Boat Works, Inc.; **Robert W. Greene,** Jeffboat/Louisiana Dock Company; and **K.A. Wheeler,** Walker Boat Yard, Inc.

The membership extensively discussed the current legislative initiative which redefines the term rebuild as contained in the Second Proviso of the Merchant Marine Act of 1920, more commonly referred to as the Jones Act. The membership voted to recommend to the AWO board of directors that the Association continue its efforts to enact legislation and to endorse the action to broaden the scope of the legislation to include all domestic trades—fishing, coastwise and Great Lakes—and not limit activities to the fishing industry.

Wayne LaGrange, Jeffboat, and **Gasper D'Anna,** Platzer Shipyard, Inc., briefed the members on the activities of the Shipyard Employment Standards Advisory Committee. This advisory committee was established by the Department of Labor to complete the effort to establish one set of streamlined safety and health regulations for the shipbuilding and repair industry.

The next full meeting was scheduled for June 22-23, in Denver, Colo. The program for this meeting will concentrate on educating the membership on environmental issues facing the industry.

Mackay Communications Wins U.S. Navy AGOR-23 Electronics Package

Mackay Communications, Inc. of Raleigh, N.C., has been awarded a subcontract to supply the exterior, interior communication as well as the navigational equipment for AGOR-23. In addition, Mackay has contracted to perform the complete turn-key installation of the Navy's newest oceanographic research vessel.

Mackay has contracted with Halter Marine Inc. of Moss Point, Miss., a division of Trinity Marine Group, New Orleans, La.

Mackay offers a complete program service from planning, design, supply of equipment, turn-key installation as well as EMI surveys and control plans.

Mackay military maintenance and repair group, based in Jacksonville, Fla., will be the program activity, managed from the Elizabeth, N.J., headquarters.

For free literature giving full information on Mackay Communications,

Circle 66 on Reader Service Card

Bruce Seaton Named Recipient Of 1988 AOTOS Award

Bruce Seaton, chairman of American President Companies, has been named recipient of the 1988 Admiral of the Ocean Sea award. The award is the most prestigious honor bestowed each year by the U.S. maritime community and is presented by United Seamen's Service. The award is traditionally given to persons or organizations in management, labor, or the government that have advanced the role of the U.S. flag in ocean shipping and the American seafaring community.

The presentation was announced by **John Bowers,** president of the International Longshoreman's Association and chairman of the USS AOTOS Committee and a vice president and member of the USS board of directors.

Mr. **Seaton** heads the Oakland, Calif.-based APC, a diversified corporation which provides American-flag international ocean shipping and distribution services. He has guided a major operational redirection of the transportation company since assuming its leadership in 1977.

FMC Issues New Brochure On Dynetor Connectors

FMC Fluid Control Operation has issued a 20-page, four-color brochure featuring its new Dynetor® Connectors.

As described in the brochure, Dynetor Connectors are designed to replace flanges and clamp-type connections in applications from 1-1/2 to 6-inch sizes. Dynetor Connectors weigh from one-fifth to one-half the weight of flanges and clamp-type connections, have smaller profiles and diameters, and can be made-up over five times faster. The brochure uses cutaway airbrush art and spot photographs to illustrate the design principals of Dynetor Connectors and to highlight the features and benefits of the various designs.

Dynetor Connectors are available in sizes and materials to meet ANSI pipe schedules, API bore sizes, and other industry standards. All Dynetor Connectors are suited for both standard and sour gas services at cold working pressures up to 15,000 psi. Complete specifications, installation instructions, and nomenclature for designating Dynetor Connectors are provided is easy-to-read form.

FMC Corporation, headquartered in Chicago, is one of the world's leading producers of machinery and chemicals for industry, government and agriculture. The company operates 112 manufacturing and mine facilities in 27 states and 15 foreign countries. Businesses are divided into four major segments: industrial chemicals, defense systems, performance chemicals, and machinery and equipment.

For more information and a free copy of the new four-color brochure on Dynetor Connectors from FMC,

Circle 40 on Reader Service Card

MHI Begins Construction Of Luxury Cruise Ship 'Crystal Harmony'

Mitsubishi Heavy Industries, Ltd. (MHI) of Tokyo, Japan, recently held a ceremony to lay the keel for the luxury cruise ship Crystal Harmony at its Nagasaki Shipyard & Machinery Works.

The 791-foot by 95-foot Crystal Harmony will have a capacity for about 960 passengers in 480 cabins. The 49,000-ton (G/T) cruise ship will have 12 decks.

Owner of the liner is Crystal Ship (Bahamas) Limited, a wholly owned subsidiary of Nippon Yusen Kabushiki Kaisha (NYK). Crystal Cruises Inc., based in Los Angeles, will operate the cruise ship once it is completed.

The Crystal Harmony is the second cruise ship to be built by MHI following the Fuji-Maru, which was constructed at its Kobe Shipyard & Machinery Works and was delivered in April of this year. The Crystal Harmony is scheduled to be launched in September 1989 and will be completed in June 1990.

For free literature giving full information on the facilities and capabilities of Mitsubishi Heavy Industries,

Circle 34 on Reader Service Card

Alexander, Starr & Kersey Named Representatives In New England For Baldt

Baldt, Inc. has named Alexander, Starr & Kersey, Inc. (ASK) to be their New England representatives for the Baldt line of anchors, chain and related products and services.

Alexander, Starr & Kersey is a full service marine engineering firm providing complete analytical, operational and managerial capabilities to the offshore maritime industry.

Baldt is a major manufacturer of marine products that include anchors, chain, hardware, dockside mooring systems, fendering systems, lashing and mooring systems and related services used by the oil industry, the U.S. Navy and commercial vessels worldwide.

For more information about Baldt's products, services and agents,

Circle 55 on Reader Service Card

Watercom Installs Payphones On Steamboat

The steamboat Delta Queen, owned and operated by the Delta Queen Steamboat Co. of New Orleans, La., was recently fitted with two Watercom payphones.

John G. Smith, vice president of marketing and sales for Watercom, stated, "All passengers and crew will now have 24-hour access to direct dial phone service, and they do not have to wait to go ashore to have it." Mr. **Smith** went on to say that "All of the calls can be charged to any Bell or AT&T Calling Card, VISA, MasterCard, American Express, or they can call collect."

Scott Young, vice president-Operations, spokesman for the Delta Queen Steamboat Co., said, "Our firm is pleased to provide its guests with the added service and convenience of Watercom." He added, "We can now offer our passengers the added convenience of making personal phone calls without having to leave the vessel at ports of call. Watercom further enhances our commitment to offer the public the finest in vacation packages."

In addition to the telephone service, Watercom is also providing a new message service for both the Mississippi Queen and her sister ship the Delta Queen. By calling a special 24-hour hotline, relatives and friends of passengers on both vessels can have a message forwarded immediately. Mr. **Young** anticipates that this service will be most useful in the event that a passenger or crew member must be immediately contacted. Watercom is a leader in the field of communications for vessels on America's waterways, providing direct-dial telephone service on over 4,000 miles of waterways.

For more information and Watercom's free brochure,

Circle 37 on Reader Service Card

Fetterolf's Specialty Assembly Valve Eliminates Field-Welding

Fetterolf Corporation, Skippack, Pa., long an expert in specialty valves, has the capacity to assemble standard and custom valves into piping systems. The valves can be permanently installed into flanged or weld-end piping sections, allowing the customer to custom-design the assembly to meet his specific needs as a prefabricated piping section. Both the piping section and the valve may be head-jacketed for appropriate temperature control if desired.

Fetterolf's Ram-Seal® piping/valve assemblies provide clog-free sampling and drain capability while eliminating field-welding of valves into piping systems. Dead tight shut-off with pressures to 6,000 psi and temperatures to 1,000 degrees F are standard features in Ram-Seal valves.

For solutions to specialty valve problems and free literature offered by Fetterolf Corporation,

Circle 35 on Reader Service Card

Avondale Unit Wins $4-Million Contract To Build High-Speed Ferry

The Boat Division of Avondale Industries, New Orleans, La., was recently awarded a $4-million order to build the second in a series of high-speed, surface-effect passenger ferries for Tri-State Marine Transportation, New York, N.Y.

The 109-foot "Air Ride" passenger ferry, designed by Air Craft, Inc., will be able to travel at speeds in excess of 40 knots. She will be powered by twin 16-cylinder Deutz MWM 604B series diesel engines.

The first vessel in this series is expected to be delivered by Avondale shortly.

For further information on the boatbuilding services of Avondale's Boat Division,

Circle 64 on Reader Service Card

Integrated Bridge Control System Offered By Valmet —Literatured Available

Valmet Automation a.s., Norway, has developed a computer-based, integrated bridge control system for medium- and slow-speed engines.

Based on experience from the integrated automation system, Damatic Marine System, which comprises monitoring and control of main and auxiliary engines, the new bridge control system has been developed according to the same principles with regard to both hardware and software.

The system is called Damatic RC and is currently available in two basic models: Damatic RC-1 for slow-speed engine with fixed propeller; and Damatic RC-2 for medium-speed engine, but also multi-engine installations.

Damatic RC is an integrated bridge control system which comprises all controls of the main engine, including safety shutdown system. In addition, the RC-2 includes a propeller pitch control system.

Damatic RC was developed in close cooperation with one of the world's leading engine manufacturers who has stipulated stringent requirements for performance and quality, and operations and safety during maneuvering of ships. All essential control and safety functions therefore have a built-in "hot-backup" which takes over automatically upon faults in the main system. The backup system operates like the main system, and has the same functions built in. The operator, therefore, does not notice any difference when the backup system takes over. This applies to both the control and shutdown functions. Damatic RC is one of the first systems on the market that has this as standard.

For more information and free literature on the new integrated bridge control system from Valmet Automation,

Circle 76 on Reader Service Card

← Circle 292 on Reader Service Card

Morgan Crane Moves To New Facility In Santa Ana, Calif.

Morgan Crane Company, Inc., the exclusive HIAB seacrane distributor for the U.S., has moved to a new facility in Santa Ana, Calif. The new address is 1300 Normandy Place, Santa, Ana, Calif. 92705.

Morgan's new facilities will allow for greater production capabilities to keep up with increased demand for seacrane products. The company offers a full line of seacranes, winches, powerpacks, skid-mounted packages, and their over-the-side recovery system.

The HIAB seacrane is designed to perform demanding tasks in a hostile environment. Morgan has delivered a number of these cranes to the U.S. Navy, U.S. Air Force, M.S.C., and the commercial maritime industry for drone recovery, torpedo handling, mine recovery, handling camera sleds, R.O.V.s, submersibles and oil skimmers. Morgan also represents Fairmont Underwater Hydraulic Tools and can put together turn-key rental packages.

Morgan Crane Company's phone number (714) 667-6024, and fax number (714) 667-7985 will remain the same.

For free literature detailing products from Morgan Crane,

Circle 72 on Reader Service Card

SeaTrac Offers Free Color Brochures On Roll-Damping Systems

The Koopnautic Company of Holland, with its years of experience in stabilization and side thrusters, has engineered a new method of roll-damping.

To improve fin-blade methods, Koopnautic has engineered equipment with greater machinery strengths. The latest electronics, roll gyro, fin-blades and hydraulics, were also developed and tested to provide optimal leverage forces while at the same time yielding less drag.

The fin-blade is traditionally used in roll damping, providing excellent leverage. The units, which are similar in appearance to rudders, are typically mounted amidships and just inboard of the chine. This equipment works well at moderate speeds but can have distinct disadvantages at either low or high speeds.

According to SeaTrac Industrial Marine, a U.S. distributor for Koopnautic roll-damping equipment, because fin-blade methods of roll-damping are less effective at extremely low speeds and may cause a detremental drag factor at high speeds, fin-blades are best-suited for a moderate-speed, long-range vessel.

For vessels requiring a greater range in roll-damping performance, from slow fishing or maneuvering speeds to high-speed cruising, Koopnautic offers the new retracting Rotary system, which utilizes the "Magnus Effect." Some of the advantages of the system, according to the firm, include superior performance at both very low speeds and high speeds, and retractability, which protects the equipment from possible damage and cuts drag at high speeds.

For more than 20 years, Koopnautic has been manufacturing roll-damping equipment for ships—not only increasing comfort on board but also contributing a great deal to ships' safety at sea.

The most well-known are the Sea-Rocq fin stabilizers and the MVS 2000 electrohydraulic moving weight system, the latter reportedly well-suited for vessels at slow speeds and at anchor. Additionally, the company also offers Trim-Plane, oversized and high-powered stern trim plate controlled by gyro and electrohydraulics. This method has been installed on vessels ranging from 10 to 300 tons displacement.

Koopnautic provides for a wide variety of roll-damping methods, with fin-blade, rotary, MVS or Trim-Plane systems. Koopnautic has also added conventional and retractable bowthrusters to its product range.

For a free brochure fully detailing the roll-damping products from Koopnautic,

Circle 69 on Reader Service Card

PROPULSION UPDATE

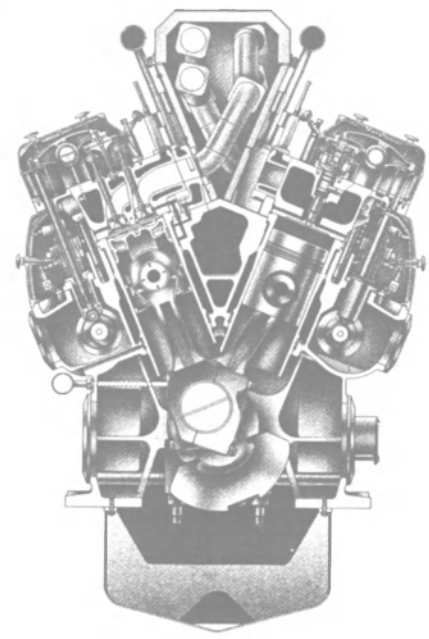
Alpha Diesel Introduces Four-Stroke Medium-Speed Diesel Engine Series

—Color Brochure Offered—

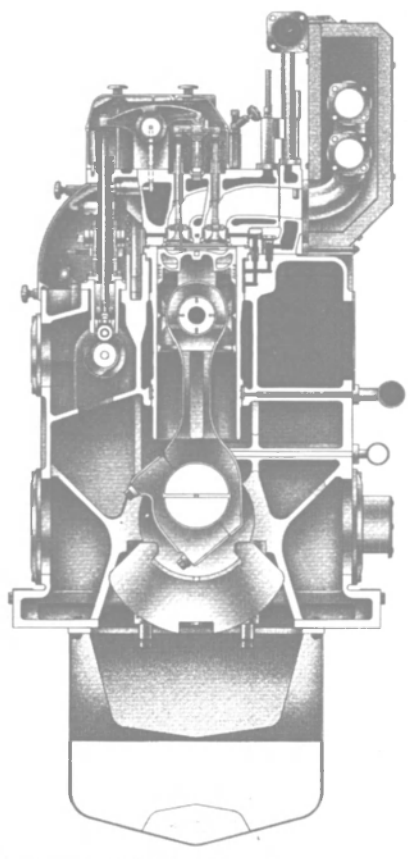
MAN B&W's objective at their Alpha Diesel Frederikshavn establishment is to meet the day-to-day requirements and improvements for efficient and reliable ship propulsion systems in all types of vessels.

There are few manufacturers with more experience than Alpha Diesel in the design, manufacture and service of complete propulsion systems. From the start of the century Alpha Diesel has manufactured complete propulsion systems consisting of engine, gearbox, propeller equipment and remote controls.

At MAN B&W Diesel's Research and Development Centers in Denmark and West Germany a staff of experts use all the very latest technology to ensure customers an Alpha propulsion system is the most attractive investment for the future. One of the latest engines introduced by MAN B&W Diesel A/S, Alpha Diesel is the 28/32A engine, a development of the well-known 28-series of four-stroke medium-speed diesel engines.



Profile of the V28/32A engine, available in V configuration with 12 and 16 cylinders.



Profile of MAN B&W Diesel's in-line engine type L28/32A, available with 6, 8 and 9 cylinders.

The engine is available as an in-line engine with 6, 8 and 9 cylinders and in V configuration with 12 and 16 cylinders. The cylinder output is 220 kw (300 hp) at 750 engine rev/min. Under non-tropical conditions the 6-, 9- and 12-cylinder versions can be delivered with cylinder outputs of 245 kw (333 hp).

The reliability achieved with the 28/32A engine is the result of careful analysis of information obtained from earlier 28-series engines over many years in service. This experience was collated from approximately 1,000 engines and corresponding to approximately 2.1 million hp.

The sturdy engine block is of nodular cast-iron. The engine has easy access for maintenance and all major moving parts are protected by noise absorbing covers and enclosures.

The cylinder covers have well-dimensioned inlet and exhaust ports for efficient air changes. Direct cooled valve seat rings enable long intervals between valve overhaul and trouble-free operating when burning heavy fuels with viscosities up to 700 cSt.

To provide an engine which is as far as possible self contained (requiring the minimum of additional services), engine-driven pumps are arranged at the forward end of the engine to cater for engine cooling water, lube and fuel oil services.

The engine is also provided with a simple and reliable air start motor obviating the necessity for complicated air start valves, distributor and extensive associated pipe work which such a system requires.

Characteristic advantages include high reliability; low fuel oil consumption; low spare part consumption; long intervals between overhaul; simple to overhaul; and no limitations for part load operation.

Alpha Diesel is offering a free 18-page color brochure detailing the 28/32A diesel engine series, as well as its reduction gearboxes, CP propellers and electronic remote control systems. For a copy,

Circle 16 on Reader Service Card

Joint Cruise Venture Formed By Salen Lindblad

The formation of a joint venture, Frontier Cruises, to build and operate an expedition cruise vessel, has been announced by Salen Lindblad Cruising and several partners.

The 6,700-ton vessel will be capable of accommodating 164 passengers and will be built by Mitsubishi Heavy Industries at a cost of $42 million. The Arctic and Antarctic will be included among its cruises.

Partners of Salen Lindblad are Mitsubishi Corp., Mitsubishi Heavy Industries, Nippon Yusen Kaisha, and Hapag-Lloyd AG.

Drew Ameroid Helps Shipowners Control High Costs Of Low-Cost Fuels

Drew Ameroid® recently introduced another "Added Value" solution to marine fuel problems—Amergy® 222 fuel oil conditioner, a premium blend of solvents, dispersants, surfactants, and detergents which minimizes the effect of fuel instability and incompatibility. This technologically advanced conditioner dissolves sludge and then stabilizes the fuel components, reducing their tendency to form sludge. Equally effective for diesel engines and steam boiler systems, and with all grades of blended and residual fuels, Drew Ameroid Marine claims the use of Amergy 222 oil conditioner can result in significant savings in fuel, cleanings, sludge disposal, labor and maintenance costs.

Amergy 222 conditioner is the latest addition to Drew's internationally available line of products for treating fuel. The company backs its fuel treatment chemicals with programs that maximize the product's potential, the efficiency of the ship, and the reduction of operating costs.

To minimize expenses, many operators are using the lowest quality fuel recommended by engine manufacturers. However, this potential for savings can be negated by fuel instability. This condition can be worsened when fuels from different bunkerings, which may be incompatible, are mixed. Unfortunately, there often isn't sufficient available shipboard bunker tank capacity to avoid mixing fuels. By adding Amergy 222 conditioner to the tanks before bunkering, problems resulting from instability and incompatibility of fuel oils are reduced. Results can be attained at a low cost-per-treatment, over a wide dosage range.

Treatment is easy with Amergy 222 conditioner because it does not require special dosing equipment. The product is slug-dosed before bunkering and is completely soluble in the fuel. Because it is both a dispersant and a solvent, the use of Amergy 222 conditioner results in improved fuel combustion, reduced sludge disposal problems, and fewer cleanings of tanks, heaters, strainers and lines.

Drew's international network of service technicians provides added value to each chemical purchase through support programs designed to promote and monitor the product's complete benefits. Drew's Pace® fuel evaluation program provides comprehensive analysis and evaluation of the chemical and physical properties of a ship's fuels, with follow-up recommendations to the ship operator. The "Red Carpet Program" provides onboard visits to assist with dosing and crew instruction, fuel analysis to ensure the most effective dosing rates, and a six-month follow-up visit to make sure that optimum results are being obtained.

For more information on how Drew's fuel treatment programs, products and services will work best for your company,

Circle 24 on Reader Service Card

USS Cowpens Launched At BIW for U.S. Navy

Bath Iron Works recently launched the guided missile cruiser USS Cowpens (CG-63) for the U.S. Navy at ceremonies in Bath, Maine.

Senator **Strom Thurmond**, R-S.C., was the principal speaker at the ceremony. **Lucy Mustin**, wife of Vice Admiral **Henry C. Mustin**, U.S. Navy (Ret.), was the sponsor of the ship.

The USS Cowpens is a Ticonderoga Class (CG-47) cruiser built to provide the primary antiair warfare protection for the Navy's battle forces. Equipped with the Aegis combat system, the ship will be able to operate in all warfare mission areas to detect, track and destroy enemy aircraft, missiles, submarines and surface ships. The Aegis system, comprising radars, computers and weapons, is designed to function effectively in all weather and hostile countermeasure environments.

The USS Cowpens is 567 feet in length, has a 55-foot beam and will displace approximately 9,600 tons upon completion. Four GE gas turbine engines will enable the ship to reach speeds in excess of 30 knots.

The ship will be equipped to carry standard surface-to-air and Tomahawk missiles launched from fore and aft vertical launching systems; the fully automated, radar-controlled Phalanx anti-air weapon system; Harpoon surface-to-surface missiles; two five-inch guns; electronic warfare systems and two Light Airborne Multi-Purpose System (LAMPS) helicopters.

For free literature detailing the shipbuilding services of BIW,

Circle 63 on Reader Service Card

Navy Awards $5.5-Million Contract To Ingalls Shipbuilding

Ingalls Shipbuilding Corporation, Pascagoula, Miss., was awarded a $5,534,706 cost-plus-award-fee contract for long lead material for ship alteration kits for DD-963 and FFG-7 class ships. The work is expected to be completed by May 10, 1991. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-4108).

CDI Marine Assigns Wantage As Manager Of Bath, Maine, Office

CDI Marine Company of Jacksonville, Fla., recently announced the assignment of **Donald R. Wantage** as manager of the company's Bath, Maine, Office.

Mr. **Wantage** has over 30 years' experience in naval shipbuilding and nuclear power generation gained at Newport News Shipbuilding and Westinghouse Electric Corporation. While at Newport News he participated in developing both contract and detail designs for HVAC systems for CVs, CVNs, SSNs and SSBNs. As a design group supervisor at Westinghouse Offshore Power Systems he was responsible for the design of HVAC and refrigeration systems for a series of floating nuclear plants. Prior to joining CDI Marine Company, he was a project manager for PAI, Inc., where he was responsible for the development of detail technical specifications for various naval facilities.

Baldwin Reappointed Vice Admiral; Assigned President Of NDU

Secretary of Defense **Dick Cheney** has announced that President **George Bush** has nominated Vice Admiral **John A. Baldwin, Jr.** U.S. Navy, for reappointment to the grade of vice admiral and assignment as president, National Defense University. Vice Admiral **Baldwin** is presently serving as Director, J-5, the Joint Staff.

200 CMA Members And Guests Attend Luncheon And Hear Talk On Oil Tanker Industry

Pictured above during the CMA luncheon in Greenwich, Conn., are, left to right: **Walter Thorsen,** International Shipyard representative; **Ed Roland**, president, Amoco Transport Co., Inc., Chicago; and **Donald B. Frost,** president, Connecticut Maritime Association and vice president, Skaarup Shipping Corp., Greenwich, Conn.

The Connecticut Maritime Association (CMA) recently held a luncheon at Maneros Restaurant in Greenwich, Conn., during which **E.J. Roland,** president of Amoco Transport Company, Chicago, delivered a speech before 200 members and guests, the largest number ever to attend a CMA luncheon.

Mr. **Roland's** talk covered a wide variety of subjects involving the oil tanker industry, including financing, safety, technology and management.

USNS 'Dutton' Emergency Drydocking At Dakar Marine

Dakar Marine, Senegal, West Africa, recently performed an emergency drydocking on the USNS Dutton, according to exclusive U.S. representative **Wesley D. Wheeler.**

The Victory Class Dutton was originally the steam-propelled Tuskegee Victory operated by LSC Marine, Inc., Wilmington, Del., for the Military Sealift Command-Atlantic.

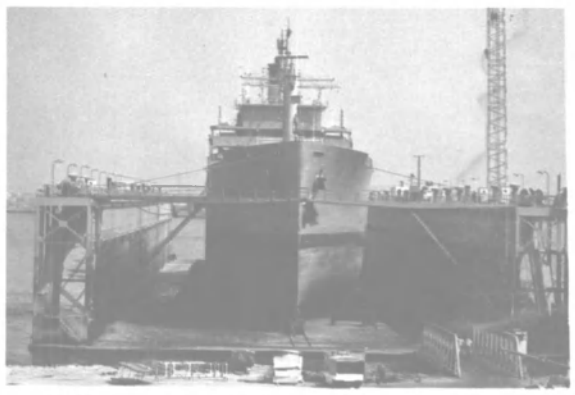
Dakar Marine at Dakar, Senegal, the westernmost point in Africa, was ideally suited geographically for the operating route of the vessel.

The yard was originally founded at the turn of the century by the French Navy. In recent years the yard was turned over to the Senegal Government Development Group and it is a corporation on private lines with the government majority interest being privatized.

There is a steady, well-trained labor force of about 500 persons, many of whom have been through the apprentice-school, the local educational system and European universities and work practice.

There is a diverse pool of subcontractors for excess and specialized types of work.

A modern Panamax floating dock has an inside breadth of 134-1/2 feet and a length of 771 feet. The graving dock has a breadth of 113.5 feet and length of 607.5 feet at quay level. A synchrolift of about 1,000 tons lift is also available mostly for the large fishing fleet and smaller craft.



The USNS Dutton emergency drydocking at Dakar Marine in Dakar, Senegal.

Prices are quite reasonable and well-equipped shops include steel fabrication, electrical, electronic, machine, pipe carpentry and painting.

The rigorous specifications called for completion of the wide variety of all shop works within 20 days with a severe penalty for late redelivery.

For free literature giving full information on the facilities and capabilities of Dakar Marine,

Circle 54 on Reader Service Card

Circle 231 on Reader Service Card

Circle 268 on Reader Service Card

DOT Regulations Prohibit Dumping Plastics At Sea

"By halting the discharge of plastic waste from ships, we are taking a major step to protect the world's marine environment," said Secretary of Transportation **Samuel K. Skinner** recently in announcing an interim final rule that prohibits the dumping of plastics, including synthetic fishing nets and other ship-generated garbage at sea.

The interim final rule, issued by the Coast Guard, implements Annex V of the International Convention for the Prevention of Pollution from Ships, known as MARPOL 73/78. The interim rule incorporates many of the comments and suggestions filed in response to earlier proposals. The regulations apply to U.S.-flag vessels anywhere in the world and foreign-flag vessels in U.S. waters out to the 200 mile limit of the Exclusive Economic Zone. Vessels covered by these regulations include commercial, recreational and fishing vessels of any size and type.

In addition to prohibiting the disposal of plastic refuse, the regulation restricts the dumping of other ship-generated garbage at sea and requires U.S. ports and terminals, including recreational marinas, to provide adequate facilities for receiving garbage. The interim final rule became effective May 30, 1989, with one exception. Those ports and terminals that receive garbage from foreign countries have until August 26, 1989 to provide disposal facilities that meet the standards of the Animal and Plant Health Inspection Services (APHIS) of the U.S. Department of Agriculture.

The regulations provide for a civil penalty of up to $25,000 and criminal penalties of up to $50,000 and five years in jail for violations.

The Coast Guard invites comments on the interim rule. The comments will be considered in refining the final rule. Written comments will be accepted through December 31, 1989, and should be sent to Commandant (G-LRA-2), U.S. Coast Guard Headquarters, Room 3600, 2100 Second Street, S.W., Washington, D.C. 20593-0001.

A copy of the rule may be obtained by calling the Coast Guard's toll-free hotline, (800) 368-5647. (In Washington, D.C., call 267-0780.)

Gerald L. Lund Named Director, Marine Survival Training Center At USL

Gerald L. Lund has been named director of the Marine Survival Training Center at the University of Southwestern Louisiana.

Construction of the center has begun on a 60-acre lake adjacent to the Lafayette Regional Airport. Instruction is scheduled to start in the summer of 1989, when the facility will be used to train personnel in water survival and abandoning oil rigs and vessels in enclosed lifeboats.

For more information and free literature on the Marine Survival Training Center at USL,

Circle 27 on Reader Service Card

Bender Awarded Contract On USCG Cutter Acushnet

Bender Shipbuilding & Repair Co., Inc. was recently awarded a contract for the regular overhaul of the USCG Cutter Acushnet, a 213-foot by 35-foot medium-endurance vessel used in search and rescue and drug enforcement missions. The vessel is homeported in Gulfport, Miss.

The base contract amount is approximately $120,000.

Bender is a full-service shipyard that builds, converts and repairs vessels for commercial and governmental owners and operators. The company has been in operation for 70 years.

For free literature detailing the facilities and capabilities of Bender Shipbuilding & Repair,

Circle 39 on Reader Service Card

Circle 24 on Reader Service Card

Meyers Appointed Sales Representative By BFGoodrich Unit

Fred Meyers has been appointed sales representative for BFGoodrich Dynamic Polymer Products, including Cutless® and Commander® brand bearings and related marine industry products.

Mr. **Meyers** will serve the company's commercial and naval accounts in Washington, Oregon, Alaska, and British Columbia. A U.S. Naval Academy graduate, he has nearly 20 years of experience in the marine industry. Sales offices are located in Seattle, Wash.

BFGoodrich Dynamic Polymer Products, a business unit of the BFGoodrich Aerospace Division, is the new name for the operations of LQMoffitt, Inc., which merged April 1, 1989, with The BFGoodrich Company.

For free literature detailing the products of BFGoodrich,

Circle 21 on Reader Service Card

Seacoast Announces 'J.I.T.' Inventory Management And Distribution System

Scott Cannold

Seacoast Electric Co. of Rye, N.Y., recently announced their "J.I.T." (Just In Time) inventory management and distribution system, which has enabled the company to cut costs and guarantee delivery. They currently have a brochure available to deliver this message to the shipbuilding industry to help reduce the cost of operations.

Seacoast Electric Co., a division of Manhattan Electric Cable, is a family business founded in 1931. The company has four branches within the U.S. and is represented in 15 countries. In 1981 the company expanded in wire and currently controls about 65 percent of the marketplace.

Scott Cannold, president, said the biggest change since 1981 is the inventory management concept, and he feels that the biggest problem in the shipping business is controlling costs. Shipping business does not perceive "service" as a product, he added, saying that companies that do not dedicate themselves to marine industry loose their position in the marketplace. "The trick is to be partners with the shipyards—know what shipyard needs will help them save money while you make money."

Seacoast Electric Company is offering a number of free brochures and bulletins detailing its marine shipboard cables, "Just-In-Time" computerized inventory management and distribution system and other products and services. In addition, the company also is offering a detailed training manual, which provides users with a greater knowledge of shipboard cables, cord, tubing, and other marine electrical products and equipment.

Among the services offered by the company, Seacoast's "Just-In-Time" (J.I.T.) inventory management and distribution system is one of its most unique.

According to the company, J.I.T. allows a customer to have complete control and use of his inventory by means of on-line information via computer link-up between Seacoast's warehouse and the customer's office.

This system allows for easy inventory analysis as well as streamlined ordering, purchasing, invoicing and distribution geared to a customer's exact production needs. With the cost-efficient J.I.T. program, the company reports there is no expediting, more efficient communications, less need to stockpile inventory, less personnel involved in procurement, less time to execute orders, less waste and less scrap. This adds up to higher productivity and profit on inventory investment.

For free copies of the Seacoast Electric brochures and literature,

Circle 67 on Reader Service Card

ELECTRONICS UPDATE

Furuno Offers New Radar For Workboats, Smaller Vessels

—Free Literature Available—

Furuno recently introduced what the company says is one of the finest small dome antenna radars ever introduced on the U.S. market, the Model 1830. This new radar, replacing the well-known M1800, has such performance features as full 3-kw output, a large, bright, high-resolution 10-inch rasterscan display, high definition four-level quantization, Furuno's exclusive MIC receiver, off-centering for forward range extension, Echo Plot to assess course and speed of other targets, and trackball-controlled EBL, EVRM, cursor and Guard Zone.

The M1830 provides eight range scales from 1/4 to 24 n.m. and has a newly designed lightweight dome antenna for easy installation. When connected to an external nav receiver, the M1830 displays position in Lat/Lon, vessel speed and range/bearing to a selected waypoint at the bottom of the CRT. Also, all radar system settings and control readouts are displayed.

Furuno's new M1830 has the styling, performance features and reliability to make it the perfect radar for yachts, smaller fishing vessels and workboats. It operates from a universal 10.2 to 40 VDC power source and requires just 50 W.

Furuno's new small dome antenna radar, Model 1830.

For free literature containing full information on the new Model 1830 small dome antenna radar from Furuno,

Circle 12 on Reader Service Card

New Lifesaving Equipment Rules Proposed For Large Commercial Ships

The Coast Guard recently announced proposed changes in the regulations for lifesaving equipment on large commercial ships. The proposed regulations are the result of recent revisions of an international treaty known as the Safety of Life at Sea Convention, or SOLAS.

The proposed rules would also carry out a number of recommendations that resulted from marine casualty investigations by the Coast Guard and the National Transportation Safety Board. Lifesaving equipment regulations for Great Lakes ships and other ships in domestic trade that are not covered by SOLAS would also be revised to require more effective lifesaving devices.

Under the proposed regulations:

• Large commercial ships operating in the ocean or on the Great Lakes would be required to carry a new type of Emergency Position Indicating Radio Beacon (EPIRB) that operates on a worldwide satellite frequency. EPIRBs alert the Coast Guard and other foreign search and rescue forces to a vessel casualty, and provide a homing beacon to locate a vessel in distress. The new satellite EPIRBs would be phased in over a six-year period.

• Ferries and passenger ships operating in water below 59 degrees F would have to carry lifeboats or rafts to keep all survivors out of the water.

• New large passenger ships in ocean service would be required to have partially enclosed lifeboats with rigid canopies at each end, and an open area in the center that can be quickly closed with a foldable cover.

• Totally enclosed lifeboats would be required on most new large cargo and tanker ships.

The proposed regulations would also allow the use of some new lifesaving systems, including free-fall lifeboats, marine escape slides, and inflatable buoyant apparatus.

The Coast Guard's proposed regulations were published in the April 10 issue of the *Federal Register*, with a four-month comment period. Comments should be submitted to: Coast Guard Marine Safety Council (G-LRA-2), 2100 Second Street S.W., Washington, D.C. 20593-0001.

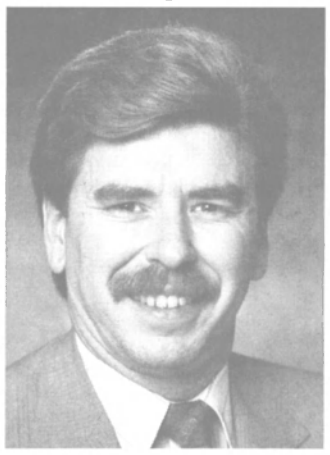
Copies of the proposed regulations may be obtained by writing to: Coast Guard Survival Systems Branch (G-MVI-3), 2100 Second Street, S.W., Washington, D.C. 20593-0001. Requests may also be made by facsimile at (202) 267-1069 (24-hour automatic operation) or by telephone at (202) 267-1444.

Jarrell Named VP, General Motors, And General Manager Of Electro-Motive

John W. Jarrell, previously general director of the Diesel Division of GM of Canada Limited, has been elected a vice president of General Motors Corporation and general manager of the Electro-Motive Division (EMD).

In September 1985, Mr. **Jarrell** was appointed general director of GMC Coaches in Pontiac, Mich. He served in that capacity until August 1987, when he was named to the position of general director for Diesel Division, General Motors of Canada Limited.

Ohio River Company Promotes Dwight Halbert



Dwight Halbert

The Ohio River Company and Orgulf Transport, subsidiaries of Midland Enterprises Inc., recently announced the promotion of **Dwight Halbert** to manager of Covered Barge Services. In this capacity, he will be responsible for the allocation, utilization and profitability of Midland's fleet of over 700 covered barges.

Headquartered in Cincinnati, Ohio, The Ohio River Company and Orgulf Transport Co. are some of the largest movers of dry cargo commodities on the inland waterway system.

Rauma-Repola Awarded $50-Million Order To Build Cruise Ship

Finnish shipbuilder Rauma-Repola was recently awarded a $50-million order to build a 330-passenger cruise for Delphin Cruises. The vessel is the second cruise ship order won by the Finnish yard from Delphin.

The new passenger ship, which is expected to be delivered in the spring of 1990, will operate in the Baltic and the Mediterranean.

At present, Rauma-Repola is completing the 300-passenger cruise vessel Delphin Clipper. She is expected to be delivered this month.

Fast Wave-Piercing Catamaran Ferry Ordered For Cross-Channel Route

The Portsmouth, U.K., yard of Aluminium Shipbuilders Ltd. will build a 161-foot wave-piercing catamaran for Condor, the Guernsey ferry operator. The twin-deck vessel, designed by International Catamaran Designs, will be the largest passenger-only fast wave-piercing catamaran ferry in the world.

The vessel is to enter service in the second quarter of 1990 on Condor's cross-channel route between St. Malo, Jersey, Guernsey and Weymouth, currently being served by two 180-seat hydrofoils. The introduction of the wave-piercer should significantly improve weather reliability and ride quality .

The hulls of a wave-piercing catamaran are designed with minimal freeboard and reserve buoyancy so that they will tend to pierce waves in rough weather rather than ride up over them. This reduces vertical motions and gives a more comfortable ride.

The two main hulls are joined by a continuous bridging structure that incorporates a third hull forward on the centerline. This center hull is normally above the water but in extreme sea conditions it provides additional buoyancy, the underside and forward end being shaped to minimize shock loads should it enter the water.

Powered by four Deutz MWM TBD 604B V16 diesels, delivering 1,682 kw each at 1,800 rpm, and waterjets, the wave-piercer will have a full load service speed of 35 knots. Length overall will be approximately 161 feet with an overall beam of 60 feet and draft of 5 feet.

The wave-piercer will be the 10th INCAT ferry built by Aluminium Shipbuilders. During the past year, the company has launched seven 55.7-foot catamarans for Thames Line's service through central London and a 12-seat executive craft. It will also be the 10th wave-piercing catamaran to enter service; six smaller versions have already been delivered, and by next summer more than a dozen will be operating in Australia, New Zealand, the United Kingdom, the U.S., and Yugoslavia.

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The listings above are an editorial service provided for the convenience of our readers.

PROPULSION UPDATE

Elliott White Gill Thrusters Offer Excellent Maneuverability With Complete Control

—Literature Available—

Elliott Turbomachinery Ltd., a subsidiary of the Elliott Turbomachinery Co. Inc. of Jeannette, Pa., was formed following the parent company's acquisition in 1971 of the marine engineering company J. Samuel White of Cowes, Isle of Wight.

Since 1964, J. Samuel White had been developing and manufacturing variations of the Gill Thruster, invented in 1921 for river and inland waterways use. Following the development and installation in 1966 of the first "deepsea" marine unit, the Elliott White Gill Thruster has since proved itself over many years in numerous and varied shipboard installations, offering unique advantages

Elliott White Gill thrusters provide full continuous thrust through 360 degrees to move a vessel in any desired direction, independently of ship speed.

All units fit flush to the hull, thereby avoiding the risk of collision damage or fouling of underwater obstacles. Also, the siting of water intakes on the underside of the hull prevents the ingestion of floating debris or intake of air in a heavy sea.

Elliott White Gill bowthrusters may be used as a completely independent means of propulsion and can be powered by any engine or electric motor of the required capacity. All units are manufactured to the BS5750 standard of quality assurance and consist of an axial flow pump mounted within the hull with only two moving elements—a bronze pump rotor and a cast rotatable vaned discharge deflector. This proven design ensures long life, trouble-free operation and ease of maintenance.

A simple, electrically driven control system allows directional maneuvering from a single control point, eliminating the need to balance control thruster, main engine and rudder simultaneously.

Elliott White Gill thruster systems include many proven advantages: positive thrust trainable throughout 360 degrees; freedom from underwater hazards (including grounding); full submergence (even in heavy seas); simplified maneuvering independent of rudder and main propulsion (capable of auxiliary propulsion); simple rugged construction; versatile applications including shallow draft vessels; only one wet bearing, requiring no attention; no critical oil seals for possible failure; and no need to reverse gearing.

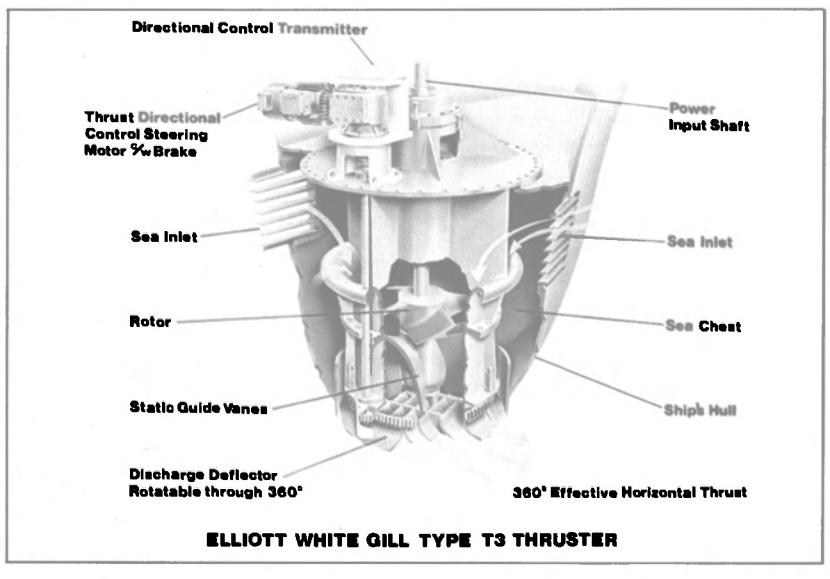
Recent orders include Cable and Wireless (Marine) Ltd.'s new cable ship Sir Eric Sharp, fitted with Elliott White Gill bow and stern thrusters Model 50T3, an identical installation to that fitted in the 1984-built sister vessel Pacific Guardian. The thrusters, operating in conjunction with an advanced dynamic positioning system, enhance the vessel's maneuvering and position-keeping capabilities, particularly while working cable or using the remote-operated cable-handling submersible. These two units complement the 14 Elliott White Gill thrusters supplied to or in service with Cable And Wireless (Marine) Ltd. over the past 20 years.

Also, Elliott Turbomachinery Ltd. has recently received an order for an Elliott White Gill vertical shaft thruster, type 50T3S, to be fitted in the bow of the first of a new class of U.S. Navy Ocean Research Vessels. The vessel, as yet unnamed, is being constructed by the Trinity Marine Group at the Halter Moss Point Shipyard in Escatawpa, Miss.

The 262-1/2-foot vessel, fitted with the Elliott White Gill unit in the bow and twin azimuthing thrusters at the stern, will be equipped with a full dynamic positioning system, and is intended for worldwide operation.

For free literature giving full information on Elliott White Gill bow/stern thruster systems,

Circle 14 on Reader Service Card



ELLIOTT WHITE GILL TYPE T3 THRUSTER

PRMMI Appoints Hayes Port Manager In Baltimore

Puerto Rico Marine Management Inc. (PRMMI), agent for Navieras de Puerto Rico, recently announced the appointmment of **Chris Hayes** as port manager in Baltimore.

Mr. **Hayes**, who began his career in the maritime industry in 1963 with U.S. Lines and then with Sea-Land, originally joined PRMMI in 1974, playing a key role in the company's development in the Port of Baltimore. In 1978, he made a career change and directed the logistic contracts for Saudi Arabia in the building of the largest and most expensive airport in the world, the King Khaled International Airport. Prior to rejoining PRMMI, Mr. **Hayes** served as project manager for the Maryland Port Administration where he was instrumental in implementing the ACROSS project, an automated port system which interfaces with the U.S. customs automated commercial system.

The R/V Edwin Link, converted from a supply vessel by North American Shipyard, will enable Harbor Branch Oceanographic Institute to conduct research all over the world.

North American Shipyard Delivers Research Vessel 'Edwin Link' To Harbor Branch Oceanographic

North American Shipyard, Larose, La., recently delivered the converted research vessel Edwin Link to Harbor Branch Oceanographic Institute (HBOI) of Fort Pierce, Fla.

Extensive modifications were required to convert a supply vessel to a submersible support ship up to HBOI's standards. Rodney E. Lay & Associates, designer of HBOI's Seward Johnson, was selected to design and engineer the conversion. A 168-foot Houma Fabricators hull was selected and work began at North American.

Labs totaling more than 1,600 square feet were added to the main deck. These include a wet lab with a fume hood room, a dry lab, two refrigerated environmental rooms, a video-film lab with dark room, a mechanical/electrical shop and a diver's support air compressor room. A crew's lounge was also added on the main deck. On the 01 deck, 1,250 square feet of quarters were added to bring the total complement to 30.

Below deck, two former freshwater tanks were converted to an auxiliary machinery room and submersible stores. The ballast tanks were also modified by removing the internal mud tanks to provide scientific stores directly beneath the dry lab. A marine sanitation device was also added. A mud compressor and diesel engine were removed to make room for a new 190-kw generator. A new switchboard was installed to parallel the new generator and two existing 75-kw generators. The existing tunnel thruster was removed and a 360-degree steerable thruster was installed for increased maneuverability while tracking the Johnson-Sealink submersibles. A Caley Hydraulics A-Frame rated at 18 tons was installed at HBOI to support the Johnson-Sealink II submersible that will be carried on board.

Additional scientific equipment installed includes a gallows frame, various oceanographic winches, uncontaminated saltwater pumps, and an internal moon pool for submersible communications. These will assist scientists in various research projects. With this new vessel, Harbor Branch has expanded its ability to conduct research all over the world.

For free literature giving full information on the facilities and capabilities of North American Shipyard,

Circle 18 on Reader Service Card

S/S Rotterdam To Undergo $10-Million Refurbishment At Northwest Marine

Northwest Marine Iron Works and Holland America Lines have jointly announced plans for a $10-million major refurbishing and renovation this fall of the S/S Rotterdam, the cruise line's flagship.

Holland-America's **J. Lievisse Anriaanse,** vice president-Technical Department, and **William Zavin,** president of Northwest Marine, said "We have 28 calendar days to complete the project, and we will be working around the clock to achieve that objective." Work will begin September 9 and must be completed by October 7 so the ship will be ready for the Caribbean cruise season.

Mr. **Zavin** said "this upgrade will mark the largest project Northwest Marine has ever done on a cruise ship. We've been doing this kind of work since 1979—and on more than 20 ships—but never on a scale as large as this and in such a short time frame."

Renovations on the 38,645-gross-ton Rotterdam will run the full gamut from reupholstering furniture to replacing bedspreads and curtains to changing carpets to expanding the casino.

Technical improvements will include replacement and upgrading of the ship's telephone system; upgrading of the public address system; installation of a bow thruster; overhaul of the stabilizers; replacement of the film projectors in the ship's theatre; and the repair of teak decking on the Upper Promenade, Sun and Bridge Decks.

Also scheduled is the installation of a new air conditioning system, the addition of new washing machines, and the conversion of the Number 3 Hold Trunk to six additional cabins. All this is in addition to normal drydocking and an underwater survey and repairs.

For free literature giving complete information on the facilities and capabilities of Northwest Marine Iron Works,

Circle 25 on Reader Service Card

U.K.'s Kelvin Hughes To Get Queen's Award For Export Achievement

The U.K.'s Kelvin Hughes, markers of maritime navigation aids and equipment since 1750, will receive the Queen's Award for Export Achievement. The award, given for a significant increase in sales of ships' navigational radar abroad, comes as the company has announced its new and revolutionary river radar system, the RSR 100, designed specifically for vessels that ply busy rivers and congested waterways.

Kelvin Hughes' long association with merchant marine and naval establishments worldwide embraces all aspects of marine navigation from charts and chart table instruments to compasses, sophisticated echo sounding and other sonar equipment, as well as radar.

The company has been sole supplier of navigational radar to the British Royal Navy for many years, and an increasing amount of business is now being conducted with a number of overseas navies. "It is this developing export business that has brought us the coveted Queen's Award," says **Ron Harman,** managing director. "I am delighted that the company has won recognition in this way. It is a great achievement for everyone concerned, and reflects the quality and performance of Kelvin Hughes' navigational radar equipment."

The award is one of two achieved by Smiths Industries plc companies. The second goes to Portex, makers of single use, sterile surgical and medical products, and part of Smiths Industries Medical Systems Group of companies.

For further information and free literature on Kelvin Hughes,

Circle 22 on Reader Service Card

◀ For literature on Aeroquip products, circle the appropriate number of the reader service card: Hose & Fittings—**Circle 205;** Polyon Hose—**Circle 206;** Teflon Hose—**Circle 207;** Quick-disconnect Couplings—**Circle 208.**

BUYERS DIRECTORY

This directory section is an editorial feature published in every issue for the convenience of the readers of MARITIME REPORTER/Engineering News. A quick-reference readers' guide, it includes the names and addresses of the world's leading manufacturers and suppliers of all types of marine machinery, equipment, supplies and services. A listing is provided, at no cost for one year in all 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) 477-6700.**

AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION
Adrick Marine Corp., 320 Cantor Ave., Linden NJ 07036
Bailey Group, 2323 Randolph Ave., Avenel, NJ 07001
Cospolich Refrigerator Co., 949 Industry Rd., Kenner LA 70062
Stal Refrigeration AB, Butangsgatan 16, S-60187 Norrkoping SWEDEN

BALLAST
Genstar Stone Products, Executive Plaza IV, Hunt Valley, MD 21031
Mineral Research & Recovery Inc., 4565 S. Palo Verde, Ste 203, Tucson AZ 85714

BARGE BUILDING
HBC Barge, Brownsville PA 15417

BARGES—Leasing
McDonough Marine Service, P.O. Box 1825, Parkersburg WV 26101

BASKET STRAINERS
Beaird Industries, P.O. Box 31115, Shreveport, LA 71130
Cleveland Gear, 3249 E. 80 St., Cleveland OH 44104

BEARINGS—Rubber, Metallic, Non-Metallic
B.F. Goodrich (formerly L. Q. Moffitt, Inc.) P.O. Box 5550, Akron, OH 44313
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Kingsbury Inc., 10385 Drummond Rd, Philadelphia PA 19154
Thomson Gordon Ltd., 3225 Mainway, Burlington, Ont., CANADA L7M 1A6

BOILER CLEANING
Asea Stal, 50 Chestnut Ridge Rd., Montvail N.J. 07645

BROKERS
Captain Astad Company, Inc., P.O. Box 350486, Ft Lauderdale FL 33335; P.O. Box 1093, Houma, LA 70360
Bergeron & Associates, P.O. Box 726, Chalmette LA 70044
Jack Faulkner Inc., 2419 Caddy Lane, P.O. Box 371, Flossmoor IL 60422
Mowbray's Tug & Barge Sales Corp., 35 De Hart St., Morristown NJ 07960

BULKHEADS
The Waugh Co./Rockment (TNF), 5111 6 Baymeadows Rd., Suite 394, Jacksonville, FL 32217

CARGO ACCESS EQUIPMENT
Morgan Crane Co., Inc. (Hiab SeaCranes and QMC Trident, Ferrari, Fassi marine cranes), 1009 E. Chestnut Ave., Santa Ana CA 92701

CARGO HANDLING SYSTEM
Skarpenord A/S, US Agent: American United Marine Corp., 5 Broadway, Rte 1, Saugus MA 01906

CHAIN
Crandall Dry Dock Engineers Inc./Marit Chain, 21 Pottery Lane, Dedham MA 02026
Milligan Marine Supply Inc., 5832 Harvey Wilson, Houston TX 77020
Washington Chain & Supply, 2901 Utah Ave South, Seattle WA 98124

COMPACTORS
ICI Multi-Pak Inc., 14719 Carolcrest, Houston TX 77079
TFC Corp., 9819 Logan Ave., So., Minneapolis MN 55431. Sales Agents: American United Marine, 5 Broadway, Rte 1, Saugus MA 01906

COMPUTERIZED INFORMATION SYSTEMS
TIMSCO, P. O. Box 91360, Mobile AL 36691

CONDENSERS/SEPARATORS
Wright Austin Co., 3250 Franklin St., Detroit MI 48207

CONTROL SYSTEMS—Monitoring
ASEA, Inc., 4 New King St., White Plains, NY 10604
The Clark-Reliance Corporation, 16633 Foltz Industrial Parkway, Strongsville OH 44136
IMO Industries, Gems Sensors Division, One Cowles Rd., Plainville CT 06062
Indikon Division, Metravib Instruments Inc., 26 New St, Cambridge, Ma 02138
MMC International (Marine Moisture Control), 60 Inip Dr, Inwood NY 11696
NAMCO Controls, 7567 Tyler Blvd, Mentor OH 44060
Schroder Bellows, P.O. Box 631, Akron OH 44309
TANO Marine Systems Inc., 4301 Poche Court West, New Orleans LA 70129
Teleflex Inc., 771 First Ave., King of Prussia, PA 19406
Valmet Automation A.S., P.O. Box 130, N-3430, Spikkestad, Norway

CRANES—HOISTS—DERRICKS—WHIRLEYS
ASEA-Hagglund, Inc., 50 Chestnut Ridge Rd., Montvale NJ 07645
The Crosby Group, Inc., P.O. Box 3128, Tulsa OK 74101
Del Gavio Marine Hydraulics Inc., 207 W. Central Ave., Maywood NJ 07607 telex: 132610 DELMARINE
Liebherr-Werk Nenzing GES.mbh, P.O. Box 10, A-6710 Nenzing, AUSTRIA
Marine Travelift, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235
Morgan Crane Co., Inc. (Hiab SeaCranes and QMC Trident, Ferrari, Fassi marine cranes), 1009 E Chestnut Ave., Santa Ana CA 92701
J.D. Neuhaus, Hebezeuge, D5810, Witten Heven, West Germany
Pettibone-Tiffin Corp., 235 Miami St., Tiffin, OH 44883
Westmont Industries, 10805 Painter Ave., Santa Fe Springs, CA 90670

DECK MACHINERY—Cargo Handling Equipment
Braden Carco Gearmatic, P.O. Box 547, Broken Arrow, OK 74013
Gearmatic—see 'Broden Carco Gearmatic' above.
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, WA 98134
McElroy Machine & Mfg. Co., Inc., P.O. Box 4455, Biloxi MS 39535
Morgan Crane Co., Inc. (Hiab SeaCranes and QMC Trident, Ferrari, Fassi marine cranes), 1009 E Chestnut Ave., Santa Ana CA 92701
Schoellhorn-Albrecht, P.O. Box 22110, St Louis MO 63116

DIESEL ACCESSORIES—CYLINDER LINERS
Acurex Corporation, Autodata Division, 555 Clyde Ave., P.O. Box 7042, Mountain View, CA 94039
Colt Industries Inc. Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511
Diesel America Inc., 5217 River Rd., New Orleans LA 70123
FCS Inc., 22 Main St., Center Brook CT 06409
General Thermodynamics Corporation, 210 South Meadow Road, P.O. Box 1105, Plymouth, MA 02360
Kiene Diesel Accessories, 325 S. Fairbanks St., P.O. Box 386, Addison IL 60101

DIESEL ENGINE—Spare Parts & Repair
Bergen Diesel A/S, P.O. Box 924, N-5001 Bergen NORWAY
Bergen Diesel Inc., 2701 Delaware Ave., Kenner LA 70062
Colt Industries Inc. Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511
Cummins Engine Company, Mail Code 60011, Box 3005, Columbus, IN 47202-3005
MAN B&W Diesel GmbH, Stadtbachstrasse 1, D-8900 Augsburg 1, Federal Republic of Germany
MAN B&W Diesel, 50 Broadway, 18th Fl., New York, NY 10004
Markisches Werk GmbH, P.O. Box 1442, D-5884 Halver 1, Federal Republic of Germany
Sims Pump Valve Co., Inc., 1314 Park Ave., Hoboken NJ 07030
Sulzer Brothers Inc., 200 Park Ave., New York, N.Y. 10166

DIVING & SALVAGE
H.J. Merrihue, P.O. Box 23123, New Orleans LA 70183

DRY DOCKS-Design
Marine Design Services, P.O. Box 928, Bonita CA 92002

ELECTRICAL EQUIPMENT
L. F. Gaubert & Co., Inc., P. O. Box 50500, New Orleans LA 70150
MMC International (Marine Moisture Control), 60 Inip Dr, Inwood NY 11696
SPD Technologies, 13500 Roosevelt Blvd., Philadelphia PA 19116
Ward Leonard Electric, 31 South St., Mt. Vernon, NY 10550
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, OR 97201

ELECTROMAGNETICS
Sentel Corp., 6713 Robinia Rd., Camp Springs MD 20748

ELECTRONIC ENCLOSURES
A&J Manufacturing, 14131 Franklin Ave., Tustin CA 92680

ELECTRONIC SYSTEMS
Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 TX: 125327

ENGINE TEST EQUIPMENT
General Thermodynamics Corp., P.O. Box 1105, 210 S. Meadow Road, Plymouth, MA 02360

EQUIPMENT—Marine
Thomas Coudon Associates, 6655 Amberton Dr., Baltimore, MD 21227
Dynabrade, 72 E Niagara St., Tonowanda NY 14150
Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302
Space Machine & Engineering Corp., 2346 16th Ave North, St Petersburg FL 33713

EVAPORATORS
Beaird Industries Inc., P.O. Box 31115, Shreveport LA 71130
Equipment Engineering, 666 Baker St., #265, Costa Mesa CA 92626
MECO (Mechanical Equipment), 861 Carondelet St., New Orleans LA 70130
Water Technologies, Div. of Aqua Chem, P.O. Box 421, Milwaukee WI 53201

FANS—VENTILATORS—BLOWERS
Carling Turbine Blower Company, 10 Nebraska St., P.O. Box 88, Worcester MA 01613
Flebu A/S, US Agent: American United Marine Corp., 5 Broadway, Rte 1, Saugus MA 01906
Jon M. Liss Associates, Inc., 411 Borel Ave., San Mateo, CA 94402

FASTENERS
Action Threaded Products Inc., 6955 S. Harlem, Bedford Park, IL 60638
Hardware Specialties Co., Ships Division, 48-75 36th St, Long Island City NY 11101
Lee Brass Company, P. O. Box 1229, Anniston AL 36202
Non-Ferrous Bolt & Mfg Co., 4085 Nevso Dr., Suite C, Las Vegas NV 89103
Okabe Co., Inc., 175 Lively Blvd., Elk Grove Village, IL 60007

FENDERING SYSTEMS/BUOYS—Dock & Vessel
Kohlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Milligan Marine Supply Inc., 5832 Harvey Wilson, Houston TX 77020
Seaward International, Inc., Clearbrook Industrial Park, P.O. Box 98, Clearbrook VA 22624

FUEL ADDITIVE
U.S. Borax, Industrial Chemicals, 3075 Wilshire Blvd., Los Angeles CA 90010

GALLEY EQUIPMENT
Gaylord Industries, 10900 S W Avery St, P.O. Box 1149, Tualatin, OR 97062
McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi MS 39535-4454

GANGWAYS, LADDERS
A.L. Don, 1 Don Plaza, Dock St., Matawan NJ 07747
National Specialty Products, 5727 Heffernan St., Houston TX 77087
Rampmaster Inc., 9825 Osceola Blvd., Vero Beach, FL 32960
Westmont Industries, 10805 Painter Ave., Santa Fe Springs, Los Angeles, CA 90670
Wooster Products Inc., 1000 Spruce St., P.O. Box 896, Wooster, OH 44691

HEAT EXCHANGERS
Alfa Laval Inc., 2115 Linwood Ave., Fort Lee NJ 07024
Beaird Industries Inc., P.O. Box 31115, Shreveport LA 71130
MECO (Mechanical Equipment), 861 Carondelet St., New Orleans LA 70130

HORNS/WHISTLES
Kohlenberg Bros Co., P.O. Box 358, Two Rivers, WI 54241

HYDRAULICS
Aeroquip Corporation, 300 South East Ave., Jackson, MI 49203
Cunningham Marine Hydraulics Co., 201 Harrison St., Hoboken NJ 07030
Del Gavio Marine Hydraulics Inc., 207 W Central Ave., Maywood NJ 07607; telex: 132610 DELMARINE
Parker Hannifin Corporation, 17325 Euclid Avenue, Cleveland, OH 44112

INCINERATORS
Teamtec A/S, P.O. Box 100, N-4912 Gjeving, NORWAY
A/S Vesta, 27 Skudehavnsvej, DK-2100 Copenhagen DENMARK. US Agent: American United Marine, 5 Broadway, Rte 1, Saugus MA 01906

INSTRUMENTATION
Technical Services Group, 2900 Main St., Alameda CA 94501

INSULATION—Cloth, Fiberglass
Soundcoat, One Burt Drive, Deer Park NY 11729

JOINER—Watertight Doors—Paneling—Ceiling Systems—Decking
Astech, 3030 S. Red Hill Ave., Santa Ana, CA 92711
IMAC AB, Berga Alle 1, S-252 55 Helsingborg, SWEDEN
Johnson Construction Specialties, Inc., 3420 Rusk, P.O. Box 1360, Houston, TX 77251
E.H. O'Neill Company, 5515 Belair Rd., Baltimore MD 21206
Walz & Krenzer Inc., 1390 Mt. Read Blvd., Rochester NY 14606
Warvel Products Inc., 160 Park St., P.O. Box 290, Gillett WI 54124

KEEL COOLERS
R.W. Fernstrum & Co., 1716 Eleventh Ave., Menominee, MI 49858
Kohlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
The Walter Machine Co., Inc., 84-98 Cambridge Avenue, Jersey City, NJ 07307

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights
Carlisle & Finch, 4562 W. Mitchell Ave., Cincinnati OH 45232
Phoenix Products, 6161 N 64th St., Milwaukee WI 53218

LINE BLINDS
American Piping Products Inc., Box 1056, New Hyde Park, NY 11040
Stacey/Fetterolf, P.O. Box 103, Skippack, PA 19474

LOGISTICS
VL Logistic Consultants, Inc., 3008-C Bienville Blvd., Ocean Springs MS 39564

LUBE-OIL CENTRIFUGES
Hamworthy Engineering Ltd., Fleets Corner, Poole, Dorset, BH17 7LA ENGLAND; Hamworthy USA, 744 Roble Rd, #190, Allentown, PA 18103

MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING
AMT, Inc., 2400 NW 39th Ave., Miami FL 33142
Del Gavio, 207 W. Central Ave., Maywood, NJ 07607. Telex: 132610 DELMARINE
In-Place Machining Co., 1929 North Buffum St., Milwaukee WI 53212

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS
Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Hwy., Arlington, VA 22202
Aero Nav Laboratories, Inc., 14-29 112 St., College Point, NY 11356
American Systems Engineering Corp., P.O. Box 8988, Virginia Beach, VA 23452
Amirikian Engineering Co., P.O. Box 15210, Chevy Chase MD 20815
B.C. Research, 3650 Wesbrook Mall, Vancouver, B.C. Canada V6S 2L2
CDI Marine Co., 900 Regency Square Blvd., Suite 203, Jacksonville, FL 32211
C.T. Marine, 18 Church Street, Georgetown, CT 06829
Childs Engineering Corp., Box 333, Medfield, MA 02052
Crandall Dry Dock Engrs., Inc., 21 Pottery Lane, Dedham, MA 02026
Crane Consultants, 15301 First Ave S., Seattle WA 98148
C.R. Cushing, 18 Vesey St., New York, NY 10007
Arthur D. Darden, 3100 Ridgelake Dr., Suite 101, Metairie LA 70002
Design Associates Inc., 14360 Chef Menteur Highway, New Orleans, LA 70129
Designers & Planners, 2011 Crystal Dr., Arlington VA 22202
Diversified Technologies, 812 Live Oak Dr., Chesapeake VA 23320
E.Y.E. Marine Consultants, Belmont House, 33 Alderney Dr., Suite 350, Dartmouth, NS CANADA B2Y 2N4
Encon Management & Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706
GHM Inc. (Industrial Measurement Consultants), P.O. Box 1836, Newport News, VA 23601
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., 600 Mutual Life Bldg., 605 First Ave., Seattle, WA 98104
Morris Guralnick Associates, Inc., 620 Folsom Street, Suite 300, San Francisco, CA 94107
C. Raymond Hunt Associates, 69 Long Wharf, Boston MA 02110
Hydrocomp, Inc., 45 James Farm-Lee, P.O. Box 865, Durham, NH 03824
Intramarine, Inc., P.O. Box 53043, Jacksonville, FL 32201
JJH Inc., No. 4 Executive Campus, Culbert Blvd. & Route 70, P.O. Box 5031, Cherry Hill, NJ 08034
R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073
James S. Krogen, 1515 NW 7th St., Suite 124, Miami FL 33125
Rodney E. Lay & Associates, 13891 Atlantic Blvd., Jacksonville, FL 32225
K.P.G. Integrated Engineering Pty Ltd., P. O. Box 525, Cairns, Qld. 4870 AUSTRALIA
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi, MS 39535-4454
John J. McMullen Associates, Inc., 1 World Trade Center, New York, NY 10048
MacPherson Maritime Services, 141 Jefferson Ave., Westfield NJ 07090
Fendall Marbury, 9 Neal Street, Annapolis MD 21401
Marine Management Systems Inc., 102 Hamilton Ave., Stamford CT 06902
Marine Power Associates, 1010 Turquois St., Ste 217, San Diego, CA 92109
Maritime Design, Inc., 2955 Hartley Rd., Jacksonville, FL 32217
R.J. Mellusi & Co., 71 Hudson St, New York. NY 10013
Nelson & Associates, Inc., 610 Northwest 183rd St., Miami, FL 33169
Nord Marine Inc., P.O. Box 305, Fair Haven NJ 07701
Northern Marine, P.O. Box 1169, Traverse City, MI 49685
Ocean Oil International Engineering Corp., 3019 Mercedes Blvd, New Orleans LA 70114
Q.E.D. Systems Inc., 4646 Witchduck Rd., Virginia Beach, VA 23455
M. Rosenblatt & Son, Inc., 350 Broadway, New York, NY 10013 and 667 Mission St., San Francisco, CA 94105
Sargent & Herkes, 225 Baronne St., Suite 1405, New Orleans LA 70112
Sea School, 3770 16th Street North, St. Petersburg, FL 33704
Seaworthy Systems Inc., P.O. Box 338, Essex, CT 06426; 17 Battery Pl., New York, NY 10004; P.O. Box 205, Solomons MD 20688; 2 Skyline Pl., 5203 Leesburg Pike, Falls Church VA 22041.
Seaworthy Electrical Systems, 17 Battery Pl. N.Y. N.Y. 10004
George G. Sharp, Inc., 100 Church St., New York, NY 10007
R.A. Stearn, Inc., 253 N. 1st Ave., Sturgeon Bay, WI 54235
Systems Engineering Associates (SEACOR), 200 East Park Dr., Suite 600, Mt Laurel NJ 08054
TIMSCO, P. O. Box 91360, Mobile AL 36691

NAVIGATION & COMMUNICATIONS EQUIPMENT
Comsat Maritime Services, 950 L'Enfant Plaza SW, Washington DC 20024
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
General Electric Company, Mobile Communications Division, Lynchburg, VA 24502
Harris Corporation, RF Communications Group, 1680 University Ave., Rochester NY 14610
Henschel Corporation, 9 Hoyt Dr., P.O. Box 30, Newburyport MA 01950
ITT Mackay, 441 U.S. Highway #1, Elizabeth, NJ 07202
Kelvin Hughes Ltd., New North Rd., Hainault, Ilford, Essex 1G6 2UR England
Koden International, 77 Accord Park Dr., Norwell MA 02061
Mackay Communications, 441 US Hightway #1, P.O. Box 331, Elizabeth NJ 07207
Magnavox MSS, 2895 Maricopa St., Torrance CA 90503
Marine Electric RPD Inc., Galbraith Pilot Marine Div., 666 Pacific St., Brooklyn NY 11217
Naval Electronics, 5417 Jetview Circle, Tampa FL 33634
Norcontrol Simulation A/S, Bekkajordet 8A, P.O. Box 1024, N-3191 Horten NORWAY
Racal Marine Inc., 70 Jackson Dr., Cranford NJ 07016
Radio-Holland USA, Inc., 6033 South Loop East, Houston, TX 77033
Raytheon Marine Company, 46 River Rd., Hudson NH 03051
Raytheon Service Company, 5760 Northampton Blvd., Ste 102, Virginia Beach VA 23455
Robertson-Shipmate, Inc., 400 Oser Ave., Hauppauge NY 11788
Sperry Marine Inc., 1070 Seminole Trail, Charlottesville VA 22906
Telesystems, 2700 Prosperity Ave., Fairfax, VA 22031 USA
Watercom Communications Systems, 453 E. Park Place, Jefferson IN 47130

OILS—Marine—Additives
B P North America Petroleum, 555 US Route 1, So. Iselin, NJ 08830
Burmah-Castrol Inc., Raritan Plaza II, Raritan Center, Edison NJ 08837
Chevron USA, 575 Market St., San Francisco, CA 94105
Exxon Company International, 200 Park Ave., Bldg 222, Room A279, Flor-

932
onal, 2000 Westchester Avenue, White Plains NY 10650

ARATORS

.c., 2115 Linwood Ave., Fort Lee NJ 07024
.o, Inc. (Westfalia Separators), 100 Fairway Court, Northvale, NJ 07647
Microphor, Inc., 452 E Hill Rd., P.O. Box 1460, Willits, CA 95490
MMC International (Marine Moisture Control), 60 Inip Dr, Inwood NY 11696

PAINTS—COATINGS—CORROSION CONTROL

American Abrasive Metals Co., 460 Coit St, Irvington NJ 07111
Armorica Sales Inc., 2 Marineview Plaza, Hoboken NJ 07030
CTI Industries, 10 Sasco Hill Rd., Fairfield CT 06430
International Paint, P. O. Box 920762, 6001 Antoine Dr., Houston TX 77292
Palmer International, P.O. Box 8, Worcester, PA 19490
Unitor Ships Service, Unitor Marine Chemicals Division, 3 High St., Rickmansworth, Herts, WD3 1SW UNITED KINGDOM

PIPE FITTINGS/CONNECTING SYSTEMS

Aeroquip, 300 South East Ave., Jackson, MI 49203
Deutsch Metal Components, 14800 S. Figueroa, Gardena, CA 90248

PORT SERVICES

Port of Iberia, P.O. Box 897, New Iberia LA 70561

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

ASEA Brown Boveri, 1460 Livingston Ave., North Brunswick NJ 08902
Bird Johnson Company, 110 Norfolk St., Walpole, MA 02081
Bergen Diesel A/S, P.O. Box 924, N-5001 Bergen NORWAY
Bergen Diesel Inc., 2701 Delaware Ave., Kenner LA 70062
Boston Metals Co., 313 E. Baltimore St., Baltimore, MD 21202
Burmeister & Wain Alpha Diesel AS, DK-1400 Copenhagen K, Denmark
Caterpillar In., 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
Cummins Engine Company, Mail Code 60011, Box 3005, Columbus, IN 47202-3005
Deutz Corp., 7585 Ponce de Leon Circle, Atlanta, GA 30340
Electro-Motive Division of GM, 9301 W 55th St., LaGrange, IL 60525
Fincantieri, Diesel Engines Division—GMT, Bagnoli della Rosandra 334, Trieste, ITALY
GE Marine & Industrial, 1 Neumann Way N-158, Cincinnati OH 45215
GE Naval & Drive Turbine Systems Department, 166 Boulder Dr., Fitchburg MA 01420
General Motors, Allison Gas Turbine, P. O. Box 420, U-6, Indianapolis IN 46206
KHD Canada Inc., 180 Rue de Normandie, Boucherville, Quebec J4B 5S7, Canada
KaMeWa, P.O. Box 1010, S-681 01 Kristinehamn, SWEDEN
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Krupp MAK Maschinenbau GmbH, P.O. Box 9009, D-2300 Kiel 17, WEST GERMANY
Lips Propellers, 3617 Koppens Way, Chesapeake, VA 23323
Marine Gears, Inc., P.O. Box 689, Greenville MS 38707
Markisches Werk, Halve, P.O. Box 1442, D-5884 Halver WEST GERMANY
MAN B&W Diesel, 50 Broadway, New York, NY 10004
MAN B&W Diesel A/S, Ostervej 2, DK-4960 Hoelby, Denmark
MAN B&W Diesel A/S, Alpha Diesel, Niels Juels Vej 15. DK-9900 Frederikshavn Denmark
MAN B&W Diesel GmbH, Stadtbachstrasse 1, D-8900 Augsburg 1 Germany
MAN High Performance Diesels (Nurnberg), 160 Van Brunt St., Brooklyn NY 11231
Michigan Wheel Corp., 1501 Buchabab Ave., SW, Grand Rapids MI 49507
Morrison-Knudsen Company, Power Systems Division, P.O. Box 1928, Rocky Mount NC 27801
MTK Magnetek Inc., 11111 Santa Monica Blvd., Los Angeles CA 90025
Northwest Marine Services Corp., 6452 So. 144th St., Tukwila WA 98168
Ovako Steel Couplings AB Sweden, S-813 00 Hofors SWEDEN
Propulsion Systems, 1441 N Northlake Way, Seattle WA 98103
Schottel-Werft, Josef Becker GmbH, KG, D-5401 Spay, WEST GERMANY
Karl Senner Inc., 25 W Third, Kenner LA 70062
Stewart & Stevenson, 1400 Destrehen, P.O. Box 8, Harvey LA 70059-0008
Sulzer Brothers, Dept. Diesel Engines, CH-8401 Winterthur, Switzerland
Sulzer/Escher Wyss, Ravensburg WEST GERMANY
Twin Disc, 1328 Racine St, Racine WI 53403
Ulstein International A/S, N-6065 Ulsteinvik, NORWAY
Ulstein Maritime Ltd., 96 North Bend Street, Coquitlam BC CANADA V3K 6H1
J.M. Voith GmbH, Marine Division, Postfach 1940, 7920 Heidenheim/Brenz, WEST GERMANY Voith Schneider America Inc., 121 Susquehanna Ave., Great Neck, NY 11021
Wagner Engineering Ltd., 40 Gostick Pl., No Vancouver BC CANADA V7M 3G2
Wartsila Power Inc., 5132 Taravella Rd., P.O. Box 868, Marrero, LA 70072
ZF of North America, Marine Sales, 500 Barclay Blvd, Lincolnshire IL 60069

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Bornemann Pumps, Unit 402, Blackstone Center, 6 Blackstone Valley Place, Lincoln RI 02865
Del Gavio, 207 W. Central Ave., Maywood, NJ 07607. Telex: 132610 DEL MARINE
Imo-Delaval, Inc., IMO Pump Division, Box 447, Monroe NC 28810
Jim's Pump Repair, 48-55 36th St., Long Island City NY 11101
Leistritz Corporation, 165 Chestnut St., Allendale NJ 07401
Megator Corporation, 562 Alpha Drive, Pittsburgh, PA 15238
Vita Motivator, 99 W Hawthorne Ave., Suite 622, Valley Stream NY 11580

ROPE—Manila—Nylon—Hawsers—Fibers

Allied Signal Inc., Fibers Division, 1411 Broadway, New York, NY 10018
Atlantic Cordage Corp., 60 Grant Ave., Carteret, NJ 07008
Columbian Rope Corporation, P.O. Box 270, Guntown MS 38849
E.I. DuPont de Nemours, Shipboard Cable, Room G-51549-NE, P.O. Box 80029, Wilmington DE 19880-0029
Samson Ocean Systems, 2090 Thornton St., Ferndale WA 98248

SANITATION DEVICES—Pollution Control

Envirovac Inc., 1260 Turret Dr., Rockford, IL 61111
Microphor, Inc., 452 E Hill Rd., P.O. Box 1460, Willits CA 95490
Research Products/Blankenship (Incinolet), 2639 Andjon, Dallas, TX 75220

SCALE MODELS

Sturgeon Bay Model Shop, 187 N Ninth Ave., Sturgeon Bay WI 54235

SCUTTLES/MANHOLES

L.S. Baier & Assoc., 7527 NE 33rd Dr., Portland OR 97211
Mock Manufacturing Inc., 777 Rutland Rd., Brooklyn, NY 11203

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MAN—GHH, P.O. Box 110240, D-4200 Oberhausen 11, West Germany
NEI Syncrolift, Inc., 8970 S W 87th Ct., Miami FL 33176
Offshore Industries, Inc., 144 Railroad Ave., Suite 206, Edmonds WA 98020

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Astilleros Espanoles S.A., Padilla 17, 28006 Madrid, SPAIN
Avondale Industries Inc., P.O. Box 50280, New Orleans LA 70150
Bay Shipbuilding Corp., 605 N. 3rd Ave., Sturgeon Bay, WI 54235
Bender Shipbuilding & Repair Company, Inc., P.O. Box 42, Mobile AL 36601
Blount Marine, Box 368, Warren RI 02885
Brodosplit Shipbuilding Industry, Put Udarnika 19, P.O. Box 17, 58000 Split YUGOSLAVIA
Colonna's Shipyard, Inc., 400 E Indian River Rd., Norfolk VA 23523
Curacao Drydock (U.S.A.) Inc., 26 Broadway, Suite 741, New York, NY 10004
Equitable Shipyards Inc., Trinity Marine Group, Box 29266, New Orleans LA 70189
Fincantieri SpA Cantieri Navali Italiani, Via Cipro 11, 16129 Genoa ITALY
Houston Ship Repair, 1621 Woods Dr., P.O. Box 489, Channelview, TX 77530
Hyundai Corporation, ShipSales Dept., 140-2 Kye dong, Chongro-ku, Soeul, KOREA
Hyundai Mipo Dockyard Ltd., 456 Cheonha-Dong, Ulsan, KOREA
Keppel Shipyard Limited, 325 Telok Blangah Road, P.O. Box 2169, Singapore 0409
Paul Lindenau GmbH, & Co., Schiffswerft u. Maschinenfabrik, D-2300 Kiel Friedrichsort, West Germany
Lisnave, Apartado 2138, 1103 Lisbon, Codex PORTUGAL
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, WA 98134
M.A.N. GHH Sterkrade, P.O.B. 110240, D-4200 Oberhausen 11, West Germany
Marco, Inc., 2300 W Commodore Way, Seattle, WA 98199
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Munson Manufacturing, 150 Dayton, Edmonds WA 98020
Newport News Shipbuilding, 4101 Washington Ave., Newport News, VA 23607
Northwest Marine Ironworks, P. O. Box 3109, Portland OR 97208
SeaArk, P.O. Box 210, Monticello AR 71655
Service Marine Industries, P.O. Box 3606, Morgan City LA 70381
Skipperliner Shipyards, 621 Park Plaza Dr, Dept 21, LaCrosse WI 54601
Southwest Marine, Inc., P.O. Box 13308, San Diego, CA 92113
3 Maj Associates Shipbuilding Industry, P. O. Box 117, 51001 Rijeka YUGOSLAVIA
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Trinity Marine Group, Box 29266, New Orleans LA 70189
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Zidell Explorations, Inc., 3121 S.W. Moody Street, Portland, OR 97201
Zodiac of North America Inc., Thompson Creek Rd., P.O. Box 400, Stevensville, MD 21666

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Saab Tank Control, 201 W Passaic St., Rochelle Park NJ 07662

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American Vulkan Corporation, P.O. Drawer 673, 2525 Dundee Rd., Winter Haven, FL 33882-0673
Cajon Co., 9760 Shepard Rd., Macedonia, OH 44056
Circle Seal Controls, Brunswick Corporation, P.O. Box 3666, Anaheim, CA 92803
Cla-Val Co., P.O. Box 1325, Newport Beach, CA 92663
Crawford Fitting Company, 29500 Solon Road, Solon, OH 44139
Cunico Corporation, 214 N Hawaiian Ave., P.O. Box 306, Wilmington CA 90748
Stanley G. Flagg Co., 1020 W High St, Stowe PA 19464
Lexair Inc., Airmatic/Beckett, 299 Gold Rush Rd., Lexington KY 40503
Loeffler Machine, US #1 & Robbins Ave., Penndel PA 19047
MMC International (Marine Moisture Control), 60 Inip Dr, Inwood NY 11696
Nupro Co., 4800 E. 345th St., Willoughby, OH 44094
PBM Inc., RD 6, Box 387A, Sandy Hill Rd, Irwin PA 15642
Parker Hydraulic Valve Division, 520 Ternes Avenue, Elyria, OH 44035
Parker Actuator Division, 9948 Rittman Road, P.O. Box 450, Wadsworth, OH 44281-4050
Parker Systems Division, 651 Robbins Drive, Box 3500, Troy, MI 48007 3500
Research Tool & Die Works, 17124 S Keegan Ave., Carson CA 90746
Skarpenord A/S, US Agent: American United Marine Corp., 5 Broadway, Rte 1, Saugus MA 01906
Stacey/Fetterolf, P.O. Box 103, Skippack, PA 19474
Swagelok Company, 5171 Hudson Dr., Hudson, OH 44236
Teleflex Inc., 771 First Ave., King of Prussia, PA 19406
Whitey Co., 318 Bishop Road, Highland Heights, OH 44143

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T. W. Spaetgens, 156 W 8th Ave., Vancouver BC CANADA V5Y 1N2
Vibranalysis Engineering Corp., 4380 S. Wayside, Suite 100, Houston TX 77087

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Beaird Industries Inc., P.O. Box 31115, Shreveport LA 71130
Everpure, Inc., 660 N. Blackhawk Dr., Westmont, IL 60559

WEATHER CHART RECORDERS

Alden Electronics, 40 Washington St., Westborough, MA 01581

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American Durweld Sales, P.O. Box 850, Scituate MA 02066
Welding Consultants USA, 10399 Paradise Blvd. #101, St. Petersburg, FL 33706

Washburn & Doughty Deliver 800-Passenger Ferry To Hy-Line

The M/V Great Point, built by Washburn & Doughty Associates, Inc., East Boothbay, Maine, is powered by Caterpillar engines to a top speed of 18 knots.

Washburn & Doughty Associates, Inc., East Boothbay, Maine, recently delivered the 185-foot, 800-passenger ferry M/V Great Point to Hy-Line Cruises of Hyannis, Mass.

Designed by John W. Gilbert Associates of Boston, Mass., the Great Point is in service between Hyannis and Nantucket Island.

Powered by Caterpillar 3516 marine diesel engines, the twin-screw vessel cruises at 16 knots.

The hull design includes a bulbous bow for improved speed and fuel economy, and a Schottel bowthruster driven by a Detroit Diesel 6-71N engine. Auxiliary machinery includes two 90-kw Caterpillar generator sets, Caterpillar 3304T engines and one 65-kw Caterpillar 3304N emergency generator.

Built to ABS rules, the piping, machinery and fire protection plans incorporate sub-chapter H criteria in many areas. The M/V Great Point measures under 100 gross tons for Coast Guard sub-chapter T requirements.

A Tenfjord hydraulic steering system featuring a rotary piston rudder actuator was installed aboard the Great Point. Tenfjord, Inc., located in Hoboken, N.J., handles steering gears for all size and type vessels.

The first Tenfjord hydraulic steering gear, introduced in 1953, was developed with emphasis on reliability. The steering gear provided constant torque throughout the rudder angle range. This was achieved by constructing a rudder actuator with a unique arc-formed piston and chamber. Simple, yet radically new. No other steering gear of comparable torque can be installed so simply. Shipyards that have experience with Tenfjord steering gear fully appreciate the overall advantages. Its ruggedness and reliability has won the confidence of owners and ship's engineers alike.

The passenger ferry has two enclosed decks and two open decks. Her main deck includes restaurant seating and booths for 250 passengers forward, with open seating, luggage and bicycle storage aft. The interior bulkheads, ceiling and overhead were supplied by Dampa USA.

For literature completely detailing the shipbuilding, engineering and naval architectural services provided by Washburn & Doughty,

Circle 53 on Reader Service Card

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Braden Carco Gearmatic, P.O. Box 547, Broken Arrow, OK 74013
Fritz Culver, Inc., P.O. Box 569, Covington, LA 70434
Gearmatic—see 'Braden Carco Gearmatic' above.
MMC International (Marine Moisture Control), 60 Inip Dr, Inwood NY 11696
Markey Machinery Co., 79 South Horton St., Seattle, Washington 98134
Nashville Bridge Co., P.O. Box 239 Nashville TN 37202
Smith Berger Marine Inc., 516 S. Chicago St., Seattle, WA 98108

WINDOWS

Marketec, Inc. (Wynn Windows), P.O. Box 946, Pisgah Forest NC 28768

WIRE AND CABLE

Seacoast Electric Company, Station Plaza, Rye NY 10580

L&C Designs And Installs Dehumidification And Monitoring System For General Cargo Ship

L&C Associates, North Hampton, N.H., an industry leader in the design and installation of dehumidification, sealing and monitoring systems for the marine market, recently announced the completion of the installation of an innovative dehumidification, sealing, and monitoring system for the American Kestrel, chartered to the Military Sealift Command.

The Kestrel is a prepositioned, general cargo ship chartered to carry breakbulk cargo.

The system, designed and installed by L&C to meet MSC specifications, consists of monitoring and dehumidifaction systems which service each of the vessel's six holds.

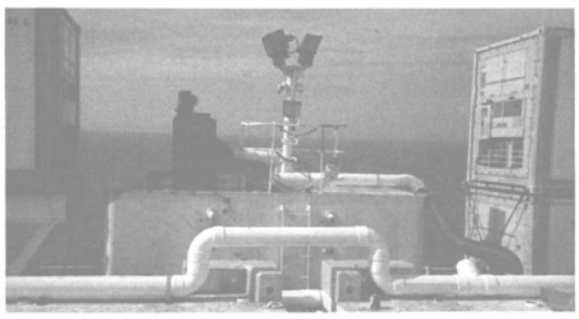

Photo shows dehumidifier (center/left) aboard the general cargo ship American Kestrel, and the rigid and flex PVC to move the dehumidified air to the containers.

A major component of the system is a Cargo Environment Monitoring System (CEM), which includes air flow sensors and humidity sensors. The area monitored by the CEM exceeds 1.2 million cubic feet.

The CEM includes a computerized data retrieval and recording system, as required by MSC specs, designed by L&C. This unit compiles and computes functions and transmits data to a logger located in the deck office. Data can be downloaded via PC to floppy disks or nonvolatile EERPOM storage cartridges.

For additional information and free literature,

Circle 48 on Reader Service Card

VL Logistics Opens New Corporate Headquarters

VL Logistics, Inc. of Ocean Springs, Miss., recently opened its new corporate office with a ribbon-cutting ceremony performed by Ocean Springs' Mayor, the Honorable **Chester McPherson** and VL president **Margaret Vallor.** VL Logistics offers logistic support services from proposal preparation through contract deliverables for cost-effective life cycle support of systems/equipment, with a special emphasis on use of existing data systems and reapplication of previously developed, proven information. VL's capabilities include integrated logistic support plans, computer software development, technical publications, provisioning/outfitting, system engineering, quality assurance plans, reliability and maintainability studies, engineering/technical documentation, system engineering and program/project management.

For more information and free literature on VL Logistics, Inc.'s capabilities and facilities,

Circle 31 on Reader Service Card

Caterpillar-Powered Scalloper Delivered By Washburn & Doughty

The 70-foot-long Theresa & Allyson is powered by a Caterpillar 3408 DITA with a Twin Disc 516 6:1 reduction gear.

Washburn & Doughty Associates, East Boothbay, Maine, recently delivered the 70-foot-long steel dragger/scalloper Theresa & Allyson to its owner, **David Jordan.**. The vessel is now fishing out of Portland, Maine. The Theresa & Allyson has a beam of 20 feet and depth of 10 feet 6 inches. Propulsion is supplied by a Caterpillar 3408 DITA with a Twin Disc 516 6:1 reduction gear.

The vessel has accommodations forward, fishhold amidship and engineroom aft. The fishhold is built with a capacity of about 2,500 cubic feet 40 pounds/cubic foot, about 100,000 pounds.

Other features include fishhold sheathing by Masterbond, electronics by Ross Marine, deck machinery and hydraulics by Down East Machine and Engineering, and paint system by Devoe.

The Theresa & Allyson is a sister ship to the three-year-old Elizabeth, owned by Cyrus Lauriat and fishing out of Boothbay Harbor, Maine.

For free literature giving details on the facilities and capabilities of Washburn & Doughty Associates,

Circle 46 on Reader Service Card

Marinette Marine Launches Second MCM Vessel

The mine countermeasure ship Champion (MCM-4) was recently launched at Marinette Marine Corporation, Marinette, Wis.

The Champion is the fourth ship of the new design "Avenger" (MCM-1) class vessel scheduled to be delivered to the U.S. Navy. The ships are 224 feet in length, have a beam of 37 feet, a draft of approximately 11 feet, and a full load displacement of approximately 1,300 tons. They are equipped with the latest state-of-the-art combat systems equipment designed to search and destroy mines.

MCM-4 is the second MCM vessel to be constructed by Marinette Marine, the first, MCM-2, is scheduled to be delivered to the Navy on August 11, 1989. Keel-laying for a third vessel, MCM-7, took place in 1987.

For free literature giving full details on the facilities and capabilities of Marinette Marine,

Circle 41 on Reader Service Card

SeaArk Marine Appoints Two New Managers

SeaArk Marine, Inc. of Monticello, Ark., has announced two new members of the company's management staff, according to **Robert Trammel**, president of SeaArk.

James F. Mullen will assume the position of engineering manager.

He formerly worked as an engineer for Grumman Corporation, Aircraft Systems Division of Bethpage, N.Y. Prior to that, he was a design engineer at Gibbs and Cox Naval Architects and Marine Engineers, a design engineer at Wing Systems of Bayville, N.Y., and a marine engineer at the American Bureau of Shipping of New York.

Eddie C. Fisher Jr. will join the staff as chief estimator. His responsibilities will include all estimating and bidding activities, and the tracking of jobs through the construction process.

Mr. **Fisher** was formerly the owner of Fisher's Marine Brokers of Marrero, La., a marine brokerage firm, and the owner and president of Quality Fabricators, Inc. of Lafitte, La., an aluminum boatbuilding and repair facility. He has worked as the engineering department manager of Camcraft, Inc. of Crown Point, La., and technical section chief and engineering manager of Dynamic Shipbuilders, Inc. of Crown Point.

SeaArk Marine, formerly Mon-Ark Boat Company, is based in Monticello, Ark. The company builds customized all-purpose workboats including patrol boats, fireboats, survey vessels, personnel and passenger launches.

Wilson Joins Omega Marine Contractors

Omega Marine recently announced that **Harry Wilson** had joined its organization as general manager, mooring division, Omega Marine Contractors (OMC).

The new company, a part of the Omega Marine Group, will provide turnkey construction and installation services to the marine and offshore industries.

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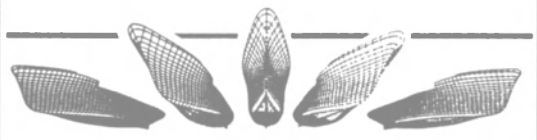

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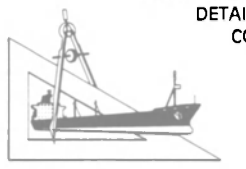

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FBM Marine Introduces New Generation Of Fast Catamarans, Ferry Craft And Crewboats

FBM Marine recently delivered the 134-1/2-foot Oregrund to Hong Kong Macao Hydrofoils. At a fully loaded cruise speed of 38 knots, the catamaran will reduce the journey time between Hong Kong and Macao by 1 hour.

FBM Marine, formerly known as Fairey Marinteknik, recently introduced the Oregrund, a 134-1/2-foot catamaran, the first of a new generation of fast catamarans, fast ferry craft and crewboats.

The craft is a single-deck catamaran designed to carry 360 passengers in spacious, quiet and comfortable cabins, at a fully loaded cruise speed of 38 knots between Hong Kong and Macao.

The catamaran is fitted with two MTU 16V 396 TB 84 engines, each producing 1,940 kw, and driving two Marinjet Power System waterjets. The control system for the jets incorporates an automatic maneuvering system which enables the craft to be moved sideways from its berth, and to be turned on its own axis. It is fitted with the Marindesign pitch damping system (PDC) with an onboard computer constantly monitoring the trim of the vessel, utilizing the specially designed trim tabs to reduce any movement, particularly in head seas.

The Group currently has two more 134-1/2-foot Marinjet catamarans under construction; four 111-1/2-foot versions and two 134-1/2-foot Marinjet Monohulls. Additionally, the world's first Fast Displacement Catamaran is under construction at the FBM Marine yard in Cowes.

The U.S. agent for FBM Marine is Atlantic Marine Inc., Fort George Island, Fla.

For more information and free literature,

Circle 49 on Reader Service Card

Moss Point Delivers Two Cummins-Powered Towboats To Hashemite Kingdom Of Jordan

The Cummins-powered towboat Jaber is shown on sea trials in the Gulf of Mexico near Pascagoula, Miss.

Moss Point Marine, Inc. of Escatawpa, Miss., recently delivered two 60-foot towboats to the Jordan Ports Corporation of the Hashemite Kingdom of Jordan.

The two vessels, the Jaber and the Bayer are part of a five-boat, $13-million U.S. AID (Agency for International Development) contract with the Trinity Marine Group, which includes Moss Point Marine.

The two all-steel towboats are each 60 feet long with a 22-foot beam and 8.5-foot depth. They are powered by two Cummins KT19-M diesel engines developing a total of 850 bhp. They are coupled to Twin Disc 518 reverse/reduction gears and drive four-blade bronze propellers in Kort type nozzles.

Both were built to move barges and lighters to and from ships at anchorage, and two barge-mounted derricks for loading and unloading ships and lighters. The towboats also assist in docking ships so they include a forecastle deck, a raised main deck, and a raised, rounded bow for pushing. They are not equipped with towing "knees" common to American towboats.

Moss Point Marine is also building two 106-foot docking tugs as part of the same contract.

A fifth boat in the contract, the 50-foot steel and aluminum pilot boat Husni, was recently delivered by Equitable Shipyards, Inc., New Orleans, La., a sister company to Moss Point Marine in the Trinity Marine Group.

The Trinity Marine Group is owned by Trinity Industries, Inc., Dallas, Texas.

For free literature detailing the shipbuilding services of Moss Point Marine,

Circle 50 on Reader Service Card

American Commercial Barge Appoints Covinsky And Fox

Jeffrey N. Covinsky **James M. Fox**

American Commercial Barge Line Company recently announced the appointments of **Jeffrey N. Covinsky** as vice president of SCNO Vessel and Fleet Operations, and **James M. Fox** as director of SCNO vessel operations.

Mr. **Covinsky** and Mr. **Fox** were associated with the Sioux City and New Orleans Barge Line which was recently acquired by American Commercial Lines, Inc.

SeaEscape's cruise vessel M/V Scandinavian Sun has been repowered with a six-cylinder Wartsila Vasa 22 engine.

Wartsila Diesel Repowering SeaEscape's Cruise Vessel M/V Scandinavian Sun

SeaEscape, one of Florida's leaders in one-day cruising, chose Wartsila Diesel to supply three diesel generating sets to repower one of its cruise ships.

The cruise vessel M/V Scandinavian Sun cruises daily between Miami and Freeport in the Bahamas. The original power plant for this vessel consisted of three generating sets of 1,180 bhp each. In July 1988, one of these existing generating sets was replaced with a Wartsila Vasa 6R22 with an output of 1,180 bhp at a speed of 900 rpm. The refitting work was completed in a fixed time period by Wartsila Diesel personnel without taking the vessel out of service. The other two engines will be installed at approximately one-year intervals.

The selection of diesel generating sets for this repowering project was based on good overall economy of the Wartsila Vasa engines, including low fuel oil and low lube oil and spare parts consumption. Another important factor was the capability of the Wartsila Vasa engines to cope with any type of fuel on the market, from diesel oil to the lowest grade heavy fuels.

For free literature giving full information on Wartsila Diesel engines,

Circle 15 on Reader Service Card

Jonathan Corporation Names Moore Manager, Advanced Systems

Richard C. Moore has joined The Jonathan Corporation as manager of advanced systems within the engineering department. He is responsible for the technical planning, development and implementation of CAD/CAM and other computer software products used internally by Jonathan and marketed by its UNICAD subsidiary.

Mr. **Moore** was at Newport News Shipbuilding for 22 years and most recently held the position of program manager for CAD/CAM advanced technology.

NMHS Offers Literature On Emergency Medical/ Trauma Consultation

National Marine Health Systems (NMHS) of Baltimore, Md., provides emergency medical/advanced life support consultation to individuals on land, sea or air through a network of leading university trauma centers.

When you are hundreds of miles out at sea and a passenger or crewman becomes injured or ill, there are not too many alternatives. The ship can return to port, call the Coast Guard for assistance or, should it be a cruise ship, hope the ship's doctor can treat the patient.

National Marine Health Systems is a nationwide network of some of the best university level one and level two trauma centers and other specialty care facilities. It provides comprehensive consultation in less than two minutes from initial contact anywhere in the world. NMHS is complemented by a global system of select hospitals, designated to receive ill and injured patients. Transport of the patient is accomplished through an international medical transportation network (government, public and private sectors), coordinated through National Marine Health Systems. NMHS is reportedly the largest emergency medical/trauma consultation system in the world.

Through its central communications and switching center in Baltimore, National Marine places the caller directly online with the physician in less than two minutes of contact. Consultation is done in almost any spoken language (interpreters are also available to participate in the incident in less than two minutes). There are a multitude of ways to communicate whether you are at sea, on land or in the air, from anywhere in the world.

NMHS has lent assistance to seamen of Yugoslavia, Ecuador and other countries. It served as a resource for those in the wake of Hurricane Gilbert; was placed on alert for the crews it the Yellowstone fire, and for other recent maritime tragedies. In the near future, travelers from the U.S. will be able to access NMHS from their cruise ship or their foreign hotel room. National Marine will provide immediate consultation that will address the needs of those suffering minor injuries and illnesses, as well as the most serious multi-system trauma.

For further information and free literature on National Marine Health Systems,

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Hitachi Zosen Delivers Huge Crude Oil Tanker

Hitachi Zosen Corporation's Ariake Dockyard recently delivered a 261,163-metric-ton tanker, the Columbia, to Columbia Tanker Corporation.

The 1,070-foot-long vessel has a molded breadth of about 185.7 feet and molded depth of 93.8 feet. The main engine is a Hitachi Zosen MAN B&W Diesel 6S80MC type diesel with a maximum continuous output of 24,180 hp at 74 rpm producing a speed of approximately 15.05 knots.

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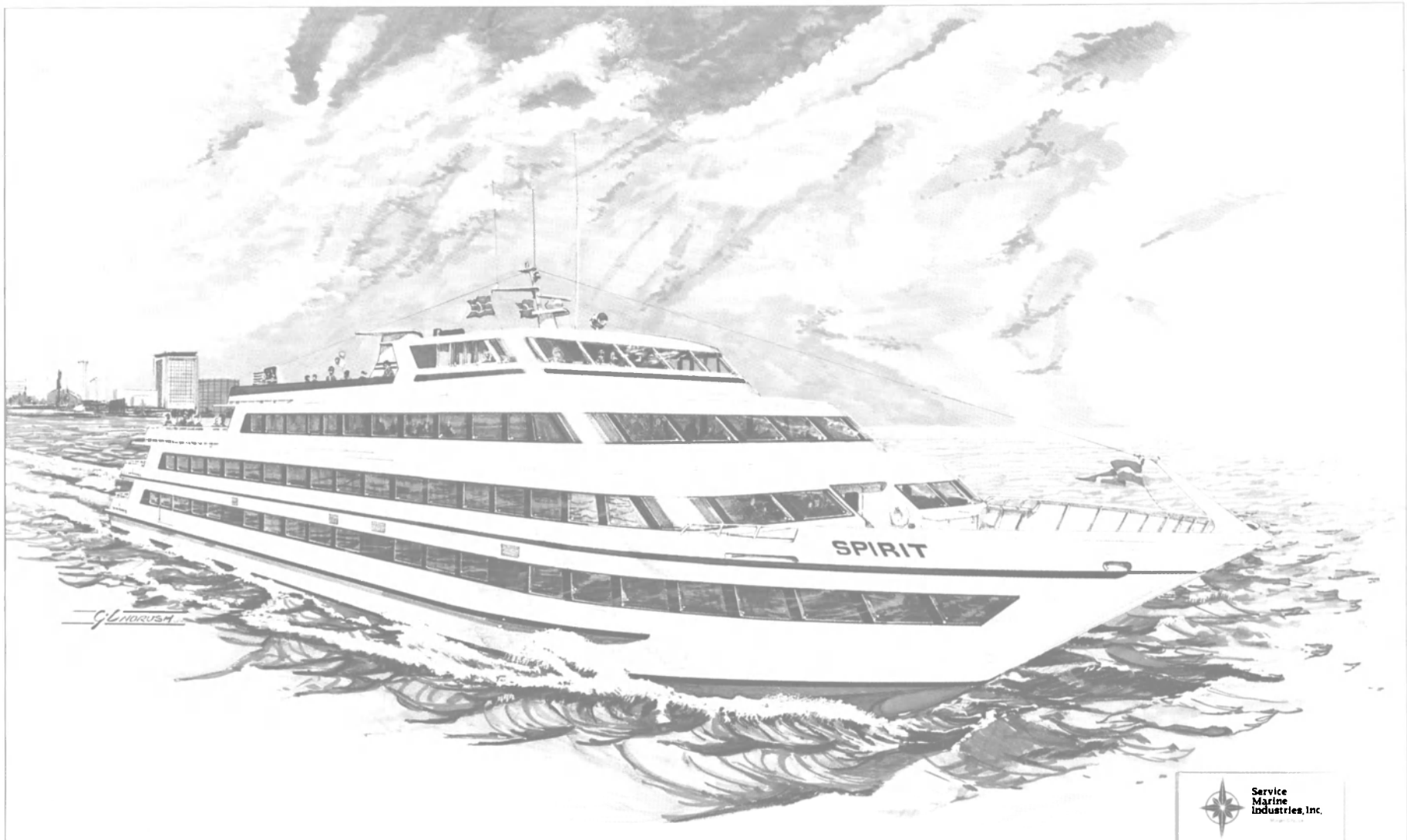

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The Spirit is a U.S. Coast Guard Subchapter T boat designed for lakes, bays, and sounds navigating in partially protected waters. She is powered by two new Caterpillar 3408 TA diesels and has two new Caterpillar 3406 T gensets for 420 kw of power. A 220 hp bow thruster can dock the boat in the most crowded harbor. Eighty tons of air conditioning with 10% fresh air makeup and 60 kw heating can handle any climate.

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You'll find a propulsion package from Karl Senner, Inc., on the new catcher/processor fishing vessel, F/T Arctic IV, built for Arctic Alaska of Seattle, WA, by Bender Shipbuilding of Mobile, AL. The package includes REINTJES reduction gear VAL 2250 with a 5:1 ratio, with internal disconnect clutch, PTO for generator drive, Vulkan torsional coupling, a Berg controllable-pitch propeller and electronic remote control systems

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