MARITIME REPORTER
AND
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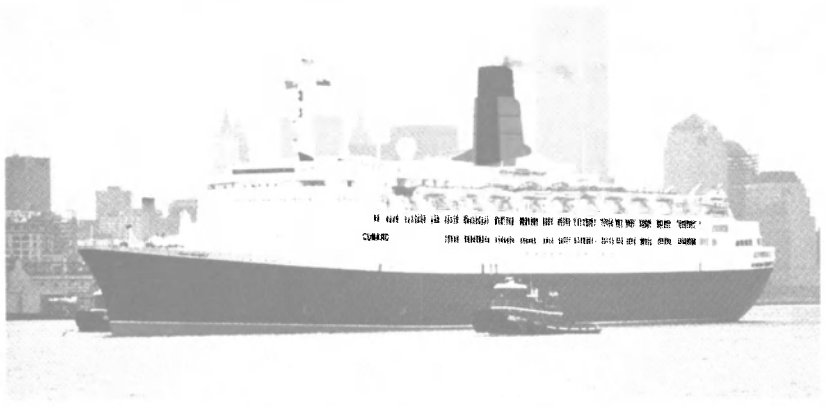
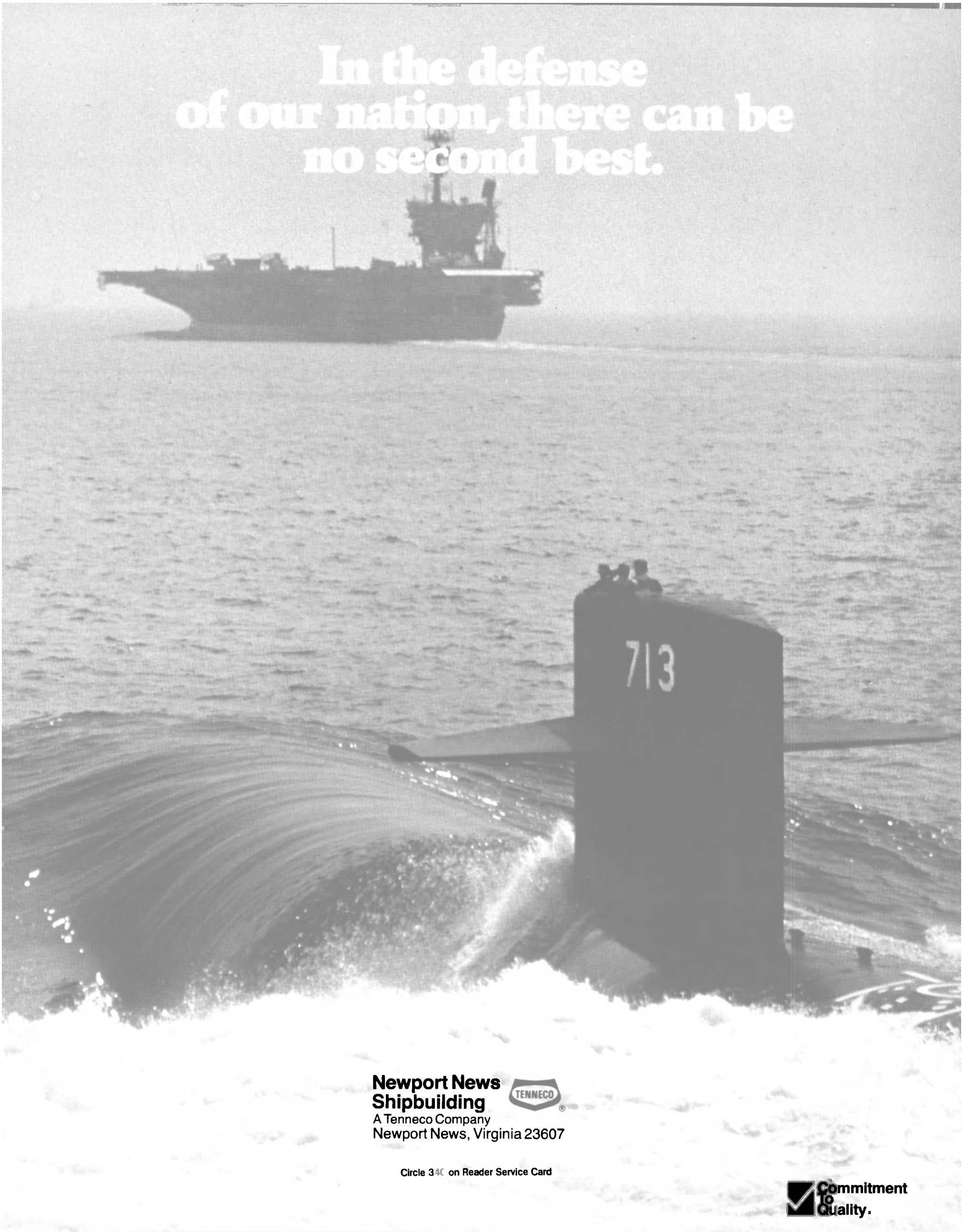


1988 YEARBOOK

JUNE 1988



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ON THE COVER

Cover Photos: (clockwise from logo) **USS Leyte Gulf,** Ingalls Shipbuilding photo; **Island Express** built by Gladding-Hearn; **CW3 Harold C Clinger** (LSV2) built by Moss Point Marine; Marathon LeTourneau's **Gulf King; Annabel Lee** built by Service Marine Industries; **Towboats/Barges**-AWO photo; (center) Cunard Lines' **QE2.**

Plans Revealed For World's Largest Cruise Ship

Plans for the world's largest cruise ship were recently revealed in London by a former tanker operator credited with the introduction of ultra-large crude carriers to the market in the 1970s.

At a press conference, **Ravi Tikkoo,** the man credited with revolutionizing the tanker market with the introduction of VLCCs, revealed his plans to build a 3,000-passenger cruise ship for the U.S. market. The ship would be over 1,130 feet long and have a gross registered tonnage of 160,000.

The state-owned Northern Ireland shipyard Harland & Wolff has signed a "Heads of Agreement" with Tikkoo Cruise Line, the company specifically set up to manage the project, to contract to build the vessel.

In provisional specifications, two eight-cylinder MAN B&W L70MC diesel engines have been specified. The aggregate output of the plant, direct-coupled to twin screws, would thus be in the region of 50,000 bhp.

Midland Enterprises Plans To Build 200-250 New Open Hopper Barges

Midland Enterprises Inc., a barge-operating subsidiary of Eastern Gas and Fuel Associates, will use the proceeds of a $50-million bond issue to finance some 200 to 250 new open hopper barges for use on the U.S. inland river system.

Midland plans to start up its mothballed Port Allen Marine Services barge yard in Baton Rouge, La.

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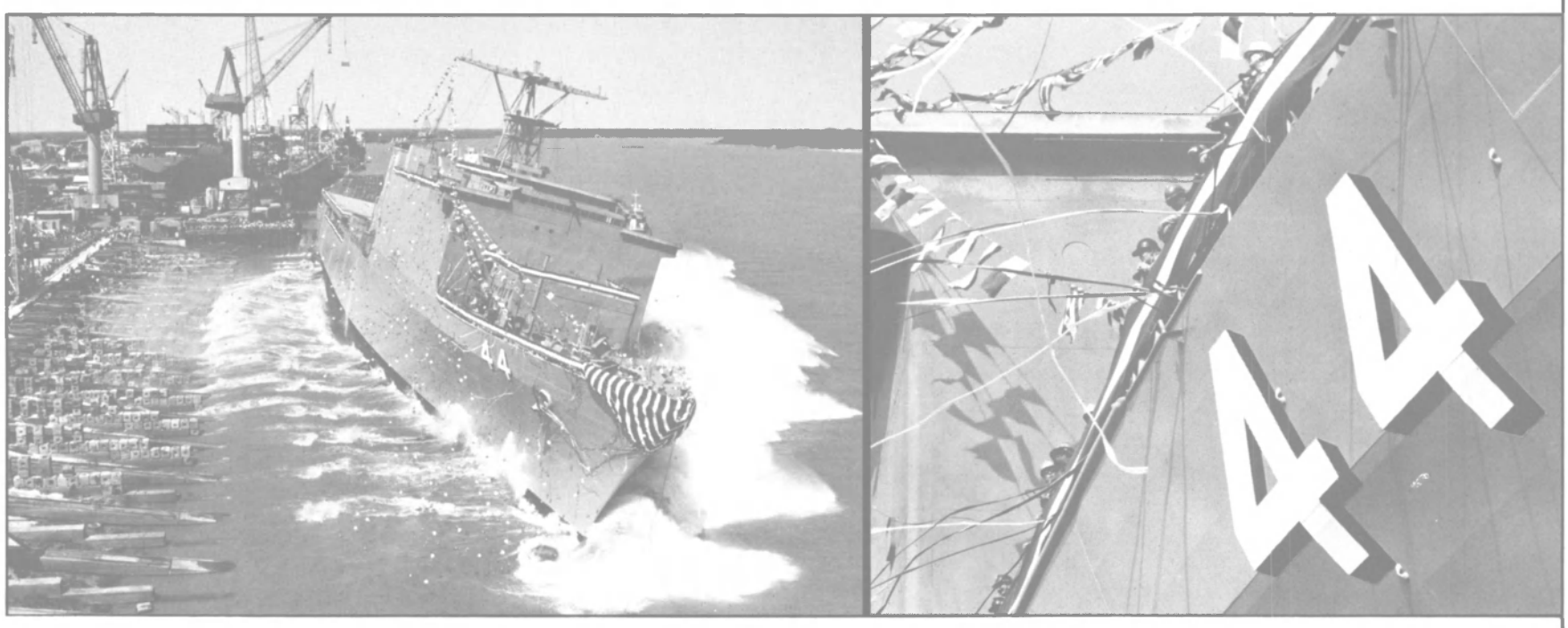

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Castrol Offers Free 56-Page Lube Oil Guide & World Service Directory

Castrol Limited International Marine, a Burmah company, is offering a free, recently published 56-page lube oil guide and marine service directory.

The fully indexed publication is organized into six main sections—"Important Information," which covers some pertinent company policies; "Castrol Marine Lubricants," which provides information and specifications on the types of marine oils offered by the company; "Marine Sample Service," details the worldwide marine lube oil testing service provided by Castrol Marine and the locations of the company's laboratories; "Tables," an excellent compilation of vital conversion factors, relative density corrections for temperature and other calculation figures; "Directory of Marine Service," a complete country-by-country listing of worldwide Castrol Marine services, with type of supply offered, names and addresses, cable, telephone, telex, and fax information and more; and "Index to Countries," a complete alphabetical listing of the countries and ports mentioned in the service directory, from Aalborg, Denmark to Zeebrugge, Belgium.

Castrol Marine offers a wide range of marine oils and lubricants. The company's products include: crosshead engine crankcase oils, multipurpose oils for crosshead crankcase and heavy duty applications, heavy duty oils for trunk pistons, synthetic heavy duty oils for trunk pistons, cylinder oils for crosshead engines, turbine and compressor oils, gear oils, hydraulic oils, refrigerator oils, stern tube oils, greases and sundry products. All of these products are detailed in the publication.

For a free copy of this Castrol Marine lube oil guide and worldwide marine service directory,

Circle 53 on Reader Service Card

Quarders Named Sales Manager, Commercial Marine Products At Simrad

David M. Quarders

David M. Quarders recently joined Simrad, Inc., Seattle, Wash., as the new sales manager of commercial marine products.

As the new sales manager, Mr. **Quarders** says he intends to add continuity between Simrad and its customers. Additions to the product line are expected to enhance this endeavor.

Mr. **Quarders** comes to Simrad, Inc. from Furuno USA, Inc., where he worked two years as an equipment trainer at sea, and for the last seven years as a regional sales manager. Mr. **Quarders** brings with him 14 years of experience in the commercial marine industry.

USCG Curtis Bay Yard Completes Two Of Four Work Barge Series

The U.S. Coast Guard Yard in Curtis Bay, Md., recently completed the construction of the first two of four 130-foot river tender work barges intended for use by the Coast Guard on the Mississippi and Missouri Rivers. The vessels will replace aging work barges in the Second Coast District.

The yard completed the construction and launch of the vessels on schedule, and expects the remaining two barges to be ready for delivery by June 1989.

R.J. Bazzini Associates To Represent FCS Inc. —Literature Available

Robert J. Bazzini, of R.J. Bazzini Associates, Ridgewood, N.J., a company that specializes in the application and sale of engineered equipment and systems, recently announced that his company has been named the representative of FCS, Inc.

FCS , Inc. is active in the application and sales of fuel and lube oil filtration systems, fuel oil homogenizer systems and the application of a unique ceramic coating system for use in diesel engine combustion chambers. FCS, Inc. produces and applies systems for more efficient fuel use and improving the emission profile of diesel engines, both for stationary and marine service.

For free literature describing the services of both companies,

Circle 63 on Reader Service Card

Babcock & Wilcox Unit Receives Contracts Worth Over $200 Million

Babcock & Wilcox, a major operating unit of McDermott International, Inc., has received over $200 million in contracts in 1988 for steam system components, of which a large portion is for the new aircraft carrier program. The contracts were awarded to Babcock & Wilcox's Nuclear Equipment Division by Westinghouse Electric Corporation and General Electric Company. The components will be fabricated at the division's facility in Barberton, Ohio.

ODECO's Hugh J. Kelly Elected Chairman Of NOIA At 16th Annual Meeting

Hugh J. Kelly, president and CEO of the Ocean Drilling and Exploration Co. (ODECO), New Orleans, La., was recently elected chairman of the National Ocean Industries Association (NOIA) for the 1988-89 term. The NOIA board of directors elected Mr. **Kelly,** along with its other officers, at the Association's 16th Annual Meeting held in Washington, D.C., April 10-12 at the Loews L'Enfant Plaza Hotel. Mr. **Kelly** has been a NOIA director since 1983, and has served as NOIA's vice chairman since April 1987.

The board also elected **Robert E. Howson,** president and COO of McDermott International Inc., New Orleans, La., to replace Mr. **Kelly** as vice chairman. Other officers re-elected for the 1988-89 term by the board were: president: **Charles D. Matthews;** vice president: **Robert B. Stewart;** treasurer: **Matthew Simmons,** president, Simmons and Co., Houston, Texas; secretary: **Robert Burke,** Environmental Services, Inc., Houston, Texas; and assistant treasurer: **Ardon Judd,** staff vice president, Dresser Industries, Washington, D.C.

New members elected to the board were: **Gordon M. Anderson,** executive vice president and COO, Santa Fe International, Alhambra, Calif.; **John B. Griffiths,** president, Hydril Company, Houston, Texas; **Dale P. Jones,** Executive vice president, Halliburton Company, Dallas, Texas; **K. Terry Koonce,** senior vice president, Exxon Company USA, Houston, Texas; **Jack E. Little,** executive vice president for E & P, Shell Oil Company, Houston, Texas; **Frank A. March,** president and CEO, Seaward International, Clearbrook, Va.; **J. Landis Martin,** president and CEO, NL Industries, Houston, Texas; **John J. Murphy,** chairman, president and CEO, Dresser Industries, Houston, Texas; **William C. O'Malley,** executive vice president, Sonat Inc., Birmingham, Ala.; **C.R. (Bob) Palmer,** chairman and CEO, Rowan Companies, Houston, Texas; **George Parker,** president, Teledyne Exploration, Houston, Texas; **Ray R. Seegmiller,** president and CEO, Marathon Manufacturing, Houston, Texas; **Matthew R. Simmons,** president, Simmons and Company, Houston, Texas; **Ian Strecker,** executive vice president, Schlumberger Limited, Sugarland, Texas; and **Kenneth W. Waldorf,** chairman and CEO, Zapata Gulf Marine Corp., Houston, Texas.

$4.3 Million To Peterson Builders To Administer Navy Parts Acquisition

Peterson Builders, Inc., has been awarded a $4,374,800.00 contract to administer the acquisition of non-standard materials for marine and aviation systems for the U.S. Navy and Foreign Military Sales (FMS). The one-year contract has options which would extend its duration to 5 years.

This contract, known as Simplified Acquisition of Part Numbered Items, is a parts replacement activity formerly handled by the Navy and its award to a contractor is part of the government's continuing privatization efforts.

PBI will locate manufacturers of the required parts for naval ships and aircraft, purchase and receive the items, inspect for quality, and in some cases, inventory the supplies before forwarding to the buyers. 16,000 parts for the U.S. Navy and 7,000 items for Foreign Military Sales will result in PBI purchases of between $10 and $12 million dollars during the first year of the contract.

PBI will carry out the central procurement services as a fully automated computerized effort. Sixteen additional personnel will be required in the areas of purchasing, accounting, material control and warehousing.

The contract has options for two additional years for a $13 million similar procurement package for U.S. Navy and FMS requirements. A second option is for a two-year program purchasing 7,000 items for FMS sales alone at a cost of $6 million per year.

PBI general manager, **Tom Kerley,** noted that Peterson Builders won the contract over stiff competition, and that the contract award enhances the firm's position in becoming a complete logistics support center for the U.S. Navy and NATO naval forces.

For more information and free literature on Peterson Builders,

Circle 73 on Reader Service Card

Engineering Visions Awarded $4.4-Million U.S. Navy Contract

Engineering Visions, Inc. (Envisions) was recently awarded a $4.4-million Navy contract to provide marine engineering, naval architectural and drafting services.

The three-year planning yard contract will serve the Naval Shipyard at Charleston, S.C. The 50-man effort will be centered in the company's Chula Vista, Calif., offices.

With a current total of eight substantial contracts and more than 300 full-time employees, Envisions is involved with the Navy in nearly every area of ship repair and alteration support.

Captain Astad Co. Opens New Ft. Lauderdale Office —Literature Offered

The shipbrokerage company Captain Astad Co., Inc., founded in 1974 by **Aage J. Astad** (Captain-USMM-Ret.) to provide a wide range of services to the maritime industry from its base in New Orleans, La., recently opened another office in Fort Lauderdale, Fla.

The decision to open an office in Florida was based on increased trading in the Caribbean Basin. This division will handle purchase, sale and chartering of any type of vessels.

The firm is already involved in the sale of a bulk carrier, single decker and cement carrier. Additionally, it is negotiating with several clients for the conversion of supply vessels into passenger ferries and casino ships.

The new office address is: Captain Astad Co., Inc. Shipbrokers, P.O. Box 350486, Fort Lauderdale, Fla. 33335; telephone: (305) 344-3502; telefax: 305-771-5214; and telex: 705722 OPMC FTL.

For free literature describing the services of Captain Astad Co.,

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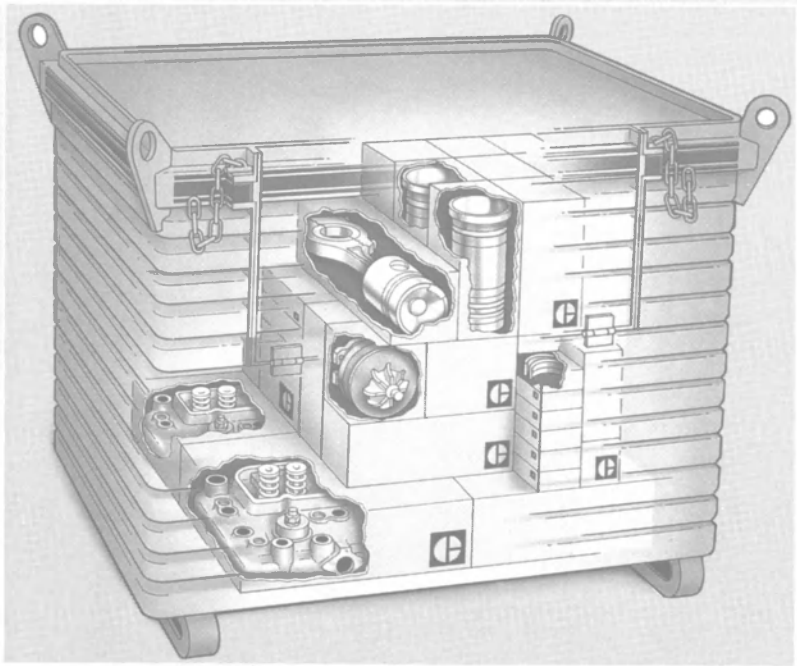
Stay on Course with Cat In-Hull Overhaul Kits

The need for an overhaul at the wrong time can deal you a list of unfriendly choices. Head for the dry dock and a long shutdown. Put in for a dockside overhaul and lose maybe a week. Or you can keep running . . . and hope.

Now there's a better option. It's the Cat In-Hull Overhaul Kit, a complete package of everything needed to overhaul your Cat Engine. Simply stow it on board, and you're equipped to do the job anywhere.



With an In-Hull Kit, you're ready . . .

You choose the time and the place to overhaul that's easiest on your work schedules. And you're assured of a fast, dependable job because there are no missing parts to chase, no "will-fit" parts forced on you. And if you do find something unexpected like a cracked head, piston or camshaft . . . you've got an instant replacement. So you're free of expensive delays. With an In-Hull Kit, every overhaul need is provided for. All kit parts and components are either new or remanufactured to original performance specs. And every item carries Marine Society Approval.

Let a Cat dealer quote a kit for you . . .

Whether your mechanics or their mechanics perform the overhaul, they'll give you a flat rate price in advance — so you'll know your full cost with no unpleasant surprises.

Anyway you look at it, a Cat In-Hull Overhaul Kit saves you money.

Another SeaCare service available from your Cat Marine Dealer. Because we want to keep your cargo moving.

SeaCare

CATERPILLAR

John Kristen Joins Ingram Barge Company

John Kristen recently joined Ingram Barge Company as manager of liquid merchandising, according to an announcement by **Les Sutton,** president of Ingram Barge Company. Mr. **Kristen** will be responsible for managing the sales operations for transportation of chemical and dry bulk products on the Gulf intercoastal waterways.

Mr. **Kristen** has 15 years of experience in the barge industry. He began his career in 1973 as manager of regulated transportation with SCNO Barge Lines and has also worked for River Line, Inc., Agri-Trans Corporation, Robert B. Miller and Associates and Robin Hood Fleeting Services. Most recently, he was a dispatcher with Dravo Mechling Corporation, a New Orleans-based barge company.

Ingram Barge Company is a subsidiary of Ingram Industries Inc., headquartered in Nashville, Tenn. Ingram is a privately held diversified corporation engaged in inland marine barging and aggregate supply, consumer product distribution, coal production and sales, oil exploration and production, the manufacture of wellhead equipment and insurance.

Holland America Line Buys Two Cruise Ships From Home Lines

An agreement to purchase two cruise ships, the Homeric and Atlantic, from Home Lines for an undisclosed price was recently announced by Holland America Line.

Delivery of the two-year-old Homeric will take place in November after it concludes its Bermuda sailing season this fall. Plans for the Atlantic have not yet been decided.

A crew of Dutch officers and Indonesian and Filipino crew and staff are expected to operate the Homeric.

Besides this acquisition, the company said it will also continue its plans for the addition of two newly constructed 1,600 to 1,800-passenger cruise vessels.

The M/V Annabel Lee, which Service Marine Industries, Inc., Amelia, La., constructed in 90 days, is powered by two rebuilt GM diesel engines.

Service Marine Christens 600-Passenger Paddlewheeler For Heritage Cruise Lines

—Free Literature Offered—

Service Marine Industries, Amelia, La., recently christened a 600-passenger dinner/cruise boat for operator Heritage Cruise Lines, Richmond, Va.

The M/V Annabel Lee, which will cruise on the James River out of Richmond, Va., is 108 feet long, has a beam of 34 feet, draft of 3 feet 9 inches and hull depth of 7 feet. She is powered by a pair of rebuilt GM8V-92 diesel engines rated at 310 hp each at 1,800 rpm furnished by Johnson's Diesel Service. Electrical power is provided by two 99-kw KATO generators driven by rebuilt GM6-71 diesel engines.

The cruise boat features two enclosed decks and an open top deck. She is fully air conditioned by four 10-ton Carrier air-cooled units, with 15-kw heating each, furnished by Johnston Brothers Enterprises, Inc. The Annabel Lee is carpeted and will feature live bands, dancing and full bar service, as well as be able to seat over 400 passengers for dinner. Two Aiphone systems will be interconnected for controlling music levels on each deck. The systems were supplied by Frank Beier Radio.

Power Panels provided the split-bus switchboard and Southern Glass furnished the rubber-mounted, tinted safety glass that surrounds the two enclosed dinning/dance floors on the cruise boat.

ANNABEL LEE
Equipment List

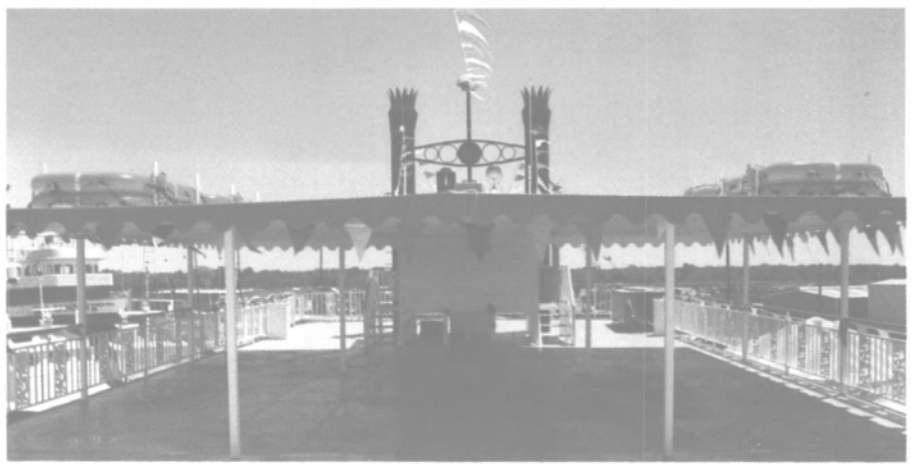
Main engines	GM
Generators	KATO
Generator engines	GM
Reduction gears	Twin Disc
A/C	Carrier
Music system	Aiphone
Paint	International Paint
Ceiling	Armstrong
Electrical panel	Power Panels
Windows	Southern Glass

Tom Hensley, owner and president of Service Marine Industries, Inc., called the Annabel Lee "a 90-day miracle," since that's how long the vessel took to construct.

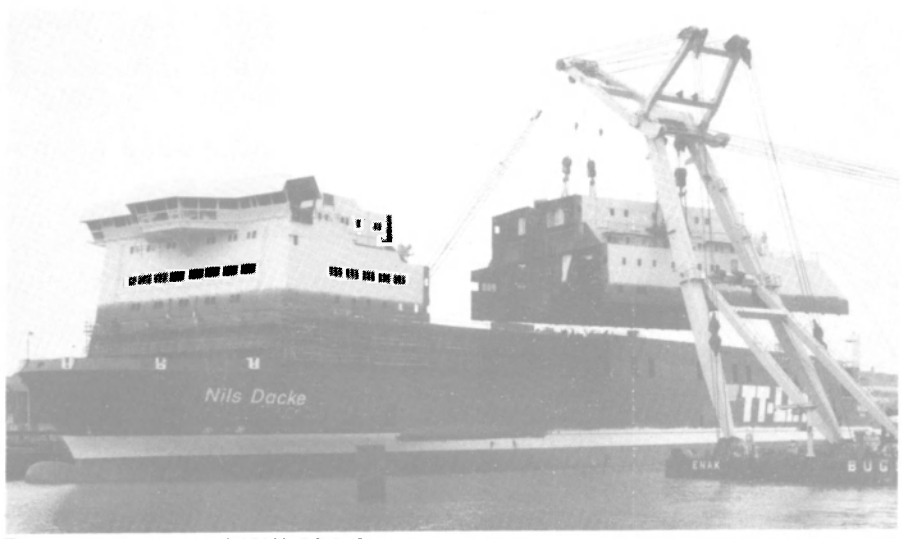
The boat is certified by the U.S. Coast Guard under Subchapter T rules for carrying over 150 passengers for service on lakes, bays and sounds, and partially protected waters.

For free literature on the boatbuilding services and facilities offered by Service Marine,

Circle 60 on Reader Service Card



The open top deck of the Annabel Lee.



The recently launched MAN B&W Diesel-powered Nils Dacke will be the world's largest railway/freight ferry.

World's Largest Railway/Freight Ferry Launched By Seebeckwerft

—Free Literature Offered—

Seebeckwerft AG of Bremerhaven, West Germany, recently launched what is said to be the world's largest railway/freight ferry, the 576-foot Nils Dacke, at ceremonies for Rederi AB Swedcarrier, the pool-partner of Hamburg-based TT-Line.

The Nils Dacke, with a molded breadth of 85-1/2 feet, draft of about 19 feet and deadweight of 7,800 tons, will be powered by two main propulsion plants consisting of four MAN B&W main engines. Each main propulsion plant will consist of a MAN B&W 6L40/45 diesel, with an output of 3,170 kw at 524 rpm, and a MAN B&W 8L40/45 diesel engine, with an output of 4,230 kw at 524 rpm. The total power for the two main propulsion (all four engines) is 14,800 kw. For maneuverability, the vessel will be equipped with Lips variable pitch propellers and Frydenbo rudder plants. She will have a service speed of about 18 knots.

Upon completion, which is expected to be in August of this year, the all-around combicarrier will enter service on the TT-Line route between Travemunde and Trelleborg, Sweden. She will have three decks interconnected by internal ramps, and will load and discharge via a stern ramp.

The lower deck, or combi deck, will be equipped with 910 meters of rail length distributed on six tracks, allowing for the transportation of 36 long-type railway wagons or 75 rail wagons of average size.

On the two upper decks, there will be space for about 100 trucks/trailers. And when not in use for rail cargo, the lower deck can accommodate an additional 60 trucks/trailers.

Furthermore, the Nils Dacke will have accommodations for 300 passengers in 122 cabins, a restaurant, lounge/bar, cinema and conference rooms. The crew complement will be about 40.

Seebeckwerft is also building the sister vessel of the Nils Dacke, the Robin Hood, for TT-Line. She is expected to be launched in August and delivered at the end of this year.

For free literature detailing the shipbuilding services and facilities offered by Seebeckwerft,

Circle 50 on Reader Service Card

SPD Technologies Negotiating To Acquire Navy Division Of Brown Boveri Power Equipment Inc.

—Free Literature Offered—

SPD Technologies recently announced the signing of a letter of intent for the acquisition of the Navy Switchgear Division of Brown Boveri Power Equipment Inc., based in Montgomeryville, Pa. Final terms of the transaction were expected to be completed May 27.

In announcing the letter of intent, company chairman **George M. Gordon** said the addition of Brown Boveri will enhance SPD's position as a leading supplier of electrical systems protection equipment for military applications.

Mr. **Gordon** noted that Brown Boveri has supplied switchgear assemblies for SPD's electrical systems protection installations on U.S. Navy nuclear submarines.

"Adding the capacity to produce high-quality switchgear will result in increased cost-efficiency as well as provide new opportunities to diversify in the electrical systems protection field," Mr. **Gordon** said.

Mr. **Gordon** indicated that the transaction is expected to be consummated shortly.

The Navy Switchgear Division is part of a U.S. subsidiary of ASEA Brown Boveri Inc., a Zurich-based international manufacturing conglomerate. The Division has annual sales in excess of $5 million.

It will become an operating subsidiary of SPD, which is one of the nation's largest producers of military circuit breakers for Naval applications.

The transaction will mark SPD's first acquisition since becoming an independent company as a result of a management buyout from Gould Inc. in 1987.

SPD Technologies is a world leader in the design, development and manufacture of advanced electronically controlled electrical systems protection equipment for military applications and other harsh operating environments. Headquartered in Philadelphia, the company has systems repair and overhaul operations across the U.S.

For free literature on the complete line of electrical systems protection equipment offered by SPD Technologies,

Circle 45 on Reader Service Card

NASSCO Announces Production Management Realignment

NASSCO recently announced the realignment of its production management organization.

Erwin Struss rejoined the new construction department as director, new construction-outfitting. Alongside Mr. **Erwin** is **Duncan McNeill,** director, new construction-steel. Mr. **Duncan** joined NASSCO late last year, bringing 30 years' diversified shipbuilding experience both in the U.S. as well as the U.K. Mr. **Erwin** and Mr. **Duncan** will both be gradually putting together their management teams as start of construction of the AOE begins later this year.

In repair, **Spencer French**, vice president, repair, now has direct responsibility for all repair production activities along with all repair support activities. All the repair ship managers, together with **Keith Rader**, superintendent-repair trades, now report to Mr. **French**.

Additionally, **Janice Shanklin**, previously director of information systems department, has been promoted to director of repair support. She also reports to Mr. **French**. Reportion to Ms. **Shanklin** are the repair materials, estimating, planning and engineering departments.

The Munson Manufacturing-built Yukon Queen is powered by Triple Lugger's L6140A engines coupled to three Hamilton waterjets.

Munson Manufacturing Launches Alaskan Excursion Boat For Holland America-Westours

—Free Literature Offered—

Munson Manufacturing, Inc., in Edmonds, Wash., recently launched a new welded aluminum vessel custom built for Holland America Line Westours. The 58-foot 6-inch Yukon Queen is fully certified by the U.S. Coast Guard and complies with SOLAS.

Triple Lugger L6140As, rated for 550 hp at 2,100 rpm, and coupled to three Hamilton 1031 jets power the Yukon Queen at 30 knots. Aside from the main propulsion system, the roomy engine compartment holds two auxiliary 8 kw diesel generators, six 8-D batteries for the 24-volt electrical system, and one battery for the 12-volt emergency electrical system. Three diesel tanks for a total capacity of 1,150 gallons will allow the vessel a range of about 450 miles.

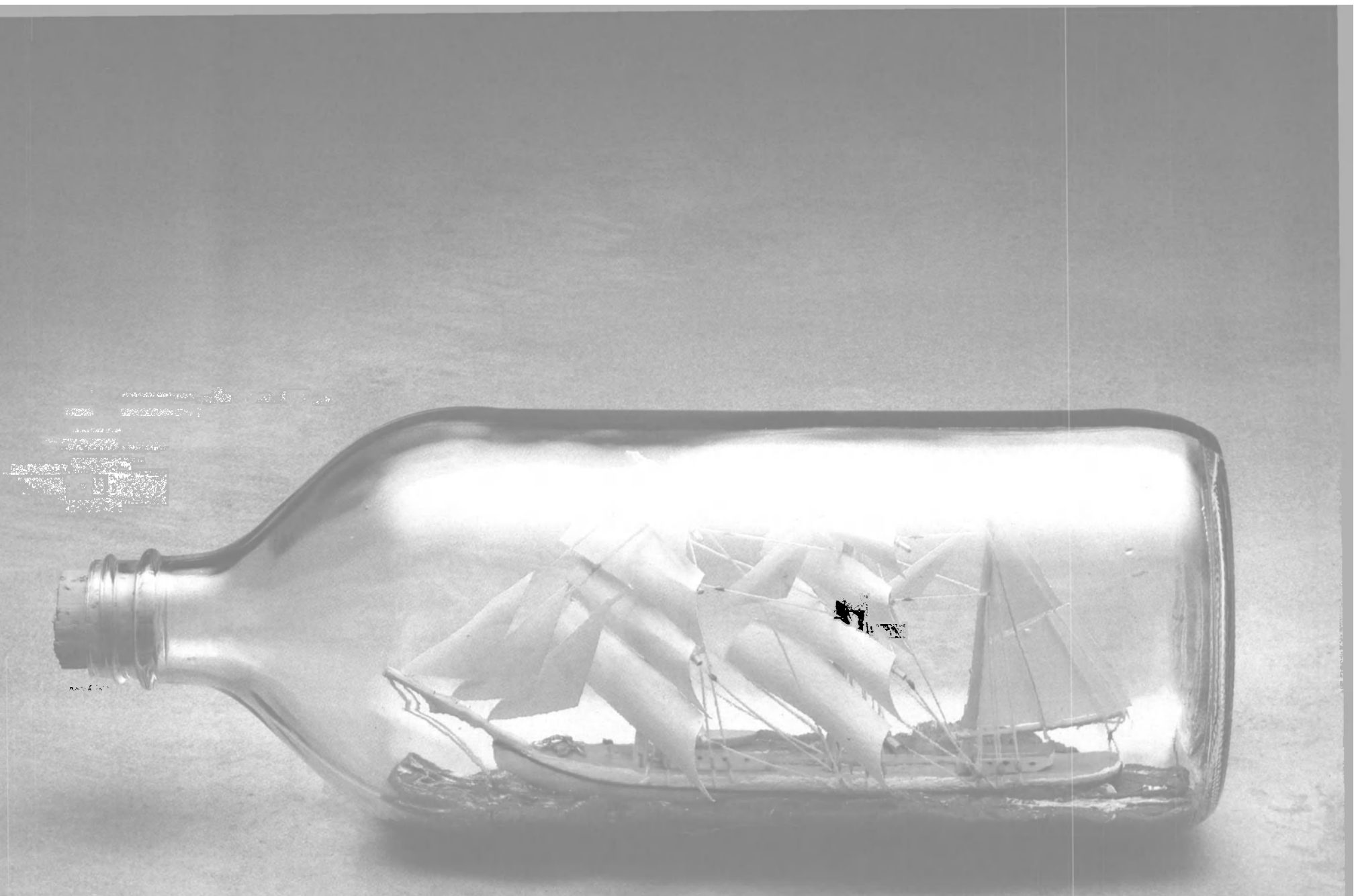
The pilothouse, located forward on the upper passenger deck provides the skipper with 360-degree visibility. Standard navigation equipment, including radar, compass, depthsounder and loudhailer are mounted in the console, along with control panels for lighting, air conditioning and all auxiliary systems.

The vessel is designed to comfortably carry 49 passengers and up to 300 cubic feet of luggage from Dawson City to Eagle, on the Yukon River in Alaska. Tables in white oak with brass trim complement the blues and mauves of the carpet and upholstery. From a galley equipped with a microwave, refrigerator and steam pots for soup, tourists will be able to get a meal during the six-hour trip.

So far, the Yukon Queen is the largest of the Sea Liner series built by Munson. A 55-foot, 70-passenger vessel built for the Smithsonian Tropical Research Institute and a 42-foot excursion vessel for Rainy Lake Cruises are a couple of the larger boats built in the series for high-speed passenger transport. Munson Manufacturing has substantially expanded its repertoire of vessels over the last five years. Originally in the business building small fishing boats. **Bill Munson** has added workboats, fire boats, police boats, survey boats and passenger boats to the production line to meet the demand of the market.

For free literature on the boatbuilding services of Munson Manufacturing,

Circle 20 on Reader Service Card



NOT EVERY VESSEL NEEDS CHEVRON MARINE LUBRICANTS.

Maybe our top-quality marine lubricants aren't for everyone. But if you make your living on the water...on *towboats, workboats,* or *tugs*...you need all the protection you can get. The dependable protection of Chevron oils and greases.

You see, at Chevron we're behind you all the way. Pushing, pulling, pumping, dredging...working the waterways of America, rivermen from coast to coast count on us. *For* our full line of fine marine products. *For* expert advice and service at over 100 ports across the U.S. *For* the kind of commitment you'd expect from an industry leader like Chevron.

Yes, not every vessel may need our marine lubricants, technical support, or reliable service. But if *you* do, contact your Chevron Sales Representative, or write: Chevron USA, 575 Market St., San Francisco, CA 94105.

- Chevron DELO Marine Oils 471, 473 and 194—premium, extra-performance diesel oils for severe-duty service in main and auxiliary engines.
- Chevron AW Hydraulic Oils for gears, compressors, and hydraulic systems.
- Chevron NL Gear Compounds for heavily loaded reverse and reduction gears.
- Chevron Marine Oil 220X for stern tube bearings and open cranks on steam engines.
- Chevron Ultra-Duty, Pinion Grease MS, Dura-Lith Grease EP, and Polyurea EP Greases for bearings, couplings, gears, and deck hardware.

Chevron

Circle 200 on Reader Service Card

MSC Awards Contracts Totaling $154.2 Million

Following competitive procurement, the Navy's Military Sealift Command has awarded six firm-fixed price contracts for the transportation of Department of Defense cargo.

—$55,093,944 to Central Gulf Lines, Incorporated of New Orleans, La., for the charter of two U.S.-flag dry cargo ships, MV Green Wave ($25,074,939) and SS Rover ($30,019,005). MV Green Wave will continue to resupply Greenland and the Antarctic, and SS Rover will be assigned to the ammunition run from Sunny Point, N.C., to Nordenham, Germany for the resupply of Europe.

—$36,839,640.50 to Vessel Charters, Incorporated of New York, N.Y., for the charter of two U.S.-flag dry cargo ships, SS Santa Adela ($18,294,789.50) and SS Santa Juana ($18,544,851). SS Santa Adela will continue to operate from the U.S. West Coast to mid-Pacific Islands and Far East ports supporting all branches of the Armed Forces. Itineraries include Midway and Wake Islands and other areas where there is little or no commercial service. SS Santa Juana will be assigned the shuttle run between Subic Bay, R.P., and Diego Garcia, Indian Ocean. This service has been continuous since 1981 and is used to transport containers and breakbulk cargo for the U.S. Navy.

—$33,197,249 to American Automar, Incorporated of Washington, D.C., for the charter of SS LASH Pacifico, a U.S.-flag dry cargo ship. The SS LASH Pacific will function as part of the U.S. Navy's Afloat Prepositioning Force. As such, this ship will be used for the prepositioning, transportation, and safe stowage of essential war materials that will be used by U.S. forces deployed to forward sites in a contingency.

—$29,119,571 to Maersk Line, Limited of Madison, N.J., for the charter of MV Elisabeth Maersk, a U.S.-flag dry cargo ship which will operate from the U.S. West Coast and resupply the Pacific Islands and Far East ports.

1,000th Golar Marine Incinerator To Be Installed —Literature Available

A significant milestone will be reached for Golar Metal, Inc., when Pennsylvania Shipbuilding installs the Golar GS500 Marine Incinerator aboard the second T-AO-187 Class Fleet Oiler, the Benjamin Isherwood (T-AO-191), which is under construction at the yard. The installation will mark the 1,000th delivery of a Golar marine incinerator.

In addition, the GS500 Incinerator, which has been specified for the entire T-AO-187 Class, is being installed aboard six Canadian patrol frigates, the first of which is nearing completion at Saint Johns Shipbuilding Ltd., New Brunswick, Canada.

On December 31, 1988, new regulations (Annex V to Marpol 73/78) will become effective internationally, which will concern the disposal of solid waste at sea and restrict the areas where certain wastes can be disposed, especially plastics. The new regulations have increased inquiries concerning Golar incinerators, since the units are designed to be easily retrofitted to existing ships.

For free literature detailing Golar Metal marine incinerators,

Circle 99 on Reader Service Card

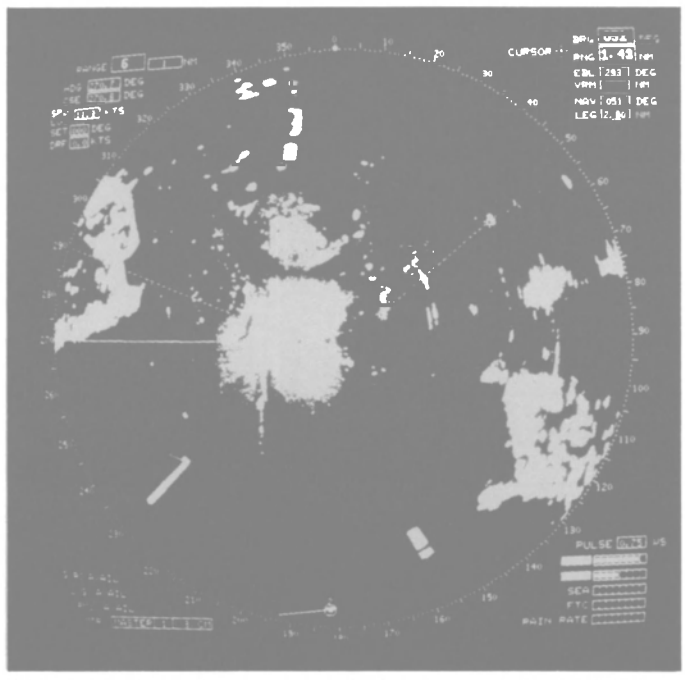
Bart Walsh Receives ASTM John Haas Memorial Award

Bart Walsh, Deputy Director, Operations Division, Naval Sea Systems Command, Washington, D.C., is a recipient of the American Society for Testing and Materials (ASTM) John Haas Memorial Award.

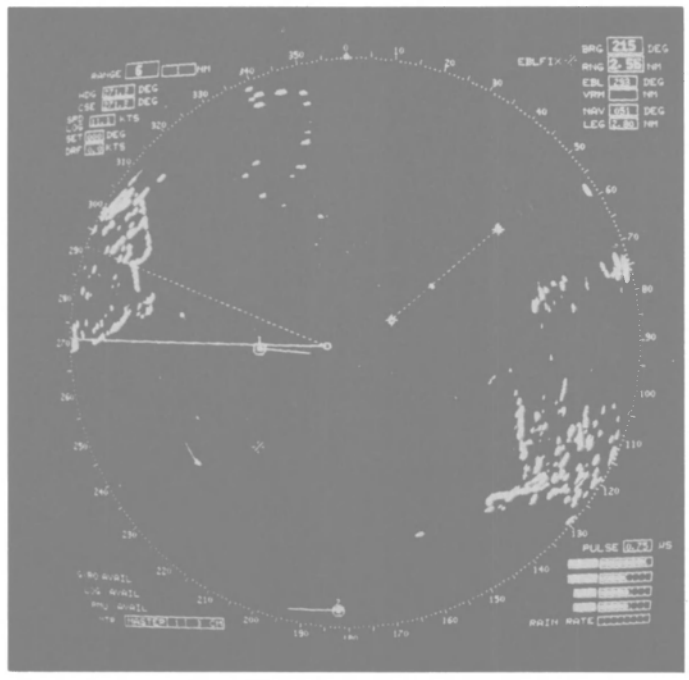
Mr. **Walsh** received the award at ceremonies in Bal Harbour, Fla., hosted by Committee F-25 on Shipbuilding (one of 140 ASTM technical committees).

Mr. **Walsh** has been active in ASTM since 1978 and served as chairman of Subcommittee F25.11 on Machinery for eight years. He is currently third vice-chairman of the committee.

Organized in 1898, ASTM is one of the largest voluntary standards development systems in the world.



With rain and sea clutter circuits OFF on PATHFINDER/ST ARPA, sea clutter extends 1.8 to 2 miles from ship, ice floe belts appear 320° to 35°, additional ice clutter scattered beyond sea clutter 270° to 320° (Thick lines at 230° and 155° are RACONS).



With rain and sea clutter circuits ON, the radar picture is absolutely "clean" Sea and ice clutter are gone. All targets previously masked are clearly visible.

Skuld Undergoes Major Changes In Structure

Skuld, the International Protection and Indemnity and FD & D Insurance Association based in Scandinavia, recently underwent major changes in its structure. Changes include reorganization of the board of directors into a smaller, more dynamic unit supported by a committee of shipowners representing a cross section of the members, the adoption of totally revised statutes and rules, the election of a new chairman, and the appointment of a new managing director.

The new statutes outline the structure of the mutual club, which is subject to the requirements of the members who give voice to their wishes by voting at the general meeting that elects the board of directors, who in turn are empowered to appoint the managing director and the other directors of the club (the mangers). Unlike most other clubs, Skuld executives are employed directly by the board of directors and not through a management company.

The members at a general meeting also elect the committee which supervises the affairs of the association and ensures that its purpose is promoted. The new chairman is **Guttorm Fossen,** shipowner of the Oslo Company of Halfdan Ditlev-Simonsen & Co. Management A/S, who takes over as chairman from **Erik F. Lorentzen,** who is retiring after having served as chairman for the past seven years.

The committee is comprised of 21 shipowners and two members from charterer's interests. It is chaired by **Erik Behn** of A/S Dampskibsselskabet Torm, Copenhagen. The other members are from Scandinavia, Germany, Greece, Holland, Hong Kong, Italy, Singapore, Switzerland and the U.S.

At the first board meeting under the new rules this year, the board of directors appointed **Havar Poulsson** to succeed managing director **Nicolay Kieding,** who retired after 44 years of service to the association, the last seven as managing director. The change took place on June 1, 1988.

Mr. **Poulsson,** a lawyer, started with the Skuld club as a claims adjuster in 1971. He has traveled extensively throughout the world for the association for many years and was appointed vice-managing director more than two years ago.

For additional information and free literature on Skuld,

Circle 54 on Reader Service Card

Metro Machine Awarded Destroyer Work Contract Worth $3 Million

Metro Machine Corporation, Norfolk, Va., has been awarded a $3-million U.S. Navy contract for the Drydocking Selected Restricted Availability (DSRA) for the destroyer USS John King (DDG-3). The work is expected to be completed September 2, 1988. The contract was awarded by the Naval Sea Systems Command (N00024-85-H-8187).

T.F. Hudgins Appoints Scott A. Rodibaugh

Scott A. Rodibaugh has been appointed chief engineer for the Spinner II® Products Division of T.F. Hudgins, Incorporated. The division markets a proprietary oil cleaning centrifuge which is used on heavy-duty diesel engines for the oilfield, marine, industrial, railroad, trucking and transit markets.

Mr. **Rodibaugh** will be responsible for the technical engineering support for Spinner II products in the United States, Canada and Mexico. He has more than 12 years of industry experience dealing with clean lubricating fluids for both transmission and diesel engine service.

Prior to joining T.F. Hudgins, Mr. **Rodibaugh** was with Pall Corporation. His responsibilities there included the field testing and marketing of the Performax fine filtration line. Mr. **Rodibaugh's** technical career began at Caterpillar.

T.F. Hudgins, Incorporated is the exclusive North American distributor of oil cleaning centrifuges manufactured in England by Glacier Metal Company.

Report 'Genesis System' Can Produce Record Fuel Savings For Vessel Owners

American Information Management Inc. (AIM) of Bay St. Louis, Miss., has developed a computerized information management system for the commercial marine industry (ships, offshore service vessels and river boats). The system, called The Genesis System®, includes proprietary software programs for use aboard vessels and by office management.

Realizing that the marine transportation industry must reduce the cost of operations and yet remain efficient, **Walter Todd,** founder of American Information Management Inc., developed a format for the information that was needed by both the boat operator and shore management, along with equipment to produce the information. Mr. **Todd** has been a director and president since the inception of AIM in 1981. In 1986, AIM formed Genesis Systems, Inc. as a wholly owned subsidiary. Genesis Systems, Inc. is responsible for all operations, markets and service for The Genesis System worldwide.

Walter Todd

According to the manufacturer, the system will save approximately 15 percent to 50 percent of the daily fuel operation expenses of commercial vessels, savings of $6,000 to $30,000 per month. The system includes engine fuel burn measurement, special navigation equipment, speed over bottom, engine efficiency, Vessel Trak, Trip Trak, Rudder Trak, electronic log, accounting, performance objectives and many other functions to help both vessel and shoreside management increase productivity.

The company services marine transportation companies on the U.S. Inland Waterways System, the Gulf of Mexico and the Caribbean, East Coast, West Coast and the deep sea.

For more information and free literature on The Genesis System,

Circle 26 on Reader Service Card

Bailey Controls Completes Installation Of New Flow Calibration Laboratory

Bailey Controls has installed a new flow calibration laboratory for its lines of vortex and mass flowmeters. The fully automated facility is located at the company's manufacturing center in Wickliffe, Ohio. It uses Bailey Network 90® process control system technology to calibrate meters to an accuracy specification of ±.25 percent for mass/flow and ±1 percent on vortex.

The Bailey type VF Vortex Shedding Flowmeter features advanced fiber-optic technology for measuring volumetric flow of liquids, gases and steam. The device is suitable for high-temperature applications (up to 662° F) and is constructed of corrosion resistant materials. The type VF is available in three pressure/temperature ANSI classes: 150, 300, and 600.

Bailey's Direct Mass Flowmeter measures flow rate up to 1,200 lb/minute and densities up to 3.2 g/cc of liquids and slurries. A digital electronics package allows the user

to troubleshoot and configure the flowmeter's transmitter from remote locations.

The new calibration laboratory has reduced calibration lead time from two weeks to two days, and provides a detailed calibration data sheet to be included in the product shipment.

Bailey Controls is a division of Babcock & Wilcox, and a leading worldwide supplier of instrumentation, controls, and computer systems for power generation, process automation and energy management in the petrochemical, electric utility and process industries. Babcock & Wilcox is a major operating unit of McDermott Incorporated, a subsidiary of McDermott International, Inc.

For more information and free literature from Bailey Controls,

Circle 59 on Reader Service Card

H. Earl Beckman Named President And CEO, Marathon Manufacturing

J. Earl Beckman

Ronald F. Walker, president and chief operating officer of The Penn Central Corporation, recently announced that **J. Earl Beckman** has been named president and chief executive officer of its Marathon Manufacturing Company, Houston, Texas. Mr. **Beckman** replaced **Ray R. Seegmiller**, who resigned to take another position.

Mr. **Beckman** joined Marathon in 1981 as president of the firm's specialty oil and chemical company. Since mid-1986, he has been president of Marathon LeTourneau Company, Heavy Equipment Division, Longview, Texas.

Prior to joining Marathon, Mr. **Beckman** held manufacturing, marketing and general management positions from 1959 to 1981 with Union Carbide Corporation.

Broken Hill Proprietary Expands Australia-Flag Fleet To 17 Vessels

Broken Hill Proprietary, Australia's biggest corporation, recently announced that it hopes to have a new Japanese-built oil tanker by the end of the year to increase its Australia-flag fleet to 17 vessels.

The new crude oil tanker, of 90,000 dwt, will be operated by BHP Transport and will be chartered by BHP Petroleum.

Houma Fabricators Awarded Contract For Vehicle-Passenger Ferry

Houma Fabricators, a division of L.O.R., Inc., has been awarded a contract for the construction of a 149-foot vehicle-passenger ferry for the State of North Carolina Department of Transportation. The vessel is 42 feet wide with a design draft of 3 feet 6 inches.

Scheduled for delivery in April 1989, the new ferry will carry 30 autos and accommodate an additional 20 passengers. With a design speed of 12 knots, the vessel is expected to make the trip between Hatteras Island and Ocracoke Island in approximately 40 minutes.

Houma Fabricators is located on the Intracoastal Waterway in Houma, La. The yard also has under construction a 196-foot double-ended ferry for Lake Champlain Transportation.

For free literature giving complete information on Houma Fabricators,

Circle 40 on Reader Service Card

Brochure Available On New Sound Absorption Material From Soundcoat

Soundcoat Company, Inc., of Deer Park, N.Y., has introduced Soundfoam HT, a newly developed sound-absorption material made of a flexible very low density, fire-resistant polyimide foam.

It provides not only excellent sound absorption but good thermal insulation, as well as being resilient and lightweight. Usable temperature range is unmatched by other noise control materials (−150 C to +260 C).

When exposed to open flame, Soundfoam HT exhibits virtually no smoke or toxic by-products, this makes it ideal for aircraft, ships, medical and combustion engine applications.

Soundfoam HT is available with decorative and protective surface finishes of nomex cloth, reinforced aluminized polyester and other thin films. Also as a composite for absorption, damping and barrier properties. It can be custom-cut and provided with high-performance pressure-sensitive adhesive for fast production line assembly or field retrofitting.

For more information and free literature on Soundfoam HT from Soundcoat Company,

Circle 72 on Reader Service Card

Navy Awards $32.9-Million Contract To Tracor Unit

Tracor Applied Sciences, Inc., a subsidiary of Tracor Inc., recently received a $32.9-million U.S. Navy contract to provide technical services and facilities to support Arleigh Burke (DDG-51) Class design engineering for DDG-52 through DDG-58.

John M. Stebbins Named VP, Sales And Marketing Of Alco Power Inc.

John M. Stebbins

John M. Stebbins has been named vice president, sales and marketing, U.S., of Alco Power Inc., a subsidiary of Bombardier, Inc., of Montreal, Canada. The announcement was made by **Roland Gagnon,** president of the Rail and Diesel Products Division of Bombardier.

In this position, Mr. **Stebbins** will be responsible for the sales and marketing of the Alco 251 diesel and the Alco 2151SI spark-injected engines in the United States. He will be establishing the U.S. sales headquarters in Norfolk, Va. This facility will also house Alco's new service, training and distribution center.

Possessing a Bachelor of Science degree granted by Purdue University, Mr. **Stebbins** comes to Alco with extensive mechanical and industrial products experience. Previous employment positions include the Fairbanks Morse Engine Division of Colt Industries, where he was vice president of government sales; the Marathon Electric Manufacturing Company, holding various marketing positions; the General Electric Company and also the U.S. Navy, where he was a naval aviator.

The Alco 251 diesel is utilized in applications which include locomotive traction, marine propulsion and stationary power in powers ranging from 1,000 to 4,000 ghp. The newly developed Alco 2151SI spark-injected engine meets the most stringent antipollution standards.

Alco's parent company, Bombardier, Inc., is a Canadian corporation active in both the transportation equipment and the aerospace industry. It acquired Alco in 1984. The division has sales offices in Washington, D.C., and Houston, Texas.

WHEN YOU BUILD SHIPS IN SERIES, YOU'D BETTER BE SURE THEY ARE THE BEST!

At B&W Shipyard we have a simple marketing philosophy. We see a ship as a means of making money for our customers.

That is why we have developed ships with outstanding fuel economy, high payloads and quick turnround capability. The evidence is in the above average charter rates they consistently obtain and the premiums paid for them on the S&P market.

We have an added incentive to design the best. Because we know that the greatest opportunity for product- and productivity improvements are found at the design stage.

We only build one type of ship at a time - in series. Our present series of panamax product tankers has become a market leader in the large product tanker sector over recent years.

You may, however, know us better for our panamax bulk carriers, the B&W Mk I, II, and III, which we built from 1967 to 1985. Soon we will introduce a Mk IV, an even superior ship.

Burmeister & Wain Shipyard
P.O. Box 2122, Refshaleøen
DK-1015 Copenhagen. Tel. 45-1-57 11 33
Telex: 31 455 bwyrd dk

Burmeister & Wain was established in 1843 and has built 700 ships, of which more than 50 were the B&W Mk I, II and III bulk carriers. Our current production series so far totals 11 CPT54E product tankers.

A high-speed passenger ferry recently ordered by TNT Hydrolines Inc., Wayne, N.J., from Gladding-Hearn Shipbuilding, Somerset, Mass., will be similar to the Island Express, shown here off lower Manhattan.

Gladding-Hearn Receives Order For INCAT-Design Passenger Ferry For New York Commuter Service

—Free Literature Offered—

Gladding-Hearn Shipbuilding, Somerset, Mass., has received an order from TNT Hydrolines, Inc., Wayne, N.J., for an 80-foot, 265-passenger, high-speed passenger ferry, which will be used for commuting and excursions in New York Harbor. The announcement was made by **George Duclos,** president, Gladding-Hearn Shipbuilding, and **John R. Arwood,** chairman, TNT Hydrolines, Inc., at a news conference aboard the Gladding-Hearn-built Island Express, which was docked at Pier 11 in lower Manhattan.

The boat, reportedly the first purpose-built vessel to be used for commuting in the area, will carry passengers to and from Monmouth County, N.J., and New York City. During midday hours, the vessel will be used for tourist excursions. She will be able to carry 220 passengers inside her cabin and a total of 265 when her outdoor seating is utilized.

The vessel will be designed by **Philip Hercus** of International Catamarans Pty Ltd. (INCAT), Sydney, Australia. Gladding-Hearn Shipbuilding and Nicholas Brothers Boat Builders, Freeland, Wash., are the only two yards in the U.S. licensed to build these type catamarans. Only eight shipyards are licensed worldwide to build these special passenger boats. The high-speed ferry will be powered by two Deutz-MWM 12-cylinder diesel engines which will give her a 31-knot capability. Her twin-hull design gives her a near wakeless operation with excellent stability in all kinds of weather.

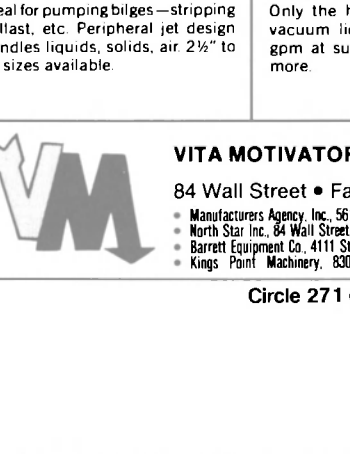
The as-yet-unnamed vessel will have luxurious accommodations, heat and air conditioning, and a snack bar on the main deck. She will be similar to the Island Express, another INCAT-designed high-speed catamaran, which was demonstrated for the press in New York Harbor at the news conference.

At present, there are more than 100 Hercus catamarans either ordered or operating worldwide. The TNT Hydrolines vessel is the first catamaran ordered for use in New York Harbor.

For free literature on the boatbuilding services offered by Gladding-Hearn Shipbuilding,

Circle 65 on Reader Service Card

SPD Technologies Names Biancamano Manager, International Marketing



John Biancamano

John Biancamano recently joined SPD Technologies as manager-international marketing.

In his new position he will be responsible for all international marketing and program development on behalf of SPD's line of military circuit breakers, switchgear and battery monitoring systems. The company is presently represented in 12 countries outside the U.S.

Prior to joining the Philadelphia-based producer of electrical systems protection equipment, Mr. **Biancamano** had been associated with SPS Technologies, Inc., Jenkintown, Pa., where he served as manager, electronic product development, supervising electronic and computer-based product development activities.

Earlier, Mr. **Biancamano** had been development engineer at Applied Color Systems, Inc., Princeton, N.J., and a member of the technical staff at RCA Astro-Electronics Division, Princeton, NJ.

SPD Technologies is a world leader in the design, development and manufacture of electronically controlled electrical systems protection equipment for military applications and other harsh operating environments. Headquartered in Philadelphia, the company has service operations across the U.S.

FELS Awarded $60-Million Contract To Build Jack-Up Rig

Far East Levingston Shipbuilding (FELS) of Singapore was recently awarded a $60-million contract to construct a harsh-environment jack-up drill rig.

The rig was ordered by Santa Fe International Corp., a Kuwaiti-owned drilling contractor operating out of the U.S. The rig will be delivered in 1989.

The new rig is an E and GL-780 MOD V cantilever jack-up and is one of the larger-size self-elevating rigs capable of operating the whole year round in the most severe environmental conditions.

Taylor Named President, Hondex Marine Electronics

Presley Taylor

Presley Taylor, a 30-year veteran of the marine electronics industry, has been named president of Hondex Marine Electronics, Clearwater, Fla.

The newly formed company, which is a U.S. subsidiary of Honda Electronics Company Ltd., has opened corporate offices at 13161 56th Court, Suite 203, in Clearwater, phone (813) 573-1870.

Hondex will market a line of consumer and commercial marine electronics.

Before joining Hondex, Mr. **Taylor** was president of King Marine Radio. Prior to that, he was vice president of SI-TEX Marine Electronics.

For more information and free literature on Hondex Marine Electronics,

Circle 23 on Reader Service Card

Holland America Line Plans To Double Size Of Alaskan Cruise Fleet

Holland America Line, the largest single passenger line serving the Alaskan cruise market, plans to expand its fleet in the area from three to six ships by 1992, according to **Terry Underwood,** company vice president for marketing.

The company, which boasts about 70,000 ship passengers in the Alaskan cruise market, recently purchased the 1,200-passenger Homeric from Home Lines to add to its Alaskan summer cruise program.

In addition, Holland America plans to build two new ships with passenger capacities of about 1,800 for delivery in 1991 or 1992.

Intertek Offers Free Eight-Page Full-Color Brochure On Services

Intertek Services Corporation, with world headquarters in Fairfax, Va., is offering a free, eight-page, full-color brochure on the tasks performed by their registry of 5,000-plus independent contractors. The registry includes expert quality engineers, consultants, inspectors, expediters and instructors with over 25 years of experience, located in over 500 U.S. and Canadian cities, as well as in major cities throughout the world.

Titled "How to Assure Quality . . . At a Lower Cost," the publication includes an extensive list of Intertek skills, along with a partial list of Intertek's capabilities in component, subsystem and system levels. Tasks performed include capability surveys, performance monitoring, inspection, expediting, and providing consultants and training instructors.

The brochure also lists a step-by-step procedure showing how easy it is to use Intertek, plus an explanation of why Intertek is the logical answer.

For more information and a free copy of the well-illustrated brochure from Intertek Services Corporation,

Circle 52 on Reader Service Card

Megan O'Leary, daughter of Cruise International president **Richard D. O'Leary,** served as sponsor of the Spirit of Chicago and broke the customary bottle of champagne across the bow to officially launch the vessel.

Blount Christens 'Spirit Of Chicago' —7th Luxury Dinner Vessel In 'Spirit' Line For Cruise International

The 192-foot Spirit of Chicago was recently christened at Blount Marine Construction in Warren, R.I. The luxury dinner cruise vessel is the seventh in the 'Spirit' line constructed for Cruise International of Norfolk, Va.

The Spirit of Chicago underwent two weeks of final preparation prior to its departure for Chicago. The vessel sailed down the St. Lawrence Seaway and through Lakes Ontario, Erie, Huron, and Michigan on its way to its debut in late April as one of Chicago's premier harbor cruise vessels.

The Spirit of Chicago will carry a crew of 75, who will be responsible for vessel operation, food, three custom-made bars and the "Salute to Broadway" revue entertainment feature. Dining service on three glass-enclosed, climate-controlled decks will be provided for 600 passengers.

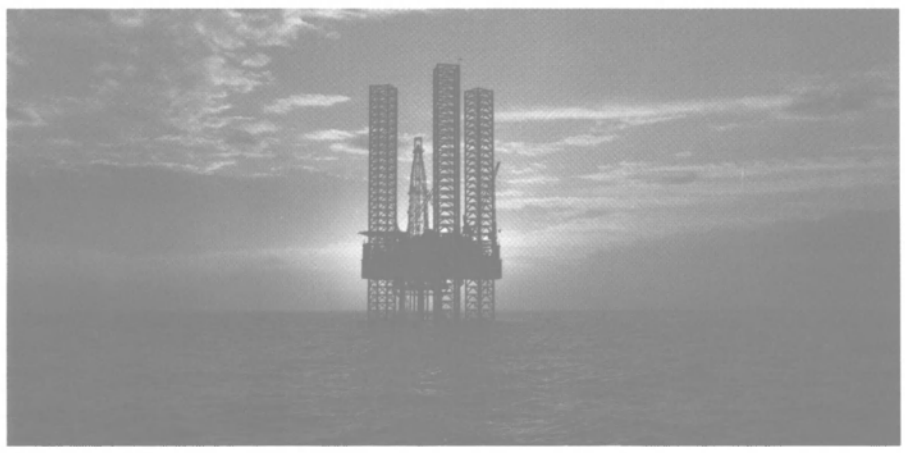
Richard D. O'Leary, president of Cruise International/C.I. Travel Centers, recently announced the construction of five new dinner cruise vessels over the next two years. He estimates that the seven Spirit vessels will carry approximately 1,200,000 passengers in 1988. The ships of the Spirit fleet provide the combination of a sightseeing tour, cabaret entertainment and dining in the cities of Boston, New York, Philadelphia, Washington, D.C., Norfolk, Va., and Miami, Fla. The first of the five newly constructed ships is scheduled to be ported in Los Angeles.

For free literature fully detailing the shipbuilding facilities and capabilities of Blount,

Circle 18 on Reader Service Card

American Transport Wins $18-Million MSC Contract

American Transport Lines, Ltd., of Teaneck, N.J., is being awarded a firm-fixed-rate, indefinite quantity, indefinite delivery contract for intermodal and ocean transportation between the U.S. East Coast and Praia Da Vittoria, Azores, in support of the Air Force Logistics Command. The cost is estimated to be approximately $18,000,000 over the term of the contract. The performance period is 29 months.



Marathon LeTourneau Introduces New GulfKing Class Jackup For Gulf Of Mexico—Brochure Available

Marathon LeTourneau of Houston, Texas, recently introduced its new GulfKing™ class offshore jackup drilling rig, a rig designed for the Gulf of Mexico.

The new GulfKing class jackup offers many of the proven features found in the popular LeTourneau ll6 class jackup, plus enhancements that expand the deck area and increase the rig's fixed, variable and drilling loads.

The greatest advantage lies in the GulfKing's 4.5-million-pound variable load and a 6-million-pound variable load for normal drilling. The GulfKing has more storage area for supplies, reducing the number of costly, time-consuming supply runs needed. The GulfKing also offers up to l,500 square feet of deck area, and up to two million pounds of hook load.

In addition, the GulfKing features LeTourneau's Slotilever™ design which permits drilling in either the slot or cantilever modes. Slotilever provides a 24- by 7l-foot drilling pattern for multi-well exploratory and production drilling, and for positioning over existing platforms during workovers.

The GulfKing is built to survive 48-foot waves and l00-knot winds in 300 feet of water.

The GulfKing features Marathon LeTourneau's rack and pinion electromechanical jacking system capable of elevating l8,000 kips (8,l70 metric tons) at l.5 feet per minute. An octagonal heliport 65 feet across the flats has ample space for the installation of refueling and firefighting systems.

To extend its operating range, the GulfKing may also be equipped with 477 feet of leg for operations in water up to 328 feet.

The GulfKing's three-level crew quarters accommodate up to 88 persons and can be built even larger to meet special customer requirements. Quarters include a five-bed hospital room, galley, dining and recreation facilities with year-round air conditioning.

For more information and a free copy of the brochure from Marathon LeTourneau,

Circle 51 on Reader Service Card

U.S. NAVY

THE $34-BILLION ANNUAL U.S. NAVY MARKET

An Update On U.S. Navy Spending For Ships And Equipment In FY1989

By Dr. James R. McCaul, President
International Maritime Associates, Inc.

The U.S. Navy continues to be the driving force for shipyards and many equipment manufacturers. Spending for ships, weapons, support equipment and maintenance exceeds $34 billion annually.

Ship Procurement

The Navy has requested funds to build 17 ships and lengthen two fleet oilers in Fiscal Year 1989. A budget of $9.1 billion for ship procurement is proposed. Details for the ship procurement budget for FY 1988 to 1992 are shown in Exhibit 1.

Some changes from last year include a more than 14 percent cut from the fast combat support ship (AOE) budget. The Navy had planned to budget $425.4 million for the AOE program—but reduced the funding level to $363.9 million in this year's budget request. The T-ACS crane ship conversion planned for FY 1989 was dropped due to budget pressures. Funds for strategic sealift were also dropped—largely as a reaction to a hotly contested decision which transferred control over the Ready Reserve Fleet (RRF) from the Navy to the Maritime Administration.

In early April, the House Armed Services Committee recommended the Navy ship program be approved—with the exception of the proposed oceanographic ship. The Navy has asked for $74 million to build one SWATH-design AGOR research ship. The committee recommended against this funding on the basis the design was not fully developed.

The Senate Armed Services Committee bill completed mark up in late April— and the Senate bill essentially similar to the House version.

Both the House and the Senate must act on the Committees' authorization bill recommendations. Each chamber will vote on an authorization bill. Differences between the two bills will be negotiated by House/Senate conferees. A compromise final version will be sent to the President for signature. An appropriations bill must also be passed by each chamber, providing funding for ship and other defense procurements. A compromise appropriations bill must then be agreed to by House/Senate conferees. Both the authorization bill and appropriations bill must be passed before the FY 1989 program is finalized.

The House Armed Services Committee has recommended the addition of one Army logistics support

Exhibit 1—Five Year Navy Shipbuilding Program
($ in millions)

	FY 1988		FY 1989		FY 1990		FY 1991		FY 1992	
	No. Ships	$	No. Ships	$	No. Ships	$	No. Ships	$	No. Ships	$
Construction										
Trident Submarine (SSBN)	1	$1,260.8	1	$1,368.1	1	$1,482.4	1	$1,546.7	1	$1,597.0
Attack Submarine (SSN 688)	3	1,676.9	2	1,493.6	2	1,503.8	2	1,438.3	1	801.2
New Design Submarine (SSN 21)	—	257.6	1	1,488.0	—	583.0	2	2,916.6	2	2,953.4
Aircraft Carrier (CVN)	2	6,325.0	—	—	—	—	—	—	—	—
Aegis Cruiser (CG 47)	5	4,127.0	—	—	1	951.3	—	—	—	—
Aegis Destroyer (DDG 51)	—	5.5	3	2,207.3	3	2,394.4	5	3,972.6	6	4,982.1
Amphib. Assault Ship (LHD)	1	752.9	1	737.5	—	41.8	1	1,136.5	—	208.2
Amphib. Land. Crft. (LSD 41 CV)	1	258.0	—	—	1	294.1	1	304.0	2	595.3
Mine Countermeasure Ship (MCM)	—	—	—	—	—	—	—	—	—	—
Coastal Minehunter (MHC)	—	—	2	197.2	3	232.6	3	246.4	4	313.7
Fleet Oiler (TAO)	2	256.4	2	284.9	2	312.0	1	158.9	—	—
Ocean Surveillance Ship (TAGOS)	—	—	3	159.6	3	176.5	2	126.7	—	—
Ammunition Ship (AE)	—	—	—	—	—	—	1	418.0	1	327.2
Fast Combat Support Ship (AOE)	—	—	1	363.9	—	—	2	903.2	—	—
Salvage Ship (ARS)	—	—	—	—	1	145.5	—	—	—	—
Oceanographic Res. Ship (AGOR)	—	—	1	74.0	2	127.4	4	252.1	—	—
Patrol Ship (PXM)	—	—	—	—	1	114.4	—	—	4	404.6
Landing Craft (LCAC)	—	36.5	9	192.6	12	274.4	12	282.3	12	289.5
Conversion										
Carrier Modernization (CV SLEP)	1	729.8	—	135.4	—	102.8	1	582.4	—	211.6
Fleet Oiler Lengthening (AO 177)	1	44.1	2	84.9	1	40.3	—	—	—	—
Crane Ship Conversion (TACS)	2	53.1	—	—	—	—	—	—	—	—
Other										
Service Craft	—	12.5	—	—	—	64.5	—	72.0	—	151.2
Landing Craft	—	—	—	—	—	21.9	—	105.9	—	107.9
Strategic Sealift	—	43.4	—	—	—	62.8	—	13.8	—	36.9
Strategic Sealift Enhancement	—	—	—	—	—	21.4	—	21.1	—	49.4
Outfitting	—	183.9	—	214.7	—	303.5	—	273.9	—	308.6
Post Delivery	—	132.0	—	128.4	—	220.7	—	163.6	—	210.4
Total Budget		**$16,155.4**		**$9,130.1**		**$9,471.5**		**$14,935.0**		**$13,548.2**
Number of Ships:										
Major Construction	15		17		20		25		21	
LCAC Landing Craft	—		9		12		12		12	
Conversion/Modernization	4		2		1		1		0	

Note: 1. Navy has not released a new five-year plan. The figures shown are those in last year's plan—less an aircraft carrier in FY 1990.
Source: Department of the Navy

vessel (LSV) in the FY 1989 program. Four of these ships are under contract to Moss Point Marine, a member of the Trinity Industries' shipbuilding group. The Army has indicated that a fifth vessel is required.

In late March, Newport News Shipbuilding, Newport News, Va., received a contract to begin pruchasing long lead items for the aircraft carriers CVN-74 and -75. Two carriers, the USS Abraham Lincoln (CVN-72) and the USS George Washington (CVN-73) are currently under construction at Newport News. This new contract gives an unprecedented backlog of four nuclear carriers.

In other ship programs, more than 90 Navy ships are under construction at U.S. shipyards. Full details are provided in Exhibit 2.

Weapons & Support Equipment

A total of $11.1 billion has been requested in FY 1989 to buy missiles, torpedoes, electronics and other support equipment. This is an increase of $600 million over FY 1988.

Ship Maintenance Budget

Maintenance and modernization of naval ships continues to drive work in U.S. ship-repair yards. Spending for ship repair is projected to be $4.8 billion in FY 1989.

From FY 1983 through FY 1987, there has been a clear decline in the number of overhauls—while the number of short term availabilities has increased significantly. In FY 1988, the number of both overhauls and SRAs/PMAs is expected to decline. In FY 1989, SRA/PMA job starts are projected to increase somewhat over this year.

Funding constraints are now obviously affecting Navy ship maintenance. A year ago the Navy planned to spend more than $5 billion to perform 215 scheduled maintenance job starts in FY 1988. The most recent plan for FY 1988 calls for expenditures of $4.7 billion to perform 178 scheduled job starts.

Almost $600 million has been cut from the Navy active fleet ship maintenance and modernization plan for FY 1989. Most of the cuts are in the area of ship alterations—where planned spending has been cut from $1.6 billion to under $1.1 billion. The trend toward fewer overhauls and more short term scheduled availabilities continues. Details are shown in Exhibit 3.

New Technology Development

Funding totaling $9.2 billion has been requested for research and engineering in FY 1989. This figure is slightly lower than FY 1988. Details for recent years are shown in Exhibit 5.

Budget pressures have forced the Navy to cut back on proposed research and development spending in FY 1989. A year ago, the Navy planned to budget slightly more than $10 billion for this activity in FY 1989. The figure has been cut 8 percent to $9.2 billion. This is still double the spending level of 10 years ago.

Expanding DARPA Role In Navy R&D

The House Armed Services Committee reaffirmed that the Defense Advanced Research Projects Agency (DARPA) should manage the advanced submarine technology program. This program is intended to identify and develop revolutionary submarine hull and nonnuclear propulsion technologies. DARPA's responsibility will continue over the next three to five years—with total funding exceeding $800 million anticipated for the work.

The Committee also assigned responsibility to DARPA to begin development of an advanced torpedo. Additional funding of $10 million is recommended for FY 1989 to begin this program.

Another responsibility assigned to DARPA is the antisubmarine warfare initiative. This is to be a major integrated technology effort to "come to grips" with the Soviet

(continued)

Exhibit 2

PRIVATE SHIPYARDS WITH NAVY CONSTRUCTION PROGRAMS (31 March 1988)

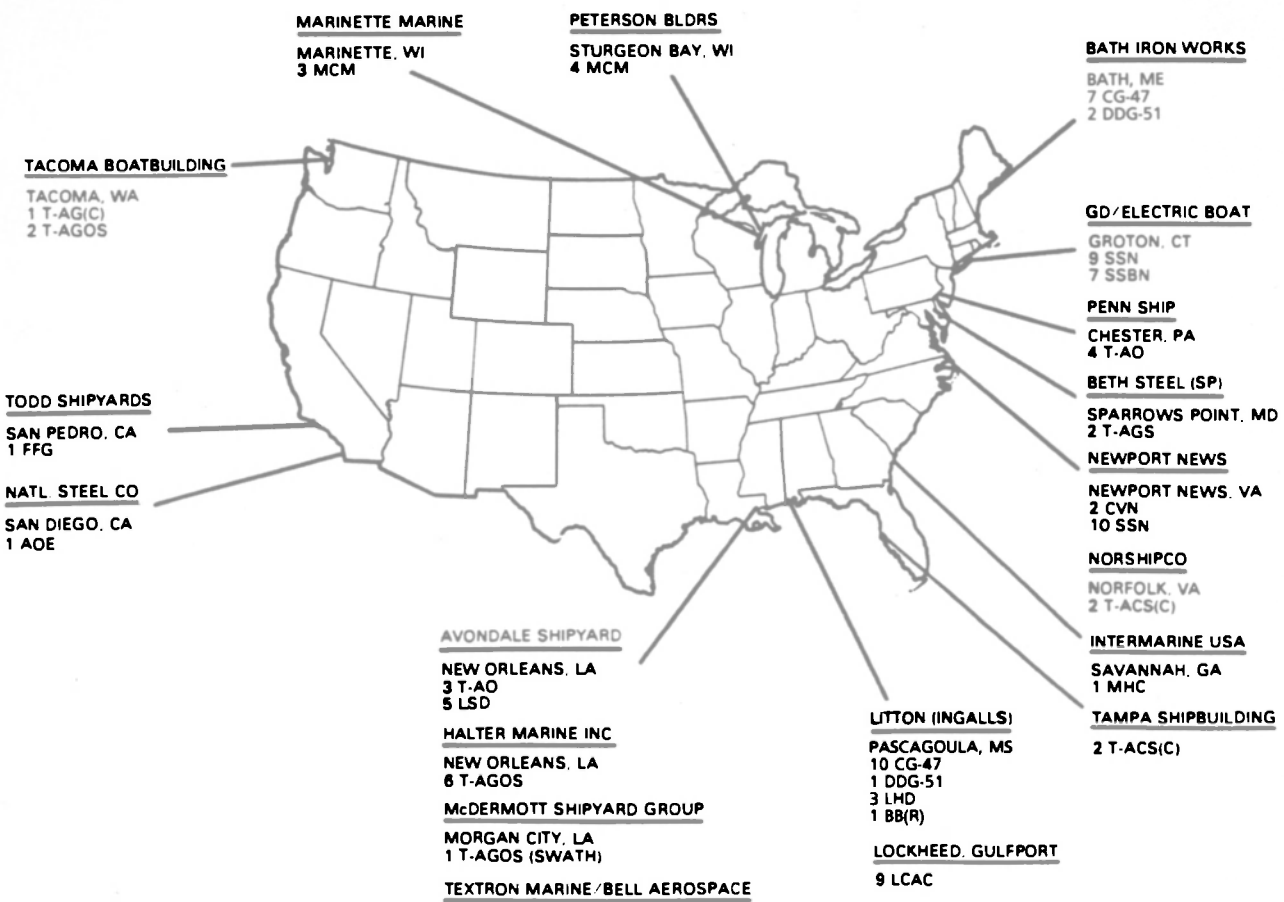


Exhibit 3—Job Starts and Expenditures for Active Fleet Ship Maintenance and Alteration FY 1986-1989

	FY 1986 actual	FY 1987 actual	FY 1988 budgeted	FY 1989 planned
No. of Job Starts				
Number of Overhauls	33	39	27	23
Number of SRA's	103	108	86	100
Number of PMA's	35	54	65	58
Total	**171**	**201**	**178**	**181**
Expenditures (in milions of $)				
Scheduled Overhauls	$1,813.7	$1,859.4	$1,271.8	$734.1
Short Term Availabilities	1,262.5	1,506.4	1,485.9	2,060.5
Ship Alterations	1,303.3	1,342.5	1,026.1	1,077.0
Intermediate Maintenance	321.5	368.4	325.2	321.1
Technical Support	131.7	145.6	137.5	139.7
Fleet Outfitting	328.2	289.9	315.4	360.5
Inactivations	40.5	25.7	66.7	110.6
Berthing/Messing	43.6	49.0	32.0	39.9
Total	**$5,245.0**	**$5,586.9**	**$4,660.6**	**$4,843.4**

Source: Department of the Navy

Exhibit 5—Naval Research, Development Test and Evaluation Budget
(In millions of $)
FY 1989

	FY 1988	Proposed	House Armed Services Comm. Recommendation
Technology Base	$ 750.0	$ 772.6	$ 777.6
Advanced Technology Devel.	233.4	204.0	206.0
Strategic Programs	1,252.1	781.0	781.0
Tactical Programs	5,663.1	5,992.4	6,116.1
Intelligence & Communic.	913.9	751.7	751.7
Defense Wide Mission Supp.	700.6	714.4	714.4
Total	**$9,512.9**	**$9,216.2**	**$9,346.9**

Source: Department of the Navy

(continued)

submarine menace. Additional funding of $40 million has been recommended to begin this program.

Twelve years ago, IMA was asked by the Navy to perform a major study of its procedures for managing naval ship procurement. This was followed by an assessment of procedures used to manage the naval ship modernization program. Since then IMA has performed consulting assignments for over 100 commercial clients in 20 countries—establishing a leading international position in marine and naval market research.

In 1981, IMA began publishing a series of special reports on naval business opportunities. These reports now reach over 400 subscribers. They include equipment manufacturers, shipyards, technology firms, electronics suppliers, etc.

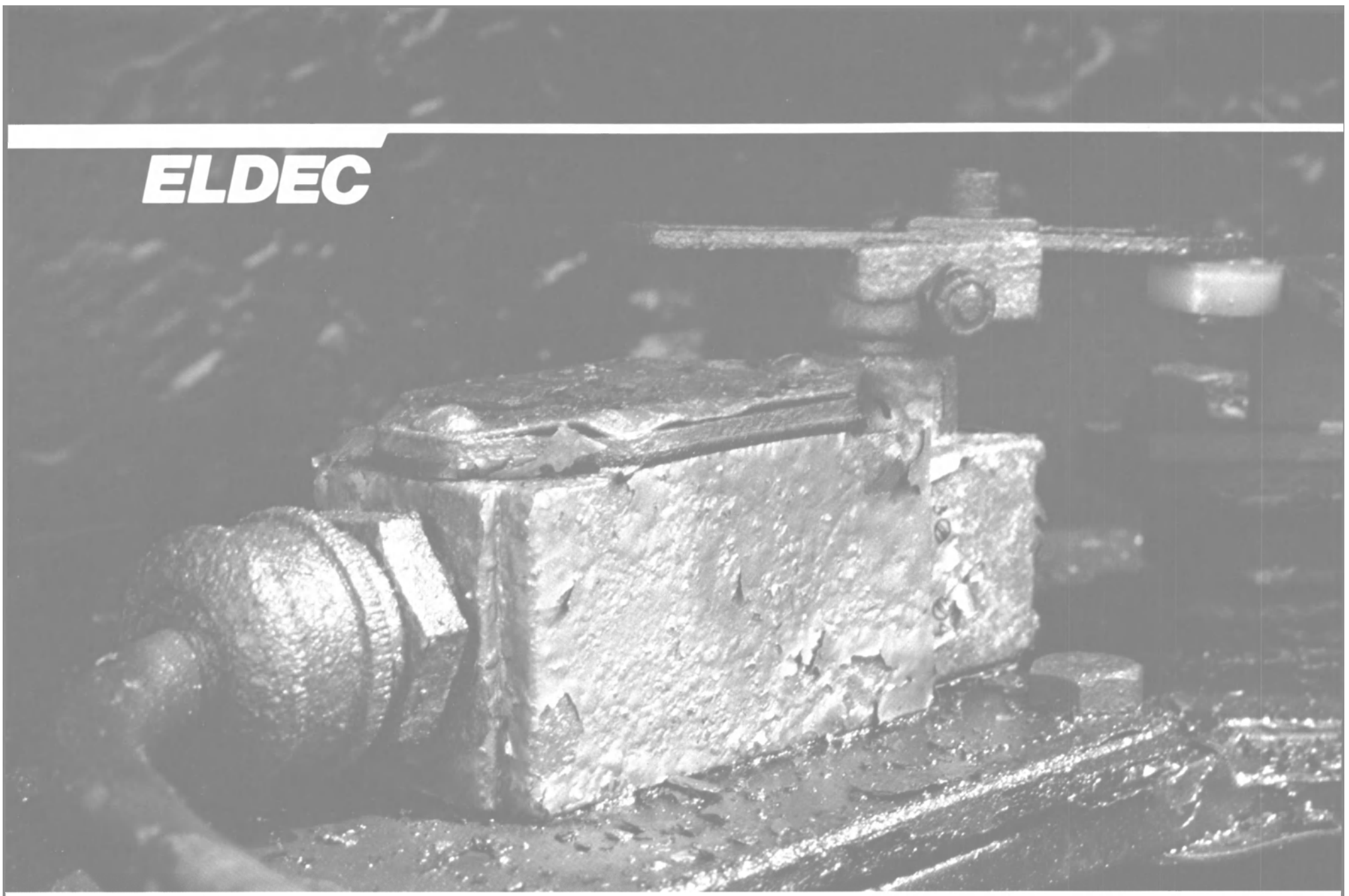
This article draws from several recent reports and provides an indication of the type of coverage provided to subscribers.

New Naval Technology Opportunities

IMA has just published a detailed guide to the new naval technology program. It describes more than 200 specific projects involving technology development representing tremendous sales opportunities for designers, suppliers and manufacturers.

Highlights include:

- a major high-level effort initiated to develop revolutionary surface ship designs;
- engineering development of the SSN-21 which requires expenditures of more than $400 million over the next two years;
- more than $800 million to be spent over the next five years on advanced attack submarine concepts—a major new initiative to be managed by DARPA;
- design and development of nuclear propulsion technology which continues to exceed $700 million annually;
- D-5 ballistic missile development expenditures which will exceed $1.6 billion over the next two years as the Lockheed-managed program transitions to the production stage;
- Tomahawk cruise missile development expenditures to exceed $130 million over the next two years;
- Boeing-managed Sea Lance ASW standoff weapon development expenditures which will exceed $150 million FY 1988-89—a figure lower than originally planned due to budget constraints;
- substantial increases in funding for development of the MK 50 advanced lightweight torpedo (ALWT) in the new FY 1989 budget—with two-year funding of development expenditures now projected to exceed $275 million;
- project definition contracts to be awarded this summer kicking off a



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In fact, lifespans of over one million cycles are typical. But that kind of reliability is no good if the electronics can't survive the marine environment.

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- Encased in non-corroding, stainless steel.
- EMI hardened to **exceed** MIL STD 461B, Class A4.
- Operating range from −30° to +65°C.
- Meets MIL STD 901C, Grade A, Class 1 for shock.

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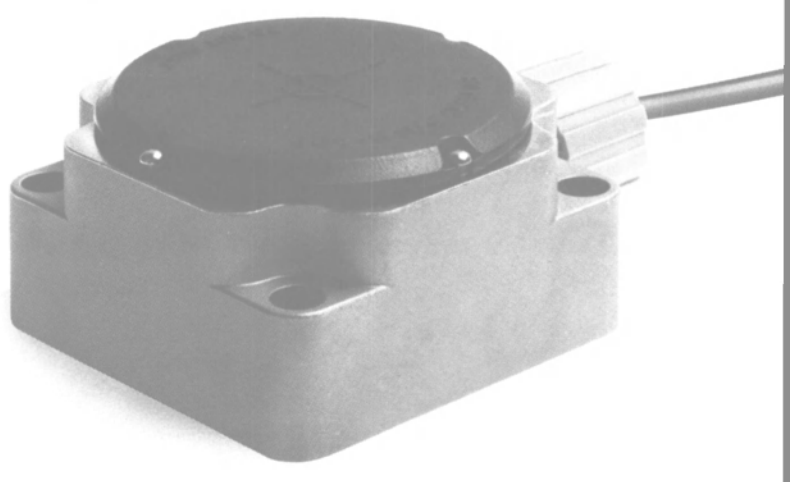
Purchase price is competitive with the best quality mechanical switches. And with less maintenance and replacements, life cycle cost savings are unsurpassed.

Send for more information today.
Once you compare, you'll agree, it's time for a switch.



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U.S. NAVY

CURRENT NAVY, COAST GUARD & MARAD OVERHAUL, REPAIR & CONVERSION CONTRACTS AT U.S. SHIPYARDS

(As of April 1988)

SHIPYARD	SHIP	TYPE OF WORK	$VALUE	COMP
Alabama Dry Dock	USS Lexington (AVT-16)	PM	10,131,466	8/90
Amertech Industries	Empire State (MarAd)	REP & OH	417,528	4/88
Atlantic Dry Dock	USS Aubrey Fitch (FFG-34)	DSRA	6,950,000	3/88
	USS Underwood (LSD-36)	DSRA	7,466,000	8/88
Avondale Shipyards	USS Boone (FFG-28)	SRA	9,998,452	7/88
	USS John J. Hall (FFG-32)	DSRA	11,170,581	9/88
	USS Radford (DD-968)	ROH	20,700,000	5/89
Bath Iron Works	4 USCG cutters	ROH	117,452,000	89
	USS Brumby (FF-1044)	ROH	14,501,392	4/88
	USS Koelsch (FF-1049)	OH	12,000,000	8/88
Bender Shipbuilding & Repair	USS Redstone (T-AGM-20)	DD & OH	5,429,704	9/88
Bethlehem Steel— Sparrows Point	USNS Neosho (T-AO-143)	DD & OH	4,489,339	5/88
Braswell Shipyards	USS Antigo (YTB-792)	SRA	1,047,448	4/88
	USNS Neosho (T-AO-143)	DD & OH	7,366,392	8/88
Charleston Naval Shipyard	USS Andrew Jackson (SSBN-619)	OH	112,058,684	3/90
	USS Woodrow Wilson (SSBN-624)	OH	120,928,007	3/89
Charleston Naval Yard	USS Henry L. Stimson (SSBN-655) & USS Mariano J. Vallejo (SSBN-658)	REF	19,673,812	8/89
Colonna's Shipyards	USS Richard E. Byrd (DDG-23)	DSRA	4,280,000	7/88
Continental Maritime	USS Ranger (CV-61)	SRA	4,926,630	6/88
	USS Mars (AFS-1)	DPMA	10,073,284	5/88
	USS Barbey (FF-1088)	DSRA	3,677,605	4/88
	USS Cook (FF-1083)	DSRA	3,324,711	4/88
DMI Shipyard	MSB-1	ROH	41,057,000	—
General Ship Corporation	USS Trippe (FF-1075)	ROH	8,801,078	5/88
	USS Stephen W. Graves (FFG-29)	EDSRA	10,969,490	6/88
Houston Ship Repair	Chesapeake (NDRF)	REP	299,985	4/88
	Mount Washington (NDRF)	REP	549,000	5/88
Industrial Welding & Machine	State of Maine (MarAd)	REP	517,200	5/88
Ingalls Shipbuilding	USS Stark (FFG-31)	REP	28,700,000	8/88
	USS Wisconsin (BB-64)	MOD	221,768,170	10/88
	USS Richmond K. Turner (CG-20)	ROH	28,780,830	8/88
Jonathan Shipyard	USS Saginaw	PM	9,900,000	6/90
Long Beach Naval Yard	LPH Class Ships	PM	8,096,132	10/90
McDermott Inc.	IX-513 Barge	MODIF	7,422,802	4/88
Metro Machine	Atlantic Fleet LPDs	PM	5,334,400	8/91
	USS Bowen (FF-1079)	OH	6,900,000	—
Metro Machine Corp.	USS John King (DDG-3)	DSRA	3,089,604	9/88
Mid-Coast Marine	USCG buoy tenders, Ironwood & Sweet Briar	DD	670,000	5/88
Moon Engineering	USS Conynham (DDG-17)	REP	1,484,444	—
NASSCO	4 LSTs	PM	3,500,000	90
	3 LSTs	MAINT	5,858,543	—
	USS Hewitt (DD-966)	ROH	26,619,695	4/88
	USS Elliott (DD-967)	ROH	27,779,349	9/88
Newport News Shipbuilding	USS Pittsburgh (SSN-720)	SRA	7,055,300	7/88
	USS Enterprise (CVN-65)	OH	34,277,751	9/88
	USS Newport News (SSN-750)	PSA	3,400,000	1/89
	Surface Ship Support Barge	REP	48,095,123	7/89
	USS Oklahoma City (SSN-723)	PSA	3,367,692	—
	USS Key West (SSN-722)	PSA	38,000,000	12/88
	USS George C. Marshall (SSBN-654)	REF	11,172,200	10/88
	USS Lewis & Clark (SSBN-644)	REF	10,751,500	7/88
Norfolk Naval Yard	USS Baton Rouge (SSN-689)	SRA	5,462,494	10/88
	USS Vulcan (AR-5)	DSRA	4,800,000	5/88
	USS Memphis (SSN-691)	SRA	8,486,562	10/88
Norfolk Shipbuilding	AO-178, 179 & 186	PM	38,900,000	—
	USS Lawrence (DDG-4)	REP	4,966,666	—
	USS Puget Sound (AD-36)	ROH	12,210,546	5/88
	USS Resolute (AFDM-10)	ROH	9,200,000	6/88
	Mormacsea & Mormacsaga (RRF)	UPG	7,973,482	—
Northwest Marine Iron Works	USS Anchorage (LSD-36)	ROH	15,300,000	11/88
	USS Paul Foster (DD-964)	ROH	26,423,466	5/88
	USNS Mercy (T-AH-19)	PSA	4,600,000	4/88
	USS Okinawa (LPH-3)	ROH	14,091,106	1/89
Pennsylvania Shipbuilding	USS Patterson (FF-1061)	PM	5-10 mil/yr.	—
Philadelphia Navy Yard	USS Independence (CV-62)	SLEP	240,000,000	—
Phillyship	USS Estocin (FFG-15)	SRA	3,805,219	4/88
Portsmouth Naval Yard	USS Kamehameha (SSBN-642)	ROH	112,100,000	11/88
	USS Albuquerque (SSN-706) & USS Philadelphia (SSN-690)	SRA	11,416,336	11/88
Puget Sound Naval Yard	USS Nimitz (CVN-68)	REP & OH	—	89
	USS Alexander Hamilton (SSBN-617)	ROH	110,713,798	11/88
Robert E. Derecktor	USS Connole (FFG-12)	ROH	2,500,000	—
Service Engineering	USNS Spica (T-AFS-9)	OH	10,700,000	—
	AE-29, -32-34	PM	4,154,000	89
Southwest Marine	USS Dubuque (LPD-8)	OH	10,000,000	—
	USS George Philip (FFG-12)	EDSRA	10,758,483	4/89
	USS Tripoli (LPH-10)	PMA	3,036,390	7/88
	USS Wichita (AOR-1) & USS Kansas (AOR-3)	REP	41,600,000	—
	USS Pluck (MSO-464)	SRA	1,041,000	—
	LST-1185, -1186 & 1191	OH	35,000,000	87-89
	USS Okinawa (LPH-3)	ROH	16,114,285	7/88
	USS Ramsey (FFG-2)	MAINT	3,000,000	4/88
	USS Durham (LKA-114)	DD	7,611,149	7/88
	USS Anchorage (LSD-36)	ROH	15,048,870	11/88
	USS Stein (FF-1065)	ROH	9,148,194	10/88
Tacoma Boatbuilding	USNS Hayes (T-AG-195)	CONV	33,878,232	3/90
Tampa Shipyards	T-ACS-7 & 8	CONV	43,158,333	10/88
Todd-Seattle	USS Camden (AOE-2)	REP	12,643,642	7/88
	8 WHECs	OH	234,903,000	2/91
USCG-Curtis Bay	14 buoy tenders	SLEP	8,500,000	—
	16 WMECs	MAINT	—	—

Legend: CONV-Conversion; DEACT-Deactivation; DSRA-Docking Selected Restricted Availability; EDSRA-Extended Docking Selected Restricted Availability; MAINT-Maintenance; MODIF-Moficiation; MMA-Major Maintenance Availability; OH-Overhaul; PM-Phased Maintenance; PMA-Phased Maintenance Availability; PSA-post-Shakedown Availability; REF-refit; REP-Repair; ROH-Reglar Overhaul; SER-Service; SLEP-Service Life Extension Program; SRA-Selected Restricted Availability; UPG-Upgrade.

Navy Market

(continued)

30-month design and engineering phase for the new generation mine;
• expenditures over the next two years for Aegis engineering and development to exceed $350 million;
• more than $118 million earmarked in FY 1988-89 for surface ship ASW system development and engineering;
• development and engineering of submarine sonar systems projected to exceed $275 million over the next two years;
• full scale engineering to develop and deliver 28 AN/BSY(2) submarine combat systems—a $7.3 billion long-term development and procurement program for the Seawolf submarine;
• expenditures to develop the Fixed Distributed System (FDS)—a key component of future offboard ASW surveillance—totaling $170 million in FY 1988-89;
• more than $97 million over the next two years to be spent on developing advanced submarine communications systems; and
• almost $87 million to be available in FY 1988-89 for developing new manufacturing technology.

Companies interested in this area will find the IMA guide useful for identifying business opportunities in the new naval technology program. The 220-page guide is available for $550. For further information, contact: International Maritime Associates, 835 New Hampshire Avenue, N.W., Washington, D.C. 20037; telephone: (202) 333-8501; fax: 202-333-8504; or telex: 64325 IMA.

Exhibit 4—Expenditures for NRF Ship Maintenance and Modernization

Fiscal Year	Number of NRF Ships	Spending for Maintenance and Modernization (millions of $)
1982	43	$ 62.8
1983	35	100.3
1984	36	97.4
1985	32	123.6
1986	39	127.9
1987	44	148.3
1988	48	167.6
1989	48	213.2

Source: Department of Defense

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Achieving savings like these obviously requires high reliability. And our boilers have proven they can deliver. With over 80,000 accumulated operating hours aboard the *Ticonderoga, Yorktown, Vincennes,* and *Valley Forge* and at the NAVSSES test facility in Philadelphia, our equipment has operated without a single boiler-related failure.

What's more, the boilers are designed with maintenance in mind by incorporating ample access to the gas and water sides. This has contributed to the excellent operating record.

Powerful ideas like our waste heat recovery boilers are typical of Combustion Engineering's commitment to the U.S. Navy.

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U.S. NAVY

CURRENT NAVY & COAST GUARD VESSELS UNDER CONTRACT AT U.S. YARDS

(As of April 1988)

SHIPYARD Navy Designation	NAME	APPROX. CONTRACT $	EST. DELIVERY
Avondale Shipyards			
T-AO-193	Walter S. Diehl	116,000,000	8/88
T-AO-195	Leroy Grumman	101,000,000	5/89
T-AO-197	Pecos	100,633,789	3/90
LSD-44	Gunston Hall	166,000,000	8/88
LSD-45	Comstock	153,400,000	2/89
LSD-46	Tortuga	153,400,000	4/89
LSD-47	unnamed	150,000,000	11/89
LSD-48	unnamed	150,000,000	5/90
Bath Iron Works			
CG-58	Philippine Sea	252,800,000	1/89
CG-60	Normandy	191,800,000	9/89
CG-61	Monterrey	191,800,000	12/89
CG-63	Cowpens	193,300,000	4/90
CG-64	Gettysburg	193,300,000	11/90
CG-67	unnamed	236,041,276	4/92
CG-70	unnamed	226,123,977	6/93
DDG-51	Arleigh Burke	321,000,000	7/90
DDG-53	John Paul Jones	189,900,000	7/92
DDG-51 Class	—	22,600,000[1]	5/92
Bethlehem-Sparrows Point			
T-AGS-39	Maury	66,000,000	8/88
T-AGS-40	Tanner	66,000,000	2/89
Bollinger Shipyard			
WPB (16)	unnamed	99,306,516	2/90
General Dynamics-Electric Boat			
SSN-751	San Juan	280,100,000	6/88
SSN-752	Pasadena	280,100,000	10/88
SSN-754	Topeka	324,500,000	2/89
SSN-755	Miami	324,500,000	6/89
SSN-757	Alexandria	283,000,000	10/89
SSN-760	unnamed	258,166,750	2/90
SSN-761	unnamed	258,166,750	6/90
SSN-762	unnamed	258,166,750	10/90
SSN-763	unnamed	258,166,750	2/91
SSN-21 Class	—	28,900,000[3]	—
SSBN-734	Tennessee	523,700,000	12/88
SSBN-735	Pennsylvania	531,600,000	8/89
SSBN-736	unnamed	500,870,000	4/90
SSBN-737	unnamed	616,400,000	12/90
SSBN-738	unnamed	674,100,000	12/91
SSBN-739	unnamed	615,000,000	12/92
SSBN-734 Class	—	48,400,000[3]	12/88
SSBN-740	unnamed	644,000,000	7/94
Halter Marine			
T-AGOS-13	Adventurous	14,250,000	8/88
T-AGOS-14	Worthy	14,250,000	12/88
T-AGOS-15	Titan	13,844,067	3/89
T-AGOS-16	Capable	14,031,914	7/89
T-AGOS-17	Intrepid	14,031,914	11/89
T-AGOS-18	Relentless	14,031,914	3/90
Ingalls Shipbuilding			
CG-57	Lake Champlain		8/88
CG-59	Princeton	325,500,000	10/88
CG-62	Chancellorsville	238,600,000	6/89
CG-65	Chosin	242,600,000	11/90
CG-66	Hue City	193,980,662	10/91
CG-68	Anzio	163,980,664	4/92
CG-69, 71, 72 & 73	unnamed	769,142,667	1/94
CG-47 Class	—	215,982,000[6]	1/94
CG-47 Class	—	44,128,775[5]	—
DDG-52	John Barry	162,149,000	9/91
LHD-1	Wasp	1,365,700,000	3/89
LHD-2	Essex	402,494,000	4/92
LHD-3	Kearsage	378,685,000[4]	1/93
DD-963 & DDG-993 Class	—	14,100,000[1]	3/93
Intermarine USA			
MHC-51	unnamed	20,926,936	4/91
Lockheed-Gulfport			
LCAC (2)	unnamed	24,800,000	88
LCAC (7)	unnamed	115,586,281	—
LCAC	—	31,759,154[6]	90
Lockheed-Seattle			
LCAC (7)	unnamed	115,586,251	6/91
LCU (Army-7)	unnamed	26,000,000	—
Lockheed-Savannah			
LCU	Kenesaw Mountain	—	3/88
LCU	Macon	—	5/88
LCUs (Army-12)	unnamed	—	7/88-11/89
Marinette Marine			
MCM-2	Defender	46,000,000	8/88
MCM-4	Champion	42,000,000	12/88
MCM-7	Patriot	51,848,816	10/89
McDermott Inc.			
SWATH T-AGOS-19	Victorious	25,424,347	2/90
YTT 8 & 9	unnamed	21,700,000	—
YTT 10	unnamed	10,913,817	5/90
Moss Point Marine			
LSV	Lt. Gen. W. Bunker	30,598,019[2]	3/88
NASSCO			
AOE-6	Supply	290,097,944	4/91
Newport News Shipbuilding			
CVN-72	Abraham Lincoln	1,550,000,000	12/89
CVN-73	George Washington	1,550,000,000	12/91
CVN-74	unnamed	724,368,395[6]	
CVN-75	unnamed		—
SSN-688 Class	—	22,000,000[1]	10/88
SSN-723	Oklahoma City	225,100,000	5/88
SSN-750	Newport News	278,000,000	8/88
SSN-753	Albany	319,000,000	7/89
SSN-756	Scranton	259,833,000	9/89
SSN-758	Asheville	259,833,333	1/90
SSN-759	unnamed	259,833,333	6/90
SSN-760	unnamed	55,000,000[6]	—
SSN-764	unnamed	257,118,500	2/91
SSN-765	unnamed	257,118,500	5/91
SSN-766	unnamed	257,118,500	8/91
SSN-767	unnamed	257,118,500	11/91
SSN-21 Class	—	325,000,000[7]	2/94
SSN-21 Class	—	23,390,510[8]	4/88
SSN-21 Class	—	28,900,003[3]	—
Pennsylvania Shipbuilding			
T-AO-191	Benjamin Isherwood	111,000,000	10/88
T-AO-192	Henry Eckford	111,000,000	5/89
T-AO-194	John Ericsson	97,500,000	2/90
T-AO-196	Kanawa	95,025,000	11/90
Peterson Builders			
MCM-3	Sentry	57,900,000	7/88
MCM-5	Guardian	57,900,000	6/89
MCM-6	Devastator	48,287,461	8/89
MCM-8	Scout	48,287,461	6/90
Robert E. Derecktor Shipyard			
WMEC-910	Thetis	30,160,000	5/88
WMEC-911	Forward	30,160,000	9/88
WMEC-912	Legare	30,160,000	5/89
WMEC-913	Mohawk	30,160,000	5/89
TB (Army-2)	unnamed	16,500,000	89
Tacoma Boatbuilding			
T-AGOS-11	Audacious	9,295,000	6/89
T-AGOS-12	Bold	9,295,000	10/89
Textron Marine			
LCAC-13-24 (12)	unnamed	187,000,000	89/-6/91
Todd Pacific-San Pedro			
FFG-61	Ingraham	96,100,000	11/88

Footnotes: 1. Lead yard services contract; 2. CW3 H.C. Clinger and Gen. E.B. Somerville delivered under contract; 3. Design contract; 4. Contains $26 million for advanced procurement of material for LHD-4; 5. Yard planning services; 6. Long lead procurement; 7. Detail design contract; 8. Contract services.

KEY TO NAVY DESIGNATIONS

AOE	Fast Combat Support Ship	T-AGS	Surveying Ship*	MHC	Mine Hunter, Coastal	LCM	Landing Craft, Mechanized
CG	Guided Missile Cruiser	T-AO	Oiler*	MSH	Mine Hunter	LCU	Landing Craft, Utility
CVN	Aircraft Carrier, Nuclear	TB	Tugboat	SSBN	Ballistic Missile Sub, Nuclear	LHD	Amphibious Transport Dock
DDG	Guided Missile Destroyer	WMEC	Medium Endurance Cutter†	SSN	Submarine, Nuclear	LSD	Dock Landing Ship
FFG	Guided Missile Frigate	WPB	Patrol Boat†	SWCM	Special Warfare Craft, Medium	LSV	Logistic Support Vehicle
LCAC	Landing Craft, Air Cushion	YTT	Warping Tug	T-AGOS	Ocean Surveillance Ship*	MCM	Mine Countermeasures Ship

*Assigned to Military Sealift Command
†Coast Guard

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 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)*
Unnamed (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 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 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 to 79,300 tons; **Length:** 1,063 to 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)[4]
Midway Class (CV-41)
Displacement: 62,000 tons; **Length:** 979 feet; **Beam:** 121 feet; **Power Plant:** 12 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 Kearage (LHD-3)*
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.

ATTACK SUBMARINES
Los Angeles Class (SSN-688)
Displacement: 6,900 tons; **Length:** 360 feet; **Beam:** 33 feet; **Power Plant:** One nuclear reactor, two geared 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)*
Unnamed (SSN-759)*
Unnamed (SSN-760)*
Unnamed (SSN-764)*
Unnamed (SSN-765)*
Unnamed (SSN-766)*
Unnamed (SSN-767)*
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)*
Unnamed (SSN-760)*
Unnamed (SSN-761)*
Unnamed (SSN-762)*
Unnamed (SSN-763)*
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-Electic 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, turbine-electric drive and one shaft.
Built By General Dynamics-Electic 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 geared 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)
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. Mendell 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 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.
Built By General Dynamics-Electric Boat
USS Skipjack (SSN-585)
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)
General Dynamics-Electric Boat
USS Flasher (SSN-613)
USS Greenling (SSN-614)
USS Gato (SSN-615)

AUXILIARY CRANE SHIPS (RRF)
TACS-1 CLASS
Displacement: 25,660 tons; **Length:** 668½ 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 Company
SS Gopher State (T-ACS-4)
SS Flickertail State (T-ACS-5)
SS Cornhusker State (T-ACS-6)*

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-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)

Footnotes: Asterisks denote under contract or construction at yard. (1) Underwent modernization at Ingalls Shipbuilding; (2) Underwent modernization at Long Beach Naval Yard; (3) To be recommissioned in August 1988 after completion of modernization at Ingalls; (4) Undergoing SLEP at Philadelphia Naval Yard; (5) Undergoing conversion to (T-AG-195); (6) Under long term time charter.

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)*
Unnamed (SSBN-736)*
Unnamed (SSBN-737)*
Unnamed (SSBN-738)*
Unnamed (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 Plants:** Eight boilers, four geared turbines and four shafts.

Built by New York Navy Yard

USS Iowa (BB-61)[1]
USS Missouri (BB-63)[2]

Built by Philadelphia Navy Yard

USS New Jersey (BB-62)[2]
USS Wisconsin (BB-64)[3]

CABLE REPAIR SHIPS (MSC)
Neptune Class (T-ARC-2)
Displacement: 7,400 tons; **Length:** 369 feet; **Beam:** 47 feet; **Power Plant:** Turbo-electric, two boilers and two shafts.

Built By Pusey and Jones

USNS Neptune -T-ARC-2)
USNS Albert J. Myer (T-ARC-6)

Zeus Class (T-ARC-7)
Displacement: 14,225 tons; **Length:** 511½ feet; **Beam:** 73 feet; **Power Plant:** Diesel-electric and two shafts.

Built By National Steel and 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 and 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 feet; **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 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)*

(continued)

U.S. Navy Fleet

(continued)

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)*
Unnamed (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)
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-34)
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)
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 gas turbines and two shafts.
Built By Bath Iron Works
USS Arleigh Burke (DDG-51)*
USS John Paul Jones (DDG-53)*
Built By Ingalls Shipbuilding
USS John Barry (DDG-52)*
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 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 Berkeley (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)*
Unnamed (LSD-47)*
Unnamed (LSD-48)*

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

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)

Supply Class (AOE-6)
Displacement: 48,500 tons; **Length:** 753

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U.S. Navy Fleet

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feet; **Beam:** 107 feet; **Power Plant:** four gas turbine engines.

Built By National Steel & Shipbuilding

USS Supply (AOE-6)*

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:** 28½ 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)
USS Monogahela (AO-178)
USS Merrimack (AO-179)
USS Willamette (AO-180)
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 gas turbines 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 Kaufman (FFG-10)

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)
USS Ramsey (FFG-2)
USS Schofield (FFG-3)

Built By Bath Iron Works

USS Talbot (FFG-4)
USS Richard L. Page (FFG-5)
USS Julius A. Furer (FFG-6)

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 (FF-1071)

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 Ouellet (FF-1077)
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 Truett (FF-1095)
Garcia Class (FF-1040)
Displacement: 3,403 tons; **Length:** 414 feet; **Beam:** 44 feet; **Power Plant:** Two boilers, two geared turbines and one shaft.
Built By Bethlehem Steel-San Francisco
USS Garcia (FF-1040)
USS Bradley (FF-1041)
Built By Avondale Shipyards
USS Edward McDonnell (FF-1043)
USS Brumby (FF-1044)
USS Davidson (FF-1045)
Built By Defoe Shipbuilding
USS Voge (FF-1047)
USS Koelsch (FF-1049)
USS O'Callahan (FF-1051)
Built By Lockheed Shipbuilding
USS Sample (FF-1048)
USS Albert David (FF-1050)
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:** Geared steam turbine, two 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; **Beam:** 39 feet; **Power Plant:** Four diesels and two shafts.
Built By Peterson Builders Inc.
USS Avenger (MCM-1)
USS Sentry (MCM-3)*
Built By Marinette Marine
USS Defender (MCM-2)*
USS Champion (MCM-4)*
USS Patriot (MCM-7)*
MHC-51 Class
Displacement: 785 tons; **Length:** 188 feet; **Beam:** 36 feet; **Power Plant:** Two diesels, two with Voith-Schneider propulsion systems
Built By Intermarine USA
Unnamed (MHC-51)*
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:** 51½ 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)*[5]

OCEANOGRAPHIC SURVEY SHIPS
Maury Class (T-AGS-39)
Displacement: 15,821 tons; **Length:** 500 feet; **Beam:** 72 feet; **Power Plant:** diesel.
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 Class (T-AGS-26)
Displacement: 2,800 tons; **Length:** 285 feet; **Beam:** 48 feet; **Power Plant:** Diesel electric and single 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.

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US Navy Fleet

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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)*
Unnamed (T-AGOS-17)*
Unnamed (T-AGOS-18)*

OILERS (MSC)
Henry J. Kaiser Class (T-AO-187)
Displacement: 40,700 tons; **Length:** 677½ feet; **Beam:** 97½ feet; **Power Plant:** Two 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 Walter S. Diehl (T-AO-193)*
USNS Leroy Grumman (T-AO-195)*
Unnamed (T-AO-197)*
Built By Pennsylvania Shipbuilding
USNS Benjamin Isherwood (T-AO-191)*
USNS Henry Eckford (T-AO-192)*
USNS John Ericcson (T-AO-194)*
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 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 Los Angeles 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:** 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 Co.
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)
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:** 530½ feet; **Beam:** 73 feet; **Power Plant:** NA
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:** NA
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 single 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 single shaft.
Built By Bath Iron Works
MV Falcon Leader[6]
MV Falcon Champion[6]
Sealift Class
Displacement: 34,100 tons; **Length:** 587 feet; **Beam:** 84 feet; **Power Plant:** Two turbocharged diesels and single shaft.
Built By Todd Shipyards
USNS Sealift Pacific (T-AOT-168)
USNS Sealift Arabian Sea (T-AOT-169)
USNS 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 single shaft.
Built By Todd Shipyards
MV Ranger[6]
MV Rover[6]
MV Courier[6]
MV Patriot[6]

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 Shipyard
USS Newport (LST-1179)
USS Manitowac (LST-1180)
USS Sumter (LST-1181)
Built By National Steel & Shipbuilding
USS Fresno (LST-1182)
USS Peoria (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 County (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) ■

U.S. MERCHANT SHIPBUILDING

SHIPBUILDING AND REPAIR IN U.S. SHIPYARDS

These days, any privately owned shipyard that was formerly occupied strictly with building new merchant ships has either swung around to the repair and conversion market, has made plans to do so, or is actively pursuing Navy work—which certainly continues to be more than substantial.

The Navy is spending $34 billion annually for ships, weapons, support equipment and maintenance, all to the benefit of both the yards and marine equipment manufacturers.

There are no large, oceangoing merchant ships under construction or on order in any U.S. shipyard. However, plans at present call for two new containerships for the Hawaiian trade to be ordered from a U.S. yard by Matson Navigation Co. The vessels would enter service in the 1990s.

The majority of U.S. yards are almost totally reliant on U.S. Navy, U.S. Coast Guard and Military Sealift Command repair, maintenance and conversion work. Cruise ship drydockings and occasional merchant ship repairs also contribute some work. Currently some 22 shipyards have contracts for work for redelivery between 1988 and 1991.

For the most part, six large U.S. yards are almost totally occupied by Navy ship construction. Some dozen smaller yards are busy with smaller surface vessels for the Navy, MSC, Army and Coast Guard. Several yards have built military vessels for foreign navies and negotiations are now underway for more such contracts.

Tacoma Boatbuilding Co., for example, recently announced that it had signed a $116-million contract with the Egyptian Navy to retrofit four Romeo Class submarines.

According to the Shipbuilders Council of America (SCA), 84 naval vessels are currently under construction in U.S. shipyards. In 1976, less than half of the 155 ships under construction in U.S. yards were for the Navy.

Last November, when Bay Shipbuilding delivered the third of a series of three containerships to Sea-Land—and the last large merchant ship to be built in the U.S.—it marked the first time in the country's history that no commercial ships were under construction.

As of June 1987, six merchant ships totaling 80,680 deadweight tons were under construction or on order in three U.S. yards. Besides the three containerships for Sea-Land, which were all delivered during the year, McDermott's New Orleans yard delivered a hopper dredge, the Atlantic American, and Tacoma Boatbuilding was building two incinerator ships. The order for the two incinerator ships was cancelled when the yard filed for Chapter 11 protection.

It has been noted that the Department of Defense relies on the private sector shipyards to provide it with essential support capabilities. Apparently, now, the private sector is not able to provide these capabilities, according to the SCA. One study suggested a minimum need of 112,000 production workers in 110 shipyards of all kinds. At the end of 1987, the industry stood at 80,000 production workers in 69 shipyards.

Cruise Market Work On The Rise

Location is a prime factor in cruise ship repairs and regular maintenance and drydocking programs. Such jobs, involving the large oceangoing cruise vessels, have been on the increase in the middle and South Atlantic coasts and the central and North Pacific coasts.

In a U.K. report on the *World Cruise Market 1987-88* from MRC Hawkedon Publications, it is noted that the U.S. West Coast (Mexico and Alaska) will continue to increase the number of berths offered because the cruise market is constantly growing and these are the least expensive, and usually most convenient areas for first-time cruisers to visit. All this means more ships amd more maintenance and repair work for U.S. yards.

In FY 1987, the U.S. shipbuilding and ship repair industry invested more than $150 million in modernization of its facilities. As of July 1987, the industry planned to spend an additional $70 million during the first half of this year. Most of these improvements will increase and modernize the repair sector.

Conversion Contracts

Last year, three National Defense Reserve Fleet ships were converted into auxiliary crane ships (T-ACS). The work on the USNS Gopher State (T-ACS-4), the USNS Flickertail State (T-ACS-5) and the USNS Cornhusker State (T-ACS-6) was performed by Norfolk Shipbuilding under a $47 million contract. Tampa Shipyards currently holds a $43.2-million contract for the conversion of the USNS Diamond State (T-ACS-7) and the USNS Equality State (T-ACS-8). A total of 12 auxiliary crane ships is planned.

Aloha Pacific Cruises' 34-year-old passenger ship Monterey underwent extensive refurbishing work at Northwest Marine Iron Works and Tacoma Boatbuilding. Conversion of the 563-foot vessel into a luxury cruise liner is being completed at Warstila-Helsinki in Finland. She will be delivered in time for her "remaiden" voyage from Copenhagen on July 31.

Last September, the Admiral Cruise Lines ship Emerald Seas was in drydock at Newport News Shipbuilding for hull and propeller work.

Review Of Major Shipyards

A number of U.S. yards are currently involved in U.S. Navy, Coast Guard and Government ship construction. They include: Avondale Shipyards, New Orleans, La.; Bath Iron Works, Bath, Maine; Bethlehem Steel, Sparrows Point, Md.; Robert E. Derecktor, Middleton, R.I.; General Dynamics-Electric Boat Division, Groton, Conn.; Halter Marine, New Orleans, La.; Litton-Ingalls Shipbuilding, Pascagoula, Miss.; Marinette Marine, Marinette, Wis.; McDermott Shipyards, New Orleans, La.; Moss Point Marine, Moss Point, Miss.; National Steel & Shipbuilding Co., San Diego, Calif.; Newport News Shipbuilding, Newport News, Va.; Pennsylvania Shipbuilding, Chester, Pa.; Peterson Builders Inc., Sturgeon Bay, Wis.; Tacoma Boatbuilding, Tacoma, Wash.; Textron Marine, New Orleans, La.; and Todd Pacific Shipyards, San Pedro, Calif.

Bath Iron Works, the lead yard for the Navy's Arleigh Burke Class destroyer (DDG-51) and a builder of CG-47 Class cruisers, reportedly is the choice of Taiwan to build a fleet of new frigates for her navy.

Rhode Island's Derecktor Shipyards currently is constructing medium endurance U.S. Coast Guard cutters and has an order for two U.S. Army 128-foot tugs.

Boston's General Ship Repair remains active and will complete an $11-million SRA of a Navy frigate shortly.

Blount Marine, Warren, R.I., completed a 101-foot ferry for Ohio owners. They also delivered the 600-passenger cruise boat Spirit of New York during 1987.

Pennsylvania Shipbuilding, Chester, Pa., is currently building four fleet oilers for the Navy. It ended 1987 with a $420-million backlog.

1—MERCHANT VESSELS OF 2,000 DWT AND OVER COMPARED IN U.S. SHIPYARDS IN 1987

VESSEL NAME OWNER	TYPE HULL NO	KEEL LAID LAUNCHED DELIVERED	LENGTH BEAM DRAFT	GROSS TONS DEADWEIGHT HORSEPOWER	DATE ORDERED COST ($ MIL. EST)
Bay Shipbuilding, Sturgeon Bay, Wisconsin					
Anchorage	Ctrshp.	8/14/85	710 ft	19,311	10/22/84
Sea-Land	735	5/31/86	78 ft	21,000	60.0
		7/10/87	30 ft	22,000	
Tacoma	Ctrshp.	11/6/85	710 ft	19,311	10/22/84
Sea-Land	736	9/27/86	78 ft	21,000	60.0
		9/4/87	30 ft	22,000	
Kodiak	Ctrshp.	6/3/86	710 ft	19,311	10/22/84
Sea-Land	737	12/20/96	78 ft	21,000	60.0
		11/9/87	30 ft	22,000	
McDermott Shipyards, New Orleans, Louisiana					
American Atlantic	H.Dredge	5/9/86	294 ft	3,104	3/4/86
Atlantic Trailing Co.		11/15/86	54 ft	7,787	—
		7/29/87	19½ ft	6,000	

TOTALS: 4 vessels; 61,037 gross tons; 70,787 deadweight tons; 72,000 horsepower

NOTE: As of May 1988, there were no merchant vessels of 2,000 dwt or over on order in U.S. yards

Bethlehem Steel Corporation announced in January of this year that it was divesting itself of its yards in Beaumont and Port Arthur, Texas and its Singapore facility, and consolidating its shipbuilding operations at Sparrows Point, Md. **David H. Klinges,** president, marine construction for Bethlehem, said "(the move) will make us more competitive and will enable us to respond to the needs of the reduced marketplace more effectively."

The new division will market and produce offshore drilling platforms, naval and commercial ships and other marine products and provide a full range of vessel repair and modification services.

At present, the Bethlehem-Sparrows Point yard is building two oceanographic survey ships for the Navy.

In addition, the company also recently leased a 44,000-ton-capacity floating drydock to supplement its 1,200-foot-long graving dock. The drydock has been successful in attracting repair business, and has been fully booked since its inauguration.

Newport News Shipbuilding, the country's largest shipyard, is currently building two Nimitz Class aircraft carriers, the USS Abraham Lincoln (CVN-72) and the USS George Washington (CVN-73), and has received a first advanced contract to start work on two additional carriers. The yard also has a number of attack submarines under construction for the Navy.

Norshipco is one of the busiest yards on the East Coast in both the naval and commercial repair and conversion sectors.

Smaller repair yards abound in the area, such as Colonna's Shipyard, Metro Machine and Moon Engineering, who are all involved in Navy repair work.

In Florida, the Jacksonville Shipyard is involved with both commercial and naval repair and maintenance work.

American Shipbuilding's Tampa Shipyards is currently working on the conversion of two national Defense Reserve Fleet ships into auxiliary crane ships.

The Ingalls Shipbuilding Division of Litton Industries is currently constructing or has on order 10 Ticonderoga Class cruisers, one Arleigh Burke Class destroyer and three amphibious assault ships for the Navy. In addition, the yard is also modernizing the battleship Wisconsin, and has a number of Navy repair contracts.

The Trinity Shipbuilding Group of Trinity Industries operates four shipbuilding and repairing companies with six yards in the Gulf. The yards include: Halter Marine, at Lockport, La. and Moss Point, Miss.; Moss Point Shipyard, Escatawpa, Miss.; Equitable Shipyards, New Orleans and Madisonville, La.; and Gretna Machine & Iron Works, Harvey, La.

Halter Marine's Moss Point yard is building six 224-foot T-AGOS ocean surveillance ships for the U.S. Navy. The company's Lockport facility has just begun the construction of a 110-foot harbor tug for Chevron USA.

Moss Point Marine is completing the fourth of four 275-foot Logistic Support Vessels (LSVs) for the U.S. Army and is also building two 65-foot pushboats and a 105-foot tug for Jordan. The yard is also building a 125-foot tug, a 161-foot ferry for the state of North Carolina and a 100-foot ferry for the state of Texas.

Equitable Shipyards is building an 85-foot ferry for use in the Virgin Islands, a 50-foot pilot boat for Jordan and finishing a 122-foot crewboat and a 101-foot crewboat.

Gretna Machine & Iron Works is building a 470-foot coal barge and is busy with ship repair, conversions and barge cleaning.

According to **John Dane III,** president of the Trinity Marine Group, his company has bid over $100 million in projects in the last three months and the group now employs about 1,000 people.

Quality Shipyards of Houma, La., recently delivered the third of three

(continued)

U.S. MERCHANT SHIPBUILDING

(continued)

inland waterway river towboats, the SuperAmerica, to Ashland oil.

Avondale Shipyards of New Orleans, while busy with the construction of Navy fleet oilers and landing dock ships, is also hoping to become a third source for the Navy's Arleigh Burke Class destroyer. Early this year, the shipyard also received contracts to build offshore structures for four operators—Apache, Chevron, Pennzoil and Shell.

Furthermore, Avondale has agreed to purchase Lockheed Shipbuilding's Gulfport, Miss., facility for $21 million. Lockheed-Gulfport is currently constructing LCACs for the Navy.

McDermott Inc., New Orleans, La., delivered the hopper dredge American Atlantic and announced at the end of last year that they had received a $100-million contract to build to drilling platforms for the Morecambe field.

In Texas, Houston Ship Repair was busy with a number of Navy and MarAd repair contracts.

On the West Coast, the National Steel and Shipbuilding Company (NASSCO) of San Diego is building a fast combat support ships (AOE) and is working on a number of Navy repair contracts.

Continental Maritime, San Francisco, and Southwest Marine, San Pedro, are both busy with Navy repair contracts.

In Portland, Ore., the Portland Ship Repair Yard (PSRY) reported it had an excellent year in 1987, recording the highest facility utilization in the history of the complex.

The facility's repair companies include Northwest Marine Iron Works, West State, Inc. and Cascade General. Some 12 cruise ships have visited the yard over the last two years for major overhauls. The liners Constitution, Rotterdam and Noordam are already scheduled for stops at the yard.

PSRY is searching for another contractor to join the present three—a firm with a solid base in shipbuilding.

Tacoma Boatbuilding will be finishing the construction of the USNS Audacious (T-AGOS-11) and the USNS Bold (T-AGOS-12) next year.

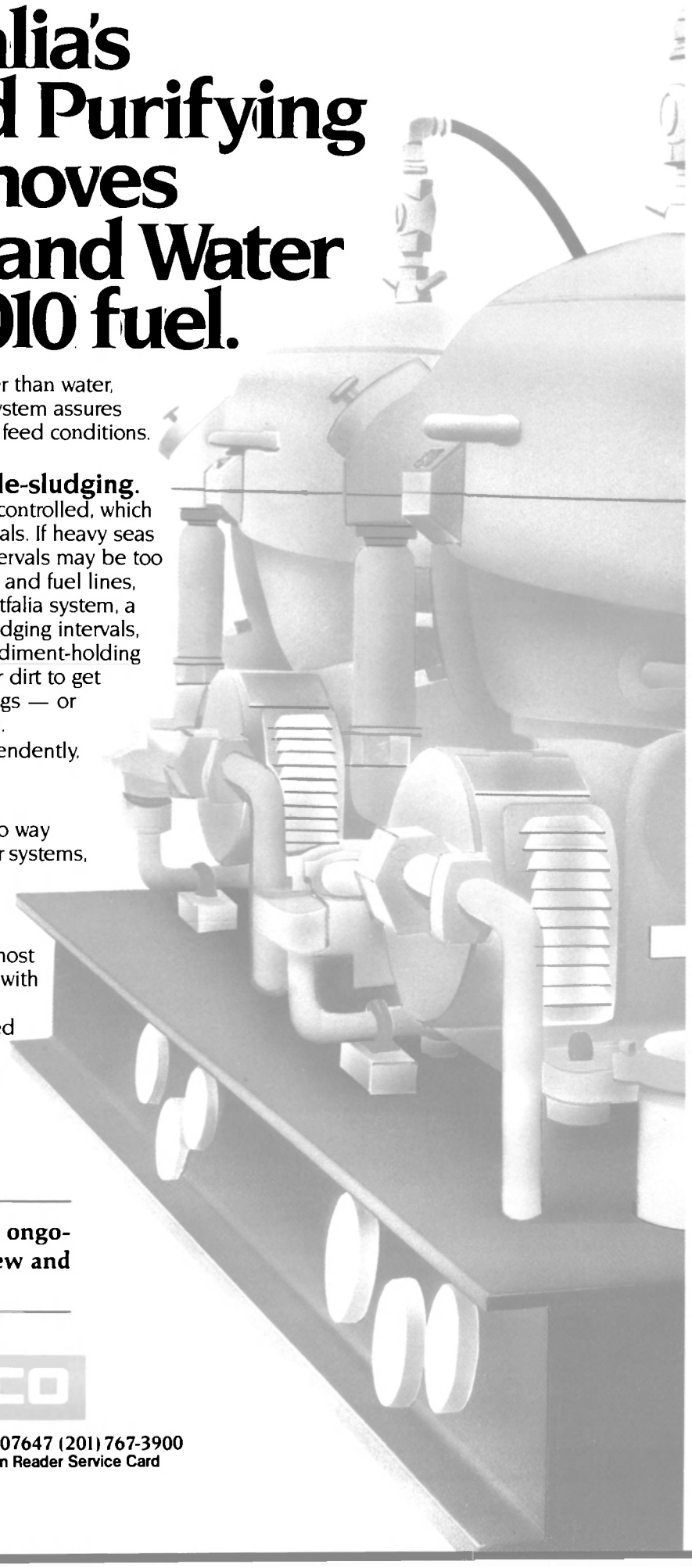
MARCO Seattle has been busy with the construction of a number of smaller craft. Its Campbell Shipyard in San Diego is building two new tuna seiner models.

Nichols Brothers Boat Builders of Whidbey Island, Wash., delivered a 156-foot excursion boat for Alaska Riverways of Fairbanks. Along with Gladding-Hearn Shipbuilding, Somerset, Mass., Nichols Brothers are the exclusive U.S.-licensed builders of International Catamarans-designed vessels. Last summer, Gladding-Hearn delivered one of these type vessels, the Mackinac Express, to Arnold Transport Company of the Great Lakes. It is the first catamaran to operate on the Great Lakes.

In Alaska, the new Ketchikan yard has a built-in business. The state has mandated that all repair and services performed on Alaskan State ferries be done within the state.

After delivering the last merchant ship on order in the a U.S. shipyard, Bay Shipbuilding, Sturgeon Bay, Wis., annoouced that it would downsize its operation to support ship repair and conversion work only.

Marinette Marine and Peterson Builders Inc., both located in Wisconsin, are busy constructing mine countermeasure vessels for the Navy.



DEMOUNTABLE RUBBER STAVE BEARINGS

Individual water lubricated bearing staves install around shaft in stern tube or strut. Assembly can be made with shaft in place. Simplifies inspection or bearing replacement. Water grooves provide flushing out of harmful particles—non-pollutant. A very popular bearing available in a full range of shaft sizes up to 36".

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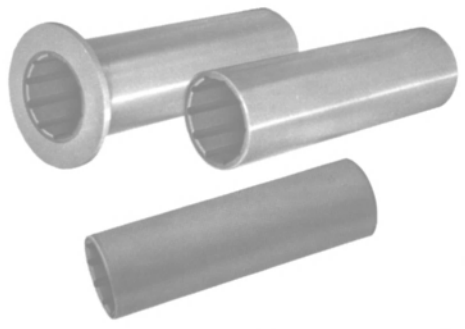
Spiral design of 90-10 Cupro nickel tubes maximize heat transfer. Less corrosion problems. Through-the-hull fittings not needed. Tubes easily replaced if ever damaged. System design permits cooling of gear boxes, hydraulics. Available in units of 4 to 24 tubes in single or double bank.

SLEEVE and FLANGED BEARINGS



Naval brass shelled Sleeve and Flanged Bearings meet military specification MIL-B-17901A (Ships) Class II Full Molded Type. Non-Metallic Sleeve Bearings have tough thermoset plastic shell making them ideally suited where corrosion or electrolysis is a problem.

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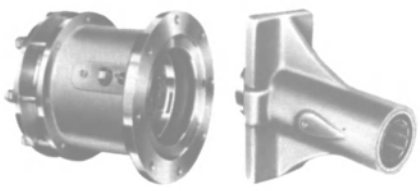
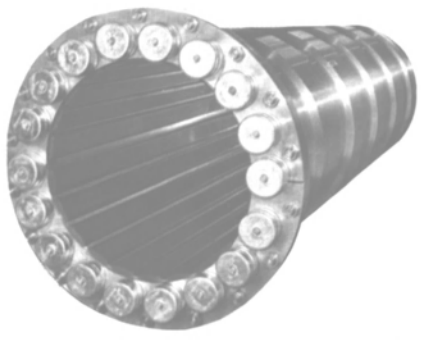


Styles available for shaft, bulkhead and rudder applications. Select from bronze, steel or aluminum. "Air-Seal" types feature inflatable rubber ring which seals around shaft, to allow packing change without dry docking. Models with water inlet for bearing lubrication, grease only, or combination water-grease service. A full range of types and sizes including split types are available.

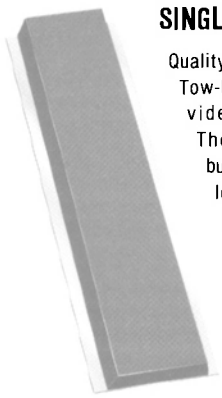
METAL BACKED STAVE BEARINGS



For extreme shaft loads; demountable staves of nitrile rubber bonded to naval brass bar for dove-tail fit into keyway bronze housing. Housings completely machined to specifications and ready for installation in stern tube. Staves are individually replaceable without removing shaft.

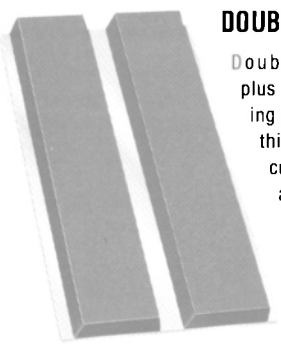
RUBBER FENDERING SYSTEMS

SINGLE TOW-KNEES



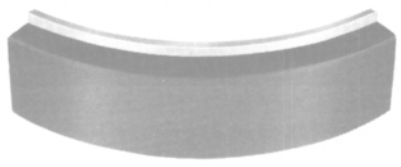
Quality engineered Duramax Tow-Knee Pusher Plates provide superior protection. These impact absorbing bumpers help give vessels longer and better service life. Choice of steel or aluminum plate.

DOUBLE TOW-KNEES



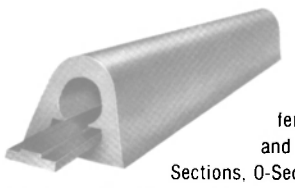
Double your protection plus mounting and welding ease with twin 2 inch thick rubber pads securely vulcanized to a single steel or aluminum plate. Count on tough Duramax Tow-Knees to stand up under rugged operating conditions.

PRECURVED TOW-KNEES



These curved tow-knees designed for maximum corner protection are engineered to absorb and cushion impact over long periods and varied operating conditions. Their 2-inch quality rubber pad is securely bonded to the plate, assuring long-lasting trouble-free service.

DOCK and BOAT BUMPERS



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U.S. BARGE AND TOWING OPERATIONS

The Tug And Barge Industry Provides A Wealth Of Benefits To American Consumers

The tug and barge industry plays a major role in the local economy, but unless you live or work along the banks of the nation's waterways, you might not realize what's happening when all those huge lumbering barges float by the shoreline, loaded with who-knows-what, bound for who-knows-where.

On a national scale the U.S. waterways industry carries more than 13 percent of all the nation's total goods, on rivers, canals, and intracoastal waterways of America, aboard thousands of gigantic silent barges of all shapes, sizes, and functions. This is a nationwide fleet of 7,500 coastal tugboats, inland river towboats, and over 32,000 huge barges of all dimensions, which ply the waters of the Atlantic, Pacific, the Gulf Coasts, and work on rivers all over the country—the Mississippi, the Ohio, the Columbia, the Hudson, the Missouri, the Tennessee, and others. It is an industry which pulls and pushes vast quantities of material on over 125,000 domestic voyages each year, to and from over 200 U.S. inland and coastal ports.

Strangely, although huge in size, scope, reach, equipment and employment, the nation's tugboat and barge towing industry is little known for either its overall contribution to the American economy, or for the main factor that enables that contribution to be so significant—the remarkable efficiency of these waterborne giants.

A towboat (which actually pushes) and its string of cargo-laden barges are not what one would usually think of as inflation fighters. But they are. The key is cost. One of the great contributors to the escalating prices of basic consumer goods like food and energy is the factor of "Operating costs," and a big portion of those costs is transportation. Since keeping transportation cost down is important to keeping consumer costs down, the call is for efficiency—the ability to move large quantities of material at low overhead cost in a competitive marketplace. And that's what we do. In fact, such a description seems to define the tugboat and barge towing industry exactly.

The statistics on the barge industry's capacity are astonishing, at least. In fact, according to the American Waterways Operators (the barge industry's trade association), a single barge can transport the harvest of over 1,500 acres of farmland, or enough gasoline to drive your car over 9 million miles, or enough coal to light and heat your home for 700 years!

Transportation of materials on the inland and coastal waterways of the United States is geared to flexible, low-cost delivery of gigantic quantities of the essential raw materials, fuels, building materials, and other main components of American life. Last year, over 558 million tons of raw materials like grain, soybeans, and other agricultural products, petroleum, lumber, chemicals, steel, and coal traveled by barge along the inland and intracoastal waterways of the nation. Essentials like housing prices and electricity rates are directly affected by the cost of transporting the materials that comprise and power them, and a firm case can be mde that it is the tug and barge industry's efficiency that helps hold down the price for consumers.

This remarkable efficiency—this ability to move tremendous quantities of essential materials effectively and inexpensively—is the key that saves consumers money on everything from gasoline to home heating oil, from orange juice to electricity. Such efficiency can be seen in the following example: on the lower Mississippi River, a single powerful towboat often pushes as many as 40 barges at one time. To move the same amount of material by railroad, it would require 600 rail cars. Or, to move the same amount of material by truck would require more than 2,200 semi-trucks. This kind of transportation cost efficiency has a direct cost-benefit effect on the price of the most basic materials of American life.

There is another major factor in the cost-to-consumer equation: competition. The water carriers provide hefty competition to the United States' railroads for the movement of many important bulk freight materials, and the water carriers help hold down prices consumers pay because of the transportation alternative they provide. Many things that can be moved by rail, can also be moved by water, and the two forms of transportation vie in a healthy—but fiercely competitive—marketplace.

So the next time you see a string of barges moving quietly along a river or the coast, think about what it is doing for you. If it's carrying fertilizer, it is moving by the most inexpensive transport available, which means America's farmers can grow food cheaper. If it's carrying coal, no other form of transport brings fuel to utilities as cheaply and efficiently as barge transport—which means your electricity bill may not climb as steeply, and which means more discretionary buying power for you.

BARGE INDUSTRY WAITS FOR CONGRESSIONAL ACTION ON HIGHWAY DIESEL TAX

A recent report from the AWO (American Waterways Operators, Inc.) detailed the current situation regarding the Highway Diesel Tax.

The AWO reported that during Omnibus Budget Reconciliation talks last year, Congress changed the highway tax collection procedures from collection at the pump to collection at the wholesale level to prevent "cheating" by highway users (the tax goes to the Highway Trust Fund). Although they exempted non-highway users such as railroads and airlines, Congress simply neglected the water transportation industry, the construction industry and the farmers. Although the tug and barge industry, the construction industry and the agricultural community did all they could to keep this unfortunate oversight from becoming law April 1, 1988, they were frustrated in their attempts.

Thus, on April 1, the inland and coastal barge and towing industry began paying an additional 15.1 cents per gallon for diesel fuel—of which the industry consumes up to 2 billion gallons annually. (This is on top of the 10 cent per gallon diesel fuel user tax which the industry currently pays.) Although the tug and barge industry is eligible for a rebate of these additional funds, the Treasury Department estimates that rebates could take up to 18 months. This prompted the *Florida Times-Union* to write "the maritime industry is about to provide the federal government with a $360-million interest-free loan."

And, *The Wall Street Journal* wrote, "farmers and other off-road users of diesel fuel who are exempt from the tax are outraged by the provision because it requires them first to pay the tax then to file for refunds."

Therefore, the industry—one that is only now beginning to come out of a crushing economic depression—will be floating a $240 to $360-million interest-free loan to the federal government, and experiencing severe and crippling cash-flow problems that could well ruin many, many companies.

Other publications seem to concur with the water transportation's position.

"Big brother in Washington often works in strange ways to dip into our pockets—as the U.S. tug and barge industry has been made painfully aware."—*The Mobile Register*

"Waterway operators are in a state of high anxiety over a recently implemented requirement changing the point of collection of a 15-cent-a-gallon excise tax on diesel fuel."—*The Journal of Commerce*

"The barge industry is caught in a Catch-22 position involving excise taxes that it is legally required to pay, even though those payments resulted from an acknowledged mistake by Congress."—*Traffic World*

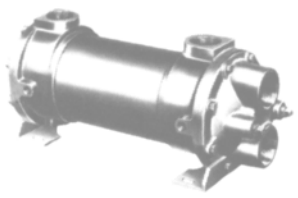
The inland and coastal tug and barge industry is looking for Congress to help now.

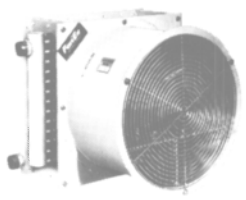
The Senate Finance Committee has already moved to exempt water carriers from the requirement that this tax be paid up front. The House Ways and Means Committee has begun to look at the problem too. But they left for recess before finishing the job. Payment began on April 1. Although over 20 bills have been introduced to correct this inequity, nothing has been done to move forward. Every day, barge and towing companies are being economically drained.

Both Sen. **Lloyd Bentsen** (D.-Texas), Senate Finance Committee Chairman, and Rep. **Dan Rostenkowski** (D.-Ill.), House Ways and Means Committee Chairman, asked Treasury Secretary **James Baker** to delay implementation of the payment requirement for non-highway users, giving Congress time to find "...an effective but practical method of collection of the diesel excise tax," as Chairman **Rostenkowski** said in his letter to Secretary **Baker.** The Secretary's response was, to paraphrase, "you guys fouled it up, now you guys fix it."

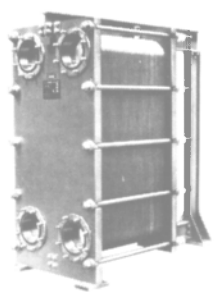
The Internal Revenue Service recently decided to allow certain waterway operators (on the inland waterways alone) to offset payment of the inland waterway fuel tax against the new tax payments for the highway diesel fuel tax. However, this provides no relief for the hundreds of coastal water transportation companies, and only partial relief for others.

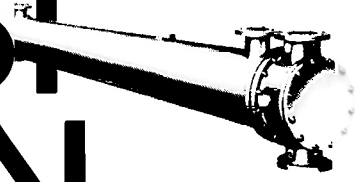
The tug and barge, along with hundreds of thousands of farmers and construction workers, are stuck in a classic bureaucratic nightmare. To the extent possible, they are mobilizing their member companies to plead their case on Capitol Hill. No other issue in recent memory has cut so deeply into the newly jump-started economic heart of the industry.

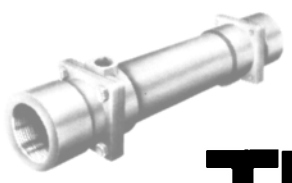




WE JUST EXCHANGED THE FIRST NAME IN HEAT TRANSFER.







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Circle 236 on Reader Service Card

GREAT LAKES

LAKE CARRIERS' ASSOCIATION

Lake Carriers' Association was established in 1880 as a trade organization serving companies operating U.S.-flag bulk vessels on the Great Lakes. Headquartered in Cleveland, Ohio, the association represents 14 U.S.-flag Great Lakes fleets. The 14 member fleets have a combined total of 68 vessels with a per-trip capacity of 1,891,110 gross tons of bulk cargo. These vessels comprise more than 95 percent of the tonnage of Great Lakes vessels and approximately 33 percent of all U.S.-documented, self-propelled vessels of 1,000 gross registered tons or larger.

The association promotes the common interests of its member fleets, particularly as they relate to legislative and regulatory affairs.

U.S. Great Lakes Registry 1987
(As of December 31, 1987)

Trade/Vessel Type	# of Ships	GRT
Bulk Freight Vessels		
Self-Unloaders	53	922,721
Straight-Deckers	6	59,138
Self-Unl. Tug/Barge	1	24,199
Barges	2	18,692
Cement Carriers		
Self-Unloaders	7	38,242
Barges	1	5,631
Tankers		
Self-Propelled	3	14,020
Integrated Tug/Barge	1	5,318
Tank Barges	10	24,944
Total—	84	1,112,905

The 1,000-foot ore carrier, Columbia Star.

Lake Carriers' Association Fleet
1,000 Gross Tons and Over

(As of January 1, 1988)

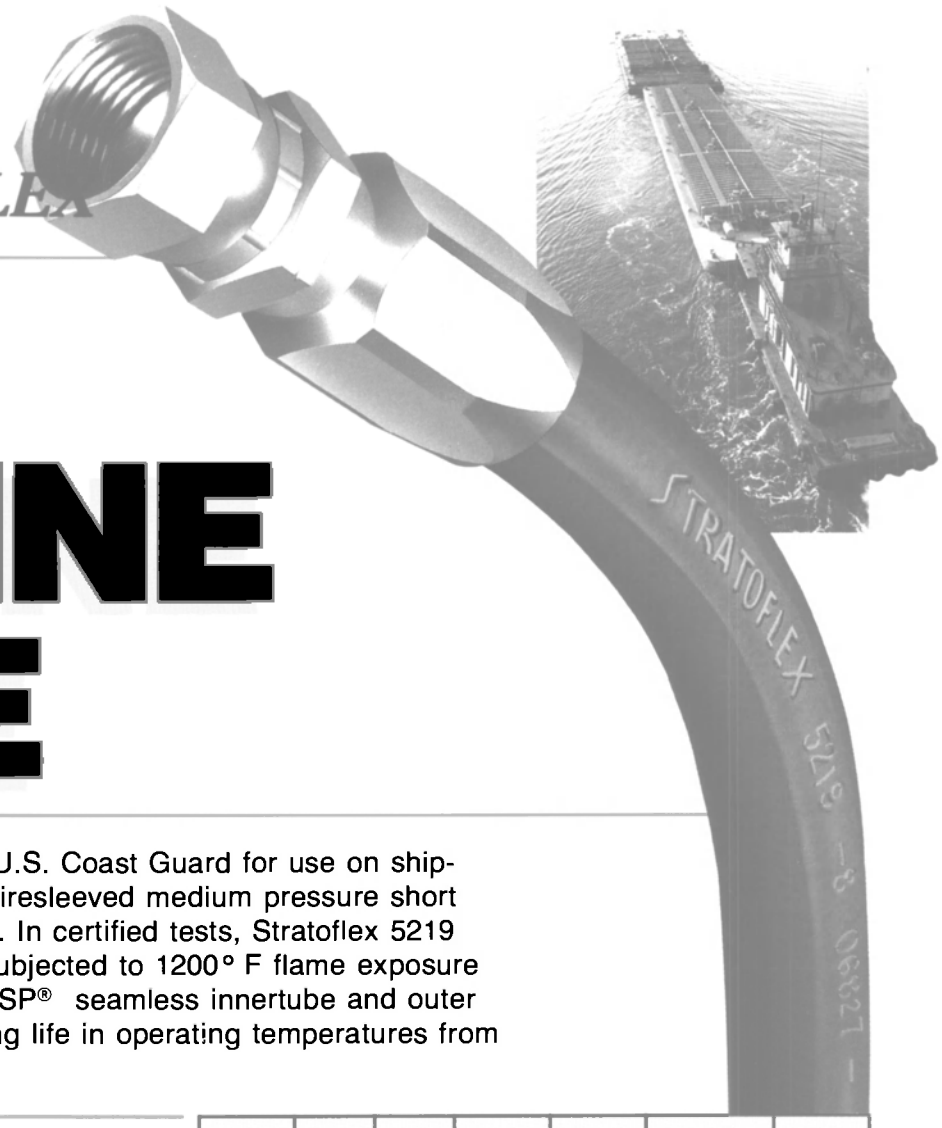
OWNER/OPERATOR Ship	DWT	LENGTH (in feet)	YEAR BUILT
American Steamship Co.			
American Mariner	37,200	730	80
American Republic	24,800	635	81
Belle River	78,850	1,000	77
Buffalo	23,800	635	78
Adam E. Cornelius	23,200	666	59
Indiana Harbor	78,850	1,000	79
Roger M. Kyes	28,200	680	73
Sam Laud	23,800	635	75
Nicolet	11,150	533	05/65
St. Clair	44,000	770	76
H. Lee White	35,200	704	74
Charles E. Wilson	33,800	680	73
Bethlehem Steel Corp.			
Burns Harbor	78,850	1,000	80
Steward J. Cort	58,000	1,000	72
Lewis Wilson Foy	78,850	1,000	78
Sparrows Point	22,300	698	52/58/80
Cement Transit Company			
Medusa Challenger	10,250	552	06/67
Cleveland Tankers, Inc.			
Gemini	—	433	78
Jupiter	—	391	76
Saturn	—	384	74
Erie Sand Steamship Co.			
Richard J. Reiss	14,900	621	43/64
Inland Lakes Management, Inc.			
S.T. Crapo	8,190	403	27
E.M. Ford	7,000	428	98/56
J.B. Ford	6,950	440	04/59
Lewis G. Harriman	6,310	350	23
J.A.W. Iglehart	13,200	502	36/65
Paul H. Townsend	7,850	447	45/53
Inland Steel Co.			
Joseph L. Block	37,200	728	76
Edward L. Ryerson	27,500	730	60
Wilfred Sykes	21,500	678	49/75
Interlake Steamship Co.			
James R. Barker	60,500	1,000	76
Charles M. Beeghly	31,000	806	59/72/81
Harry Coulby	16,000	631	27
William J. DeLancey	68,000	1,014	81
Elton Hoyt 2nd	22,300	698	52/57/80
Herbert C. Jackson	24,800	690	59/75
J.L. Mauthe	21,400	647	52
Mesabi Miner	60,500	1,000	77
Litton Great Lakes Corp.			
Presque Isle	57,500	1,000	73
M.A. Hanna Company— Skar-Ore Steamship Corp.			
George A. Stinson	59,700	1,000	78
Oglebay Norton Co. Columbia Transportation Div.			
Armco	26,000	767	53/74/82
J. Burton Ayers	15,575	620	43/74
Courtney Burton	22,300	690	53/81
Columbia Star	78,850	1,000	81
Joseph H. Frantz	13,600	618	25/65
Middletown	26,300	730	43/61/82
Robert C. Norton	15,400	621	43/66
Crispin Oglebay	15,400	621	43/73
Reserve	26,000	767	53/75/83
Fred R. White, Jr.	23,800	635	78
Wolverine	19,650	630	74
Oglebay Norton Co. Pringle Transit Co.			
William Roesch	19,650	630	73
Paul Thayer	19,650	630	73
Rouge Steel Co.			
Ernest Breech	18,800	642	52
Henry Ford II	13,000	611	24/74
Benson Ford	25,900	767	52/76/81
William Clay Ford	29,300	826	42/61/76/78
U.S. Steel, Great Lakes Fleet Inc.			
Arthur Anderson	25,650	767	52/75/82
Roger Blough	44,500	858	72
Calcite II	13,000	605	29/61
Cason J. Callaway	25,650	767	52/74/82
Philip R. Clarke	25,650	767	52/74/82
Irvin L. Clymer	12,100	552	17
Edwin H. Gott	74,100	1,004	78
John G. Munson	25,800	768	52/76
George A. Sloan	14,975	621	43/67
Edgar B. Speer	73,700	1,004	80
Myron C. Taylor	12,800	604	29/56

Source: Lake Carriers' Association

ANOTHER

BLUE from STRATOFLEX

5219 MARINE HOSE



Stratoflex 5219 is accepted by the U.S. Coast Guard for use on shipboard engine systems including unfiresleeved medium pressure short fuel, lube oil and transmission lines. In certified tests, Stratoflex 5219 held pressurized diesel fuel while subjected to 1200° F flame exposure for over 2½ minutes. Our proven HSP® seamless innertube and outer cover gives 5219 superior, extra long life in operating temperatures from −55° F to +300° F.

FEATURES

- Single-wire braid construction (to 100R5 dimensions) allows small bend radii
- Uses Stratoflex Group I field attachable fittings
- Hydrostatic pressure-tested at two times recommended operating pressure
- Easily identifiable blue HSP embossed outer cover

PART NO.	HOSE SIZE	HOSE I.D.	HOSE O.D.	MIN. BURST PRESS.	MAX. WORKING PRESS.	MIN. BEND RADIUS
5219-5	-5	1/4	.58	6,000	1,500*	1.00
5219-6	-6	5/16	.67	6,000	1,500	1.25
5219-8	-8	13/32	.77	5,000	1,250	1.75
5219-10	-10	1/2	.92	5,000	1,250	2.25
5219-12	-12	5/8	1.08	3,000	750	2.75
5219-16	-16	7/8	1.24	1,600	400	3.50

* U.S. Coast Guard accepted at 400 psi
For Diesel Fuel and Oil Applications

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SF-49

Active U.S. & Canadian Excursion, Cruise & Ferry Services On Great Lakes/St. Lawrence River System
(As of Fall 1987)
Note: NV–carries no vehicles

COMPANY / Vessel	Type	# of Passengers
LAKE SUPERIOR		
DULUTH SUPERIOR EXCURSIONS, Duluth, Minn.		
Vista King	Excursion	253
Vista Queen	Excursion	253
GRAND PORTAGE-ISLE ROYALE TRANS. LINES INC., Duluth, Minn.		
Voyageur II	Ferry	49 (NV)
Wenonah	Ferry	150 (NV)
APOSTLE ISLANDS CRUISE SERVICE, Bayfield, Wis.		
Sea Queen II	Excursion	47
Manitou	Excursion	150
MADELINE ISLAND FERRY LINE, LaPointe, Wis.		
Island Queen	Ferry	150
Nichevo II	Ferry	150
Madeline	Ferry	150
WELCOMESHIP, LTD., Thunder Bay, Ont.		
Welcome	Excursion	200
NATIONAL PARK CONCESSIONS ROCK HARBOR LODGE, Houghton, Mich.		
The Sandy	Excursion	43
ISLE ROYALE NATIONAL PARK, Houghton, Mich.		
Ranger III	Combi	123 (NV)
COPPER HARBOR LIGHTHOUSE TOUR, Kearsage, Mich.		
Star of Keweenaw	Excursion	24
ISLE ROYALE FERRY SERVICE, Copper Harbor, Mich.		
Isle Royale Queen II	Ferry	54 (NV)
PICTURED ROCKS CRUISES, INC., Munising, Mich.		
Miners Castle	Excursion	207
Miss Superior	Excursion	207
Miss Pictured Rocks	Excursion	132
Miss Munising	Excursion	132
ST. MARYS RIVER		
FAMOUS SOO LOCKS CRUISES, Sault Ste. Marie, Mich.		
Nokomis	Excursion	297
Le Voyageur	Excursion	284
SOO LOCKS BOAT TOURS, Sault Ste. Marie, Mich.		
Hiawatha	Excursion	272
Holiday	Excursion	272
Bide-a-wee	Excursion	272
LOCK TOURS CANADA, Sault Ste. Marie, Ont.		
Chief Shingwauk	Excursion	200
Bon Soo	Excursion	156
EASTERN UPPER PENINSULA TRANS. AUTHORITY, Kincheloe, Mich.		
Drummond Islander	Ferry	139
Drummond Islander II	Ferry	135
Neebish Islander	Ferry	24
Sugar Islander	Ferry	112
LAKE MICHIGAN		
BEAVER ISLAND BOAT CO., Charlevoix, Mich.		
South Shore	Ferry	120
Beaver Islander	Ferry	200
CHARLEVOIX CO. ROAD COMM., Boyne City, Mich.		
Charlevoix	Cable Ferry	27
ROCK ISLAND FERRY, Washington Island, Wis.		
Karfi	Ferry	50 (NV)
WASHINGTON ISLAND FERRY LINE, Washington Island, Wis.		
C.G. Richter	Ferry	178 (NV)
Voyageur	Ferry	150
Eyarbakki	Ferry	150
Robert Noble	Ferry	177
VOIGHT'S MARINE SERVICES, Gills Rock, Wis.		
Bounty II	Excursion	51
Yankee Clipper	Excursion	103
Island Clipper	Excursion	150
MANITOU ISLAND TRANSIT, Leland, Mich.		
Mishe-Mokwa	Combi	136 (NV)
Manitou Isle	Combi	66 (NV)
LOLLIPOP BOAT TOURS, Sturgeon Bay, Wis.		
Lollipop	Excursion	24
BO-MAR CRUISELINES LTD., Sturgeon Bay, Wis.		
Jean Nicolet	Excursion	150
Chippewa	Excursion	102
RIVERTOWN BOAT LINES, INC., Green Bay, Wis.		
River Queen	Excursion	150
MICHIGAN-WISCONSIN FERRY SERVICE, Ludington, Mich.		
City of Midland	Ferry	509
PORT CITY PRINCESS INC., North Muskegon, Mich.		
Port City Princess	Excursion	250
EMERALD ISLE CRUISELINES, Milwaukee, Wis.		
Emerald Isle	Excursion	250
STAR OF MILWAUKEE, Milwaukee, Wis.		
Star of Milwaukee	Excursion	275
INT'L MARINE SYSTEMS, Milwaukee, Wis.		
Iroquois	Excursion	149
QUEEN OF SAUGATUCK BOAT CRUISES, Saugatuck, Mich.		
Queen of Saugatuck	Excursion	82
PETERSON STEAMSHIP CO., Douglas, Mich.		
City of Douglas	Combi	49 (NV)
Ary Lou	Combi	49 (NV)
Diane	Chain Ferry	25 (NV)
CAPTAIN NICHOLS, South Haven, Mich.		
Captain Nichols	Excursion	50
Mainstay	Excursion	38
STAR OF CHICAGO, Chicago, Ill.		
Star of Chicago	Excursion	600
Star of Chicago II	Excursion	350
MERCURY CHICAGO'S SKYLINE CRUISELINE, Chicago, Ill.		

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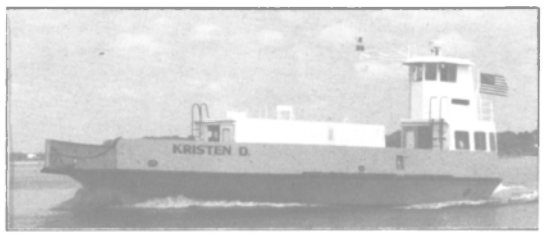
Another busy year

SPIRIT OF CHICAGO APRIL 1988
192'x35'x6 Steel Dinner Boat
Owner: Spirit of Chicago Trust
Norfolk, VA



KRISTEN D AUGUST 1987
64'x35'x5' Steel Passenger/Auto Ferry
Owner: Plaunt Transportation, Inc.
Cheybogan, MI

MACHIGONNE II OCTOBER 1987
122'x36'x9' Steel Passenger/Auto Ferry
Owner: Casco Bay Island Transit District,
Portland, ME

LA PINTA MAY 1988
92'x22'x5' Aluminum Passenger Ferry
Owner: Puerto Rico Ports Authority

Since 1949, the words "Blount built" have stood for quality marine design and construction. And every year we add to that reputation, building proud new vessels from elegant dinner boats to passenger/auto ferries to super-fast, low-wake, HITECH® commuter boats.

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Circle 103 on Reader Service Card

COMPANY Vessel	Type	# of Passengers
Skyline Queen	Excursion	127
Skyline Princess	Excursion	110
WENDELLA SIGHTSEEING CO. Chicago, Ill.		
Wendella	Excursion	140
Sunliner	Excursion	108
SHORELINE MARINE CO. Evanston, Ill.		
Marlyn	Excursion	300
Shoreline	Excursion	300
CHICAGO FROM THE LAKE Chicago, Ill		
The Fort Dearborn	Excursion	200
LAKE HURON		
ARNOLD TRANSIT CO. Mackinac Island, Mich.		
Ottawa	Combi	600 (NV)
Chippewa	Combi	600 (NV)
Algomah	Combi	600 (NV)
Huron	Combi	400 (NV)
Mohawk	Combi	400 (NV)
Mackinac Islander	Combi	400 (NV)
Straits II	Combi	525 (NV)
Island Princess	Combi	200 (NV)
Mackinac Express	Combi	350 (NV)
SHEPLER'S INC. Mackinaw City, Mich.		
Felicity	Ferry	150 (NV)
Wyandot	Ferry	265 (NV)
The Welcome	Ferry	120 (NV)
The Hope	Ferry	150 (NV)
The Captain Shepler	Ferry	265 (NV)
STAR LINE MACKINAC ISLAND PASSENGER SERVICE St. Ignace, Mich.		
LaSalle	Ferry	150 (NV)
Marquette	Ferry	150 (NV)
Nicolet	Ferry	150 (NV)
RAY PLAUNT Cheboygan, Mich.		
Chee-maun-nes	Ferry	49
Kristen D.	Ferry	60
RAINBOW ISLAND BOAT TOURS Elliott Lake, Ont.		
Rainbow I	Excursion	82
ONTARIO NORTHLAND MARINE Owen Sound, Ont.		
Chi-Cheemaun	Ferry	638
M.V. SEAVIEW III Tobermory, Ont.		
Seaview III	Excursion	64
BLUE HERON CO. Tobermory, Ont.		
Blue Heron IV	Excursion	55
30,000 ISLAND CRUISE LINES Parry Sound, Ont.		
Island Queen	Excursion	550
BUSH'S BOAT LIVERY Port Severn, Ont.		
Day Maker	Excursion	20
CHRISTIAN ISLAND BEAUSOLEIL BAND Christian Island, Ont.		
Indian Maiden	Ferry	70 (NV)
Quinte	Ferry	9
ARGEE BOAT CRUISES, LTD. Penetanguishene, Ont.		
Georgian Queen	Excursion	200
PMCL 30,000 ISLAND BOAT CRUISES Midland, Ont.		
Miss Midland	Excursion	215

COMPANY Vessel	Type	# of Passengers
ORILLIA'S LADY BELLE BOAT CRUISES Orillia, Ont.		
Lady Belle	Excursion	138
ST. CLAIR & DETROIT RIVERS & LAKE ST. CLAIR		
DUC D'ORLEANS Corunna, Ont.		
Duc d'Orleans	Excursion	200
BLUE WATER FERRY CO., LTD. Sombra, Ont.		
Daldean	Ferry	100
WALPOLE ISLAND/ALGONAC FERRY Port Lambton, Ont.		
Walpole Islander	Ferry	100
Lowell D.	Ferry	50
RUSSEL ISLAND TRANSIT CO. Algonac, Mich.		
Islander	Ferry	49
CHAMPION'S AUTO FERRY Algonac, Mich.		
North Channel	Combi	125
South Channel	Combi	125
Champion	Combi	125
St. Clair Flats	Combi	125
Port Welcome	Combi	450 (NV)
BLUEWATER CRUISES Algonac, Mich.		
Stillwater	Excursion	110
GREAT WATER YACHTS St. Clair Shores, Mich.		
Infinity	Excursion	150
STAR OF DETROIT Detroit, Mich.		
Star of Detroit	Excursion	500
WAYWARD PRINCESS CRUISE SHIPS Windsor, Ont.		
Wayward Princess	Excursion	325
Little Princess	Excursion	80
Ferry Princess	Excursion	1,200
ISLAND BOBLO COMPANY Detroit, Mich.		
Ste. Claire	Combi	2,414 (NV)
Friendship	Combi	166 (NV)
Tecumseh	Combi	300 (NV)
Papoose III	Combi	275 (NV)
Columbia 2	Combi	2,556 (NV)
L.R. Beattie	Combi	595 (NV)
Gibralter	Combi	300 (NV)
Papoose	Combi	275 (NV)
LAKE ERIE		
TOLEDO RIVER CRUISE LINES Toledo, Ohio		
Arawanna Queen	Excursion	500
Arawanna II	Excursion	48
RIVER ADVENTURES INC. Toledo, Ohio		
Sandpiper	Excursion	100
PELEE ISLAND TRANS. SER. Pelee Island, Ont.		
Pelee Islander	Ferry	268
Upper Canada	Ferry	100
MILLER BOAT LINE INC. Put-In-Bay, Ohio		
Islander	Ferry	400
Wm. Miller	Ferry	250
West Shore	Ferry	250
PARKER BOAT LINE INC. Put -In-Bay, Ohio		
Erie Isle	Ferry	189
Yankee Clipper	Ferry	299
NEUMAN BOAT LINE INC. Sandusky, Ohio		

COMPANY / Vessel	Type	# of Passengers
Challenger	Combi	250
Kelly Islander	Combi	150
Endeavor	Combi	150
CEDAR POINT TRANSPORATION Sandusky, Ohio		
Cedar Point	Ferry	110 (NV)
Cedar Point II	Ferry	115 (NV)
Cedar Point III	Ferry	110 (NV)
SANDUSKY BOAT LINE Sandusky, Ohio		
City of Sandusky	Excursion	300
GOODTIME I TRANSIT LINE Cleveland, Ohio		
Goodtime I	Excursion	365
MYSTIC BELLE PADDLEBOAT RIDES Vermilion, Ohio		
Mystic Belle	Excursion	25
GOODTIME CRUISE LINE INC. Mentor, Ohio		
Goodtime II	Excursion	475
NAUTICA CRUISES Cleveland, Ohio		
Nautica Princess	Excursion	165
RUTHERFORD CRUISE LINE INC. Grand River, Ohio		
Mary Ann I	Excursion	149
KETTLE CREEK CRUISE CO. Port Stanley, Ont.		
Kettle Creek Queen	Excursion	64
ABIGAIL TOURS Simcoe, Ont.		
The Lady Abigail	Excursion	100
RUGARE'S SIGHTSEEING CRUISES & FERRY SERVICE Erie, Pa.		
Little Toot	Combi	49 (NV)
BUFFALO CHARTERS INC. Buffalo, N.Y.		
Miss Buffalo	Excursion	125
Miss Buffalo II	Excursion	200
LAKE ERIE BOAT CRUISE CORP. Buffalo, N.Y.		
ex-Block Island	Excursion	680
CLASSIC YACHT CRUISES Tonawande, N.Y.		
Whalebird	Excursion	42
YACHT CRUISES Buffalo, N.Y.		
Mary Holly	Sail Excur.	12
Chellemar	Sail Excur.	6
MAID OF THE MIST CORP. Niagara Falls, N.Y.		
Maid of the Mist I	Excursion	100
Maid of the Mist II	Excursion	150
Maid of the Mist III	Excursion	150
Maid the Mist IV	Excursion	200
Maid of the Mist V	Excursion	300
MID-LAKES NAVIGATION CO. Skaneateles, N.Y.		
Emita II	Excursion	50

LAKE ONTARIO

E.K. TOUR BOAT SERVICE LTD. Hamilton, Ont.		
Macassa Bay	Excursion	160
GRAY LINE BOAT TOURS OF TORONTO Toronto, Ont.		
Five Amsterdam-style boats	Excursion	100 each
C-O CHARTER & TOUR LINES Toronto, Ont.		
Challenge	Sail Excur.	75
Oriole	Sail Excur.	150
TORONTO HARBOUR COMM. Toronto, Ont.		
Maple City	Ferry	100
Windmill Point	Ferry	100
TORONTO TOURS Toronto, Ont.		
Shipsands	Excursion	51
PETER FERGUSON Toronto, Ont.		
Toronto The Feeling	Excursion	35
TORONTO METRO PARKS Toronto, Ont.		
Trillium	Ferry	500 (NV)
San McBride	Ferry	475 (NV)
Thomas Rennie	Ferry	400 (NV)
William Inglis	Ferry	250 (NV)
Ongiara	Ferry	200
CLUB CANAMAC CRUISES Toronto, Ont.		
Aurora Borealis	Excursion	240
JAGUAR YACHT CHARTERS INC. Toronto, Ont.		
M.V. Jaguar II	Excursion	120
ADVENTURES AFLOAT Toronto, Ont.		
M.V. Torontonian	Excursion	175
Mariposa Belle	Excursion	250
TORONTO PADDLEWHEEL CRUISES Toronto, Ont.		
Pioneer Princess	Excursion	100
PMCL BOAT CRUISES Midland, Ont.		
Ste. Marie	Excursion	72
Island Queen IV	Excursion	60
MI-TOI-TU YACHT CHARTERS Mississauga, Ont.		
MI-TOI-TU	Excursion	30
OLCOTT BEACH BOAT TOURS INC. Olcott, N.Y.		
Miss Olcott Beach	Excursion	100
BOUNTY BAY CRUISES Rochester, N.Y.		
Bounty Queen	Excursion	46
RIVERVIEW CRUISE LINES INC. Rochester, N.Y.		
The Spirit of Rochester	Excursion	500
ONTARIO WATERWAY CRUISES Peterborough, Ont.		
Kawartha Voyageur	Excursion	24
ONTARIO MINISTRY OF TRANS. & COMMUNICATIONS Kingston, Ont.		
Wolf Islander III	Ferry	330
Quinte Loyalist	Ferry	70
Glenora	Ferry	70
Amherst Islander	Ferry	125
Charlevoix	Ferry	30

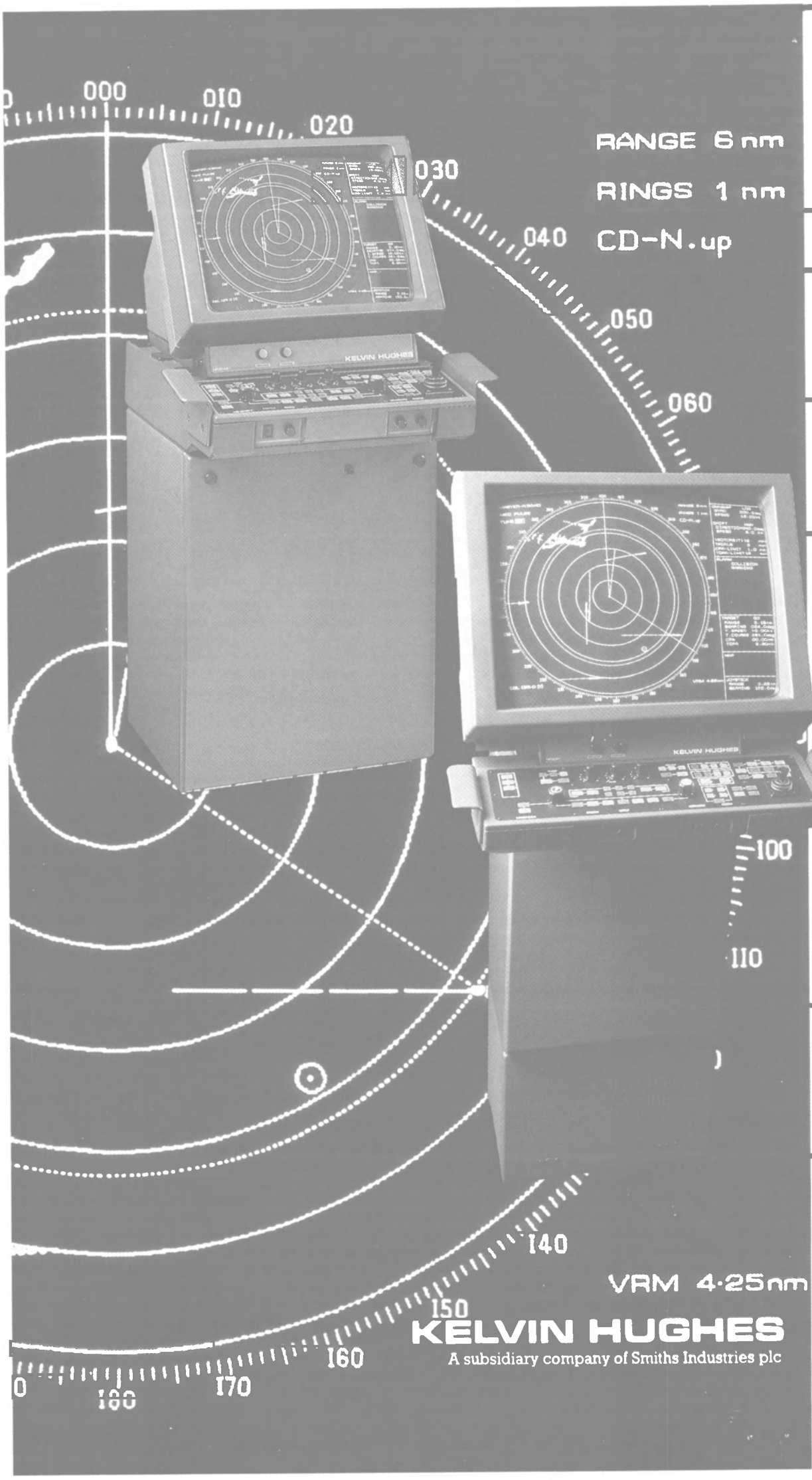
ST. LAWRENCE RIVER

KINGSTON & THE ISLANDS BOAT LINE LTD.		
Island Queen	Excursion	300
Island Princess	Excursion	88

COMPANY Vessel	Type	# of Passengers
RIDEAU ST. LAWRENCE CRUISE SHIPS Kingston, Ont.		
Canadian Express	Excursion	66
HORNE'S FERRY CO., LTD. Wolfe Island, Ont.		
William Darrel	Ferry	100
THOUSAND ISLANDS SHIPYARD MUSEUM Clayton, N.Y.		
Spray VI	Excursion	50
HOWE ISLAND TWP. FERRY Gananoque, Ont.		
The Howe Islander	Ferry	40
THOUSAND ISLANDS TOUR & TRAVEL INC. Gananoque, Ont.		
Wentworth Lady	Excursion	52
GANANOQUE BOAT LINE LTD. Gananoque, Ont.		
Thousand Islander	Excursion	580
Thousand Islander II	Excursion	370
Thousand Islander III	Excursion	500
Thousand Islander IV	Excursion	500
IVY LEA BOAT TOURS Ivy Lea, Ont.		
Miss Ivy Lea II	Excursion	76
EMPIRE BOAT TOURS Alexandria Bay, N.Y.		
Island Empress	Excursion	350
Island Princess	Excursion	350
Paul III	Excursion	54
UNCLE SAM BOAT TOURS Alexandria Bay, N.Y.		
Alexandria Belle	Excursion	310
Uncle Sam	Excursion	76
Uncle Sam VI	Excursion	60
Uncle Sam VII	Excursion	270
Island Wanderer	Excursion	225
1000 ISLANDS SEAWAY CRUISES Alexandria Bay, N.Y.		
Miss Clayton III	Excursion	250
Miss Clayton II	Excursion	136
ROCKPORT BOAT LINES LTD. Rockport, Ont.		
Ida-M	Excursion	130
Ida-M II	Excursion	176
1000 ISLANDS HERITAGE BOAT TOURS Brockville, Ont.		
Miss Brockville	Excursion	42
CROISIERES BELLEVUE LTEE. Dorion, Que.		
Le Sieur de Vaudreill II	Excursion	80
CROISIERES MARITIMES DE L'ARCHIPEL Lachine, Que.		
Le Saint-Louis IV	Excursion	210
JAMES YERBURY Dorval, Que.		
Islander	Ferry	28 (NV)
LACHINE RAPIDS TOURS INC. Montreal, Que.		
Saute Moutons I	Excursion	30
Saute Moutons II	Excursion	30
G.R. CLOUTIER Longeuil, Que.		
Miss Montreal	Ferry	50 (NV)
OLD PORT OF MONTREAL Montreal, Que.		
Kateri II	Ferry	45 (NV)

COMPANY Vessel	Type	# of Passengers
CROISIERS DU PONT DE MONTREAL Montreal, Que.		
Montreal	Excursion	400
Concordia	Excursion	290
Miss Olympia	Excursion	90
COOPERATIVE DE TRANSPORT MARITIMME Iles de la Madeleine		
CTM Voyageur	Excursion	15
TRAVERSE LAVAL-ILE BIZARD ENR. Laval-sur-le-Lac, Que.		
Ile Bizard Enr.	Ferry	34
CROISIERES DES ILES DE SOREL Ste. Anne de Sorel, Que.		
Le Survenant III	Excursion	185
JACQUES CARTIER INC. Trois Rivieres, Que.		
Jacques-Cartier	Excursion	380
TRAVERSE LOTBINIERE-DESCHAMBAULT FERRY INC. Lotbiniere, Que.		
Traverse Lotbiniere	Ferry	24
LES TOURS ST. LAURENT Quebec City, Que.		
Fort Mingan	Excursion	200
EXCURSION AML INC. Haute-Ville, Que.		
Louis Jolliet	Excursion	1000
Samuel de Champlain	Excursion	80
Tourmente Club Med	Sail Excur.	10
CROISIERS NAVIMEX INC. Quebec City, Que.		
Cavalier Des Mers	Excursion	160
JOSEE AUDET Saint-Jean, Ile d'Orleans		
Philippe-Aubert	Excursion	50
SOCIETE DES TRAVERSIERS DU QUEBEC Quebec City, Que.		
Lucien L	Ferry	300
Camille-Marcoux	Ferry	600
Armand-Imbeau	Ferry	400
Jos-Deschenes	Ferry	400
Trois-Rivieres	Ferry	600
Lomer-Gouin	Ferry	70
Alphonese-Desjardins	Ferry	70
NAVIGATION LAVOIE INC. Ile aux Grues, Que.		
Grues-des-Iles	Ferry	120
TRAVERSE RIVIERE-DU-LOUP Riviere-Du-Loup, Que.		
Le Saint-Laurent	Ferry	450
FAMILLE DU FOUR Tadoussac, Que.		
Maire Clarisse	Excursion	100
LES CROISIERES DU GRAND FLEUVE INC. Tadoussac, Que.		
Pierre Chauvin	Excursion	96
Lachance III	Excursion	75
CROISIERES MARJOLAINE INC. Chicoutimi, Que.		
Marjolaine II	Excursion	175
TRAVERSE TROIS-PISTOLES ET ESCOUMINS Trois-Pistoles, Que.		
Le Gobelet d'Argent	Ferry	200
TOURISM CORPORATION Sept-Iles, Que.		
Sylvesta	Excursion	33

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.

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Radio Holland—Norfolk	Phone: (804) 721-7744
Radio Holland—Long Beach	Phone: (213) 595-0177
Radio Holland—Springfield	Phone: (201) 379-2660
Radio Holland—Portland	Phone: (503) 223-5715
Radio Holland—San Francisco	Phone: (415) 420-8635
Radio Holland—Seattle	Phone: (206) 246-9559
Radio Holland—Mobile	Phone: (205) 432-3139
Radio Holland—New Orleans	Phone: (504) 733-4024
Radio Holland—Corpus Christi	Phone: (512) 851-9390

Shipyards

Cadiz
Telf.: (34-56) 25 10 00
Fax: (34-56) 27 83 62
25 68 28
Telex: 76021 ASTIL E
76153 AVEN E

Sevilla
Telf.: (34-54) 45 10 11
Fax: (34-54) 45 76 59
Telex: 72345 ASTIL E

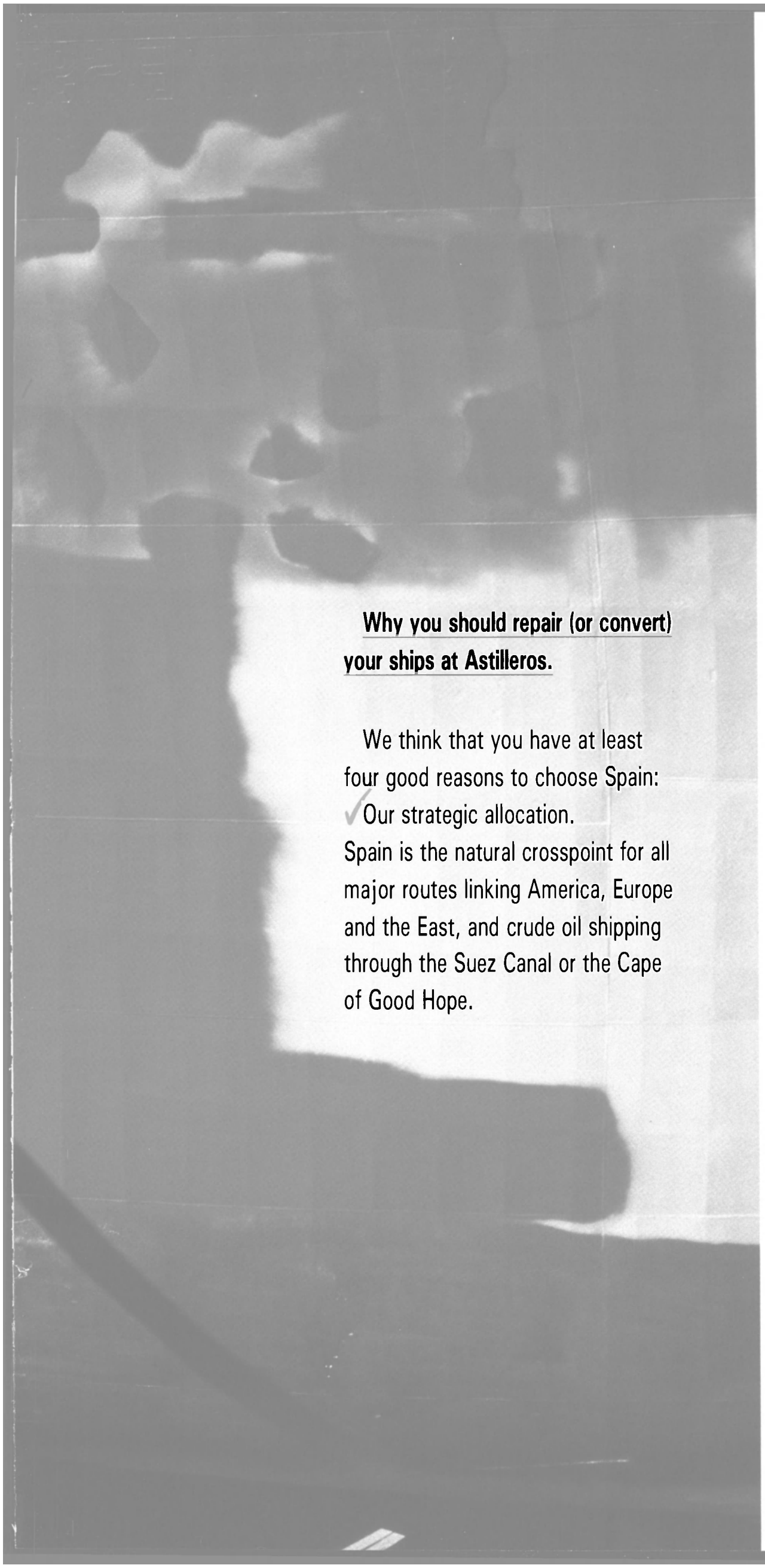
Bilbao
Telf. (34-4) 495 71 50
Fax: (34-4) 496 49 76
Telex: 31519 AERS E

Santander
Telf.: (34-42) 54 00 50
Fax: (34-42) 54 00 26
Telex: 35810 ASSA E

ASTANO Ferrol
Telf.: (34-81) 34 07 00
Fax: (34-81) 34 09 54
(34-81) 34 32 52
Telex: 85507 ASTAN E
82381 ASTAN E

ASTICAN
Canary Islands
Telf.: (34-28) 27 32 66
Fax: (34028) 26 48 07
Telex: 95147 ASVAS E
96502 YARD E

The Shipbuilders of Spain



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We think that you have at least four good reasons to choose Spain:

✓Our strategic allocation.
Spain is the natural crosspoint for all major routes linking America, Europe and the East, and crude oil shipping through the Suez Canal or the Cape of Good Hope.

✓Our technical skills and facilities.
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✓Our conversion experience
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Along the long coastline of Spain, and covering all tonnages.

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28006 Madrid
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Telex. 27648 ASTIL-E
Fax. (341) 276 29 56

Circle 184 on Reader Service Card

COMPANY Vessel	Type	# of Passengers
AMERICAN CANADIAN CRUISE LINE INC. Warren, R.I.		
Caribbean Prince	Excursion	80
New Shoreham II	Excursion	72
OCEAN CRUISE SERVICES		
Passenger Capacities in parentheses BERMUDA STAR LINE		
Canada Star (750)		
Vera Cruz I (698)		
BLACK SEA SHIPPING Gruziya (450)		
CAST NORTH AMERICA INC. ? (12)		
COSTA CRUISES Eugenio C' (1156)		
CUNARD/NAC Sagafjord (505)		

COMPANY Vessel
EPIROTIKI LINES MTS Jason (250)
HAPAG-LLOYD Europa (758)
OCEAN CRUISE LINES INC. Ocean Princess (460)
POLISH OCEAN LINES Stefan Batory (779)
ROYAL CRUISE LINE Royal Odyssey (798)
ROYAL VIKING LINE Royal Viking Sea (700) Royal Viking Sky (700)
SUN LINE CRUISES Stella Solaris (658)
YUGOSLAV GREAT LAKES LINES ? (12)
Source: Great Lakes Commission

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

OWNER/OPERATOR Ship	GT	Length (feet)	# of Passengers	Year Built
ADMIRAL CRUISE LINES 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
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 LINE 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

OWNER/OPERATOR Ship	GT	Length (feet)	# of Passengers	Year Built
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
DOLPHIN CRUISES Miami, Fla.				
Dolphin	13,007	501	586	56
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
HOME LINE CRUISES INC. New York, N.Y.				
Atlantic	19,337	669	986	82
Homeric	42,000	669	1,132	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

OWNER/OPERATOR Ship	GT	Length (feet)	# of Passengers	Year Built
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
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
Sun Princess	17,370	534	700	72
PREMIER CRUISE LINES Cape Canaveral, Fla.				
Oceanic	19,500	780	1,562	65
S/S Royale	15,483	603	1,255	58
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
Royal Odyssey	25,500	593	816	64
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
SEAESCAPE LTD. Miami, Fla.				
Scandinavian Sky	8,200	416	926	72
SITMAR CRUISES Los Angeles, Calif.				
Fairsea	25,000	606	925	56
Fairsky	46,000	787	1,200	84
Fairwind	25,000	606	925	57
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
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

CANADIAN SHIPBUILDING

REVIEW AND OUTLOOK

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

J. Y. Clarke

Although 1987 was by no means a banner year for our shipbuilding, ship repairing and allied industries, it did have some positive aspects that portend well for the future. The Order Book total, i.e. vessels under construction and on order, at the end of 1987 was 63,820 GT, a 58% increase over 1986. While this tonnage is still far lower than the years before 1986, it is encouraging to note that 32,220 GT or just over half, stemmed from commercial contracts. It is certainly hoped that is indicative of future trends.

It is also encouraging that the number of foreign built vessels registered in Canada decreased slightly, from 9 to 7, although, in terms of gross tonnage, this represents a significant increase. Situations of this sort support the CMIA contention that, as Canada needs and wants a viable shipbuilding and repairing infrastructure, a national policy must be developed, to this end. Such a policy should, we suggest, provide the capability for innovative financing arrangements to evolve, which would persuade Canadian fleet operators to build and refit in Canada. More about this later.

The value of allied industries marine revenue was down slightly from 1986, but the implications of the June, 1987 White Paper on Defence should reverse this trend during 1988.

During 1987, Marine Industries Limited acquired Versatile Vickers (Montreal), Versatile Davie (Lauzon) and Versatile Systems Engineering Inc. The MIL Group then consolidated the three shipyards along the St. Lawrence River, with respect to operations. This action undoubtedly warmed the cockles of the hearts of those members of the Federal bureaucracy intent on monitoring the rationalization of the Canadian shipyard infrastructure. At the time of writing, early May '88, it is understood that Government officials are involved in discussions on the West Coast but no results have yet been announced.

At the end of December, 1987 shipyard employment stood at 5,649, the lowest level in CMIA records. However reports have been received of significant hirings since the beginnings of '88.

During the first quarter of 1988, several new contracts were awarded, with a virtual 50-50 balance between new construction and refit/repair.

The outlook through '88 into the next decade appears promising, for several reasons. First, world shipping increased steadily over the past 20 months, with several ports, including some in Canada, reporting record operations, either in certain categories of cargo, or in total. Secondly, Canadian fisheries are placing more orders in Canadian yards, not as many as we'd like, perhaps, but enough to provide work for several medium yards. Finally, offshore drilling continues at low levels in the Beaufort, off the Newfoundland coast and in the Sable Island area. Planning is well advanced against the day when phasing into the production stages becomes economically viable, and this major move could be made in the near future.

Government contracting with respect to the Canadian Coast Guard and Fisheries & Oceans' fleets continues, with both new construction and major refit and repair contracts being expected this year. It is pending naval contracts, however, that are capturing media attention in all parts of the country. The third and fourth Tribal-Class modernizations have yet to be announced, and the industry anxiously awaits the Government's next move on the acquisition of a mine counter-measures fleet and other minor war vessels.

The nuclear-propelled submarine project, however, has gained the limelight. The "battle" between Britain and France to win the impending country-of-origin decision has progressed to the final rounds, and it is believed that this decision is imminent. In total, the prospects for shipbuilding and ship repairing in Canada, together with those for the allied manufacturing and service industries, hold promise for a modest recovery from the slump of the past few years.

Finally, the question of a national shipbuilding and repairing policy for Canada has advanced to a new stage. Working with Government officials, the CMIA has developed a framework for a national policy, which has now been submitted to the Prime Minister with a formal request that such a policy be formulated. To use the somewhat trite expressions received from Government on this issue two years ago, the monkey is off the Association's back, and the ball is in the Government's court.

SHIPBUILDING AND SHIP REPAIRING INDUSTRY
STATISTICAL HIGHLIGHTS
AS AT DECEMBER 31, 1984-1987

	No	1984	No	1985	No	1986	No	1987	Change from 1986 %
ORDER BOOK—Vessels Under Construction or on Order As at December 31, 1987									
Commercial (GT)	11	92,347	6	33,850	5	1,650	10	32,220	+1,852.7
Federal Government (GT)	21	59,330	19	56,360	9	38,700	8	31,600	−18.3
Total (GT)	32	151,677	25	90,210	14	40,350	18	63,820	+58.2
NEW ORDERS—Received in 1987									
Commercial (GT)	9	29,220	7	7,900	9	2,144	13	33,529	+1,463.9
Federal Government (GT)	6	6,500	2	400	—	—	1	500	+500.0
Total (GT)	15	35,700	9	8,300	9	2,144	14	34,029	+1,487.2
DELIVERIES—During 1987									
Commercial (GT)	6	50,100	11	55,900	10	34,518	8	3,615	−89.5
Federal Government (GT)	2	1,700	4	4,600	10	17,760	2	7,600	−57.2
Total (GT)	8	51,800	15	60,500	20	52,278	10	11,215	−78.5
VALUE OF NEW CONSTRUCTION									
Commercial ($000)	—	172,541	—	160,156	—	25,609	—	125,406	+389.7
Federal Government ($000)	—	115,663	—	302,254	—	306,580	—	21,532	−93.0
Total ($000)	—	288,204	—	462,410	—	332,189	—	146,758	−55.8
VALUE OF REPAIRS AND CONVERSIONS									
Commercial ($000)	—	163,259	—	146,606	—	136,623	—	118,010	−13.6
Federal Government ($000)	—	87,426	—	83,458	—	90,931	—	61,488	−32.4
Total ($000)	—	250,685	—	230,064	—	227,554	—	179,498	−21.1
TOTAL VALUE OF SHIPYARD PRODUCTION —New Construction, Repairs and Conversions									
On Domestic Account ($000)	—	479,638	—	667,374	—	540,356	—	303,873	−43.8
On Foreign Account ($000)	—	59,251	—	25,100	—	19,387	—	22,383	+15.5
Total ($000)	—	538,889	—	692,474	—	559,743	—	326,256	−41.7
FOREIGN BUILT VESSELS REGISTERED IN CANADA (GT)	18	235,975	7	8,233	9	9,641	7	23,069	+139.2
EMPLOYMENT									
In CMIA Shipyards									
New Construction	—	2,849	—	4,420	—	3,435	—	3,171	−7.7
Repairs	—	4,240	—	3,660	—	3,521	—	2,478	−29.6
Total	—	7,089	—	8,080	—	6,956	—	5,649	−18.8
Dollar Output Per Employee ($)	—	76,743	—	85,702	—	80,469	—	57,754	−28.2

World Shipbuilding

World shipbuilding orders in 1987 rose to an estimated 13.5-million gross metric tons from 12.7-million tons in 1986, according to Lloyd's Register of Shipping Annual Report. This was an optimistic sign, reversing a three-year decline in the shipbuilding industry.

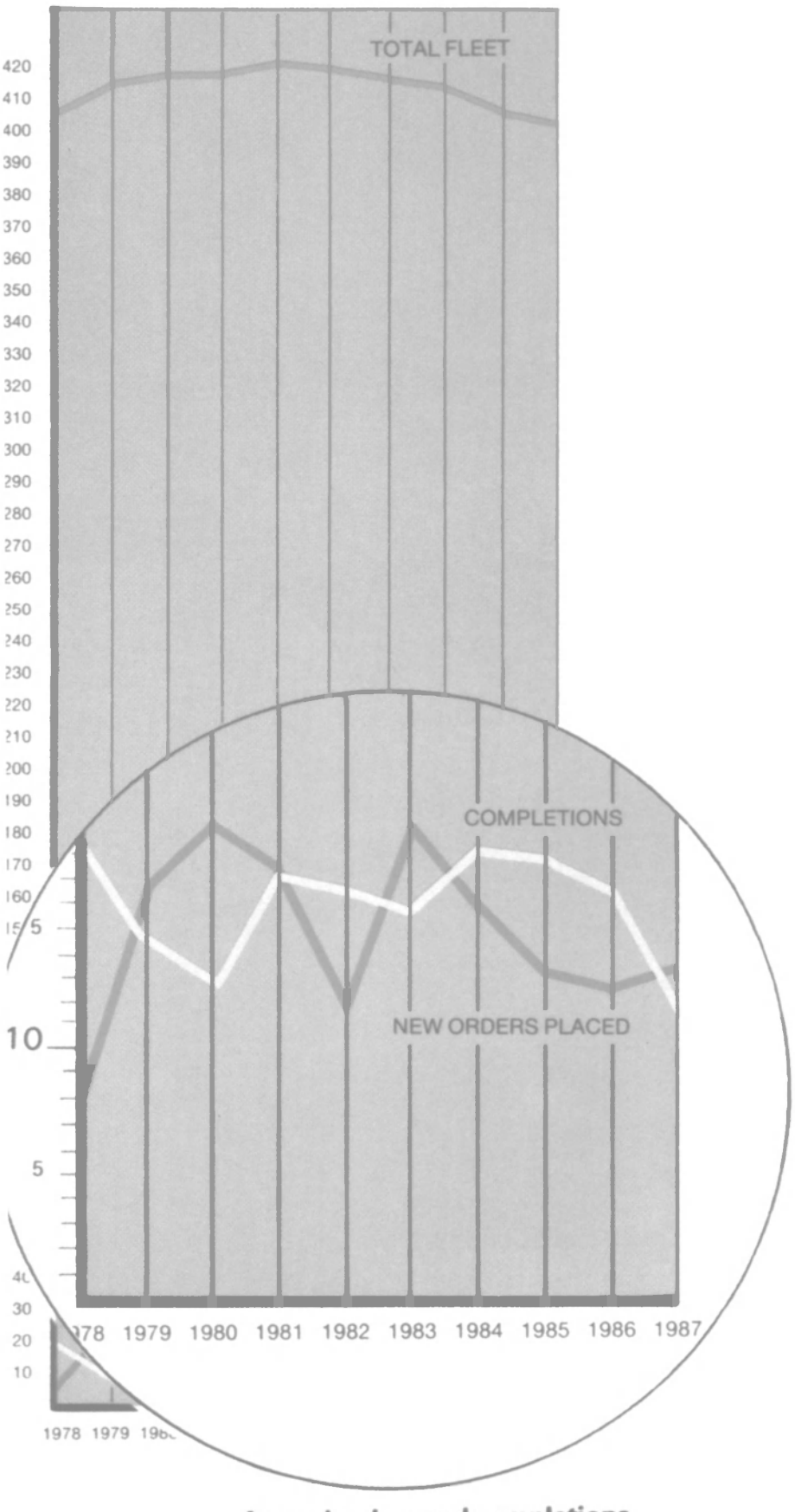
However, figures published by Lloyd's Register showed a drop in merchant ship completions during 1987 to 12.3-million gross tons, a decline of 4.6-million gross tons from 1986's total of 16.8-million gross tons.

According to the Annual Summary of Merchant Ships Completed, Japan and South Korea accounted for just over 4 million gt of the overall decrease. Despite the reduction, Japan's output of 5.7-million gross tons represents 46.6 percent of the world's total output. South Korea boasted a 17 percent market share, amounting to just over 2-million gross tons.

Orders for tankers rose substantially during 1987 to an estimated 6.1-million metric tons, an increase of about 33 percent over 1986 figures. Newbuilding contracts for Suezmax and Very Large Crude Carriers (VLCCs) predominated, with both these vessel types realizing the largest operating profits in recent months.

Once again, for the third consecutive year, general cargo and containership building contracts increased to an estimated 3.4-million gross tons, up about 13 percent over 1986 figures.

Orders for bulk carriers were down slightly in 1987 to an estimated 2.3-million metric tons.



Annual orders and completions
million gross tonnage

New Developments

However, in terms of shipbuilding output, the relative positions of Japan and South Korea are likely to be reversed in 1988. According to the delivery schedule of the world orderbook at the end of 1987, South Korea is due to complete 4-million gt of its total 6-million gt, while Japanese yards are due to complete 3.2-million gt of their 5-million gt total orderbook. Of the total world orderbook of 22.5-million gt, 13.6-million gt is due for delivery in 1988.

Although a number of countries recorded decreases in their shipbuilding tonnage output in 1987, others showed significant increases. Yugoslavia's output of 350,406 gt, an increase of 117,410 gt over 1986, was the third largest in the world, according to all available information. Spain, with an output of 324,541 gt; Italy, 312,989 gt; the People's Republic of China, 285721 gt; Romania, 198,443 gt; the United Kingdom, 194,231 gt; and France, 167,027 gt, showed the largest gains during 1987 among the world shipbuilding leaders.

Demolitions/Removals

Based on data compiled thus far, high charter rates for VLCC loading in the Persian Gulf provided some shipowners with lucrative returns and, thus, discouraged sales to breakers.

In the dry bulk sector, a second-quarter revival in demand for handy-size and Panamax type vessels similiarly created better trading opportunities and diminished the flow of ships to the breakers' yards. By late 1987, signs of upturn were emerging, too, in the steel-making raw materials trades. This meant that a higher demand emerged for larger ships as well. Accordingly, it is not surprising that across all vessel sizes, much lower scrappage duly emerged.

MERCHANT SHIP COMPLETIONS
1963-1987

Year	Number of Ships	Gross Tonnage
1963	2,038	9,028,210
1964	2,032	9,723,825
1965	2,202	11,763,251
1966	2,484	14,105,450
1967	2,766	15,156,857
1968	2,740	16,844,962
1969	2,912	18,738,741
1970	2,814	20,979,977
1971	2,917	24,387,691
1972	2,776	26,748,822
1973	2,999	30,408,930
1974	2,949	33,541,289
1975	2,730	34,202,514
1976	2,723	33,922,193
1977	2,796	27,531,824
1978	2,618	18,194,120
1979	2,466	14,289,369
1980	2,412	13,101,104
1981	2,269	16,931,719
1982	2,312	16,820,101
1983	2,276	15,911,143
1984	2,210	18,334,061
1985	1,964	18,156,526
1986	1,634	16,844,909
1987	1,528	12,259,419

Source: Lloyd's Register of Shipping

The fall in total demolition sales was very pronounced in 1987. Based on figures from a leading London ship broker, last year's sales to breakers were about half their 1986 levels in both the tanker and dry cargo sectors.

Laid-Up Tonnage

If 1987 was notable for much-reduced scrapping and a recovery of newbuilding ordering, it was identified too with further reductions in laid-up tonnage. The inactivity total fell for the fifth year in succession. Interestingly, there was more evidence of reductions taking place due to recommissioning of ships for active service, rather than for delivery to breakers' yards. By year end-1987, the lay-up total was estimated to be around 10.2-million gt, a fall of over 25 percent from 1986 levels of 14-million gt.

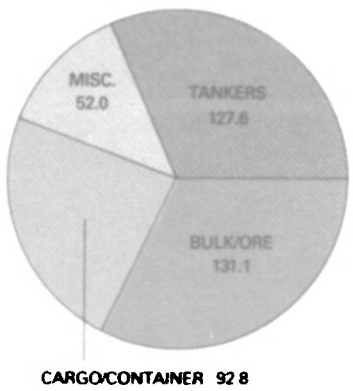
World Orderbook Far East

Once again as in 1986, Japan and South Korea dominated the merchant shipbuilding market, receiving an estimated 35.6 percent and 31.2 percent, respectively, of the new orders placed during 1987.

However, by year's end, Japan

Source: Lloyd's Register of Shipping and Maritime Reporter/Engineering News

Composition of the world fleet as at June 30
million gross tonnage



TOTAL 403.5m gt

had lost its position as the world's shipbuilding leader. By the fourth quarter, South Korea, with an orderbook of 6,021,483 gross tons, held an almost one million gt edge over Japan. This is an amazing turnaround since, just seven years earlier in 1980, Japan led the world by far with a total tonnage order of 13.1-million gt (or 38 percent of the world total) to a mere 2.5-million gt (7.2 percent) for South Korea.

The reduced demand at home and abroad forced the Japanese Ministry of Transport to approve plans by domestic shipbuilding groups to drastically cut their production capacities.

However, despite these cuts, several Japanese yards made a number of noteworthy deliveries. Mitsubishi Heavy Industries (MHI) launched nine ships during the year totaling 539,608 dwt (416,012 gt) and completed 13 ships totaling 461,521 dwt (407,917 gt) during the same period. One of MHI's most significant deliveries was the Pacific Pintail, the first irradiated nuclear fuel carrier built in Japan.

One of MARITIME REPORTER's Outstanding Oceangoing Vessels of 1987 was delivered by Nippon Kokan's Tsurumi yard. The 31,598-gt RO/RO-Passenger ferry Norsun was completed and delivered to her owners, Hollandse Vrachtvaart Maatschappij of the Netherlands, during the second quarter of the year. A second MARITIME REPORTER Outstanding Oceangoing Vessel, the U.S.-flag Pure Car Carrier (PCC) Marine Reliance, was delivered by Sumitomo Heavy Industries, Ltd.'s Oppama Shipyard to the U.S. shipping company Marine Transport Lines, Inc.

In South Korea, Hyundai Heavy Industries (HHI) was a major force, delivering 17 vessels to class. Included among the group's deliveries was the Americana, another MARITIME REPORTER Outstanding Oceangoing Ship. The innovative ship is a new concept container/passenger carrier (CONPASS), which has a passenger capacity of 110 and container capacity of 1,120 TEUs.

In Busan, Korea Shipbuilding and Engineering Corporation delivered two 10,900-dwt RO/ROs to Gorthon Lines of Sweden.

In Koje Island, Samsung Heavy Industries, Co., Ltd., delivered the MARITIME REPORTER Outstanding Oceangoing Ship Jasmine to Korea Shipping Corporation. The 188,000-dwt bulk carrier was over 954 feet long with a beam of about 157 feet. Samsung also delivered a 95,000-dwt products carrier and began construction of six petroleum product carriers for the Kuwait Oil Tanker Co. Also in Koje, Daewoo Shipbuilding & Heavy Machinery completed a 186,000-dwt bulk carrier for Pan Ocean, while commencing a 240,000-dwt bulker for the company and the first of two 135,000-dwt crude carriers for ICB.

The People's Republic of China's shipyards were busy with a number of new construction orders as well as repair contracts. China State Shipbuilding Corporation's Zhonghua and Donghai shipyards, for example, were constructing five "Supercoaster" multipurpose dry cargo/container carriers for European owners.

The year's main marine news in Taiwan, was the delivery of the 305,836-dwt oil/ore carrier Ruhr Ore to Krupp Handel GmbH and

(continued)

COMBINED CARRIERS DELIVERED AND TONNAGE ON ORDER OR UNDER CONSTRUCTION BY COUNTRY OF BUILD AND YEAR OF DELIVERY AS AT 1st APRIL 1988

(Number of vessels and tons deadweight)

Delivered Jan-Mar 1988	Country of Build	1988	1989	1990	1991	Total
	China, Taiwan	1 305,000				1 305,000
	Korea, South	7 334,698				7 334,698
	Yugoslavia	2 121,200				2 121,200
	Total	10 760,898				10 760,898

Source: Clarkson Research Studies Ltd.

COMBINED CARRIERS ON ORDER OR UNDER CONSTRUCTION AS AT 1st APRIL 1988

(Number of vessels and tons deadweight)

Delivered Jan-Mar 1988	Deadweight Groups	1988	1989	1990	1991 & later	Total
	10,000/ 15,999					
	16,000/ 24,999					
	25,000/ 34,999					
	35,000/ 44,999					
	45,000/ 59,999	7 334,698				7 334,698
	60,000/ 79,999	2 121,200				2 121,200
	80,000/ 89,999					
	90,000/119,999					
	120,000/159,999					
	160,000/199,999					
	120,000/159,999					
	160,000/199,999					
	200,000/219,999					
	220,000/254,999					
	255,000/319,999	1 305,000				1 305,000
	320,000/& Above					
	Total	10 760,898				10 760,898

Source: Clarkson Research Studies Ltd.

BULK & ORE CARRIERS DELIVERED AND TONNAGE ON ORDER OR UNDER CONSTRUCTION BY COUNTRY OF BUILD AND YEAR OF DELIVERY AS AT 1st APRIL 1988

(Number of vessels and tons deadweight)

Delivered Jan-Mar 1988		Country of Build	1988	1989	1990	1991	Total
		Argentina	3 193,500		1 64,000	4 256,000	8 513,500
1	35,000	Brazil	4 440,000	2 128,000			6 568,000
		Bulgaria	2 76,000				2 76,000
		China, People's Republic	20 667,070	1 64,000			21 731,070
		China, Taiwan	1 12,000	4 347,000	2 302,000		7 661,000
		France	3 126,000				3 126,000
		Germany, Democratic Rep					
1	73,816	India	8 294,500	2 85,500			10 380,000
		Italy	2 274,000	2 397,000			4 671,000
2	233,930	Japan	24 1,569,500	20 1,594,223			44 3,163,723
		Korea, South	5 599,000	13 1,368,800	1 110,000		19 2,077,800
		Mexico	1 22,000				1 22,000
1	32,971	Poland	11 304,400	1 32,800		2 270,000	14 607,200
		Rumania	1 65,000				1 65,000
		Spain	2 131,940				2 131,940
		Turkey	3 78,000				3 78,000
		United Kingdom					
		Yugoslavia	2 87,000	1 39,000			3 126,000
5	375,717	**Total**	92 4,939,910	46 4,056,323	4 476,000	6 526,000	148 9,998,233

Source: Clarkson Research Studies Ltd.

BULK AND ORE CARRIERS ON ORDER OR UNDER CONSTRUCTION AS AT 1st APRIL 1988

(Number of vessels and tons deadweight)

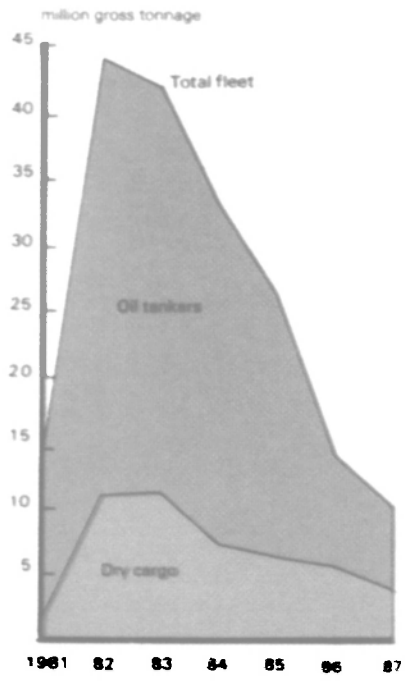
Delivered Jan-Mar 1988		Deadweight Groups	1988	1989	1990	1991 & later	Total
1	10,335	10,000/ 19,999	4 46,940				4 46,940
		20,000/ 24,999	11 227,400				11 46,940
		25,000/ 29,999	15 387,000				15 387,000
1	32,971	30,000/ 34,999	4 129,400	1 32,800			5 162,200
1	35,000	35,000/ 39,000	15 545,370	1 39,000			16 584,370
		40,000/ 44,999	12 504,100	4 168,300			16 672,400
		45,000/ 49,999	1 48,000	1 48,000			2 96,000
		50,000/ 59,999		2 108,593			2 108,593
		60,000/ 69,999	19 1,230,400	25 1,620,480	1 64,000	4 256,000	49 3,170,880
1	73,816	70,000/ 79,999	1 75,000				1 75,000
		80,000/ 99,999					
		100,000/119,999		3 330,000	1 110,000		4 440,000
		120,000/159,999	3 394,000	2 288,000	2 302,000	2 270,000	9 1,254,000
1	223,595	160,000/& Above	7 1,352,300	7 1,421,150			14 2,773,450
5	375,717	**Total**	92 4,939,910	46 4,056,323	4 476,000	6 526,000	148 9,998,233

Source: Clarkson Research Studies Ltd.

World Shipbuilding

(continued)

Laid up shipping as at December 31
monthly figures not plotted



the commencement of a sistership for the same company by China Shipbuilding Corporation's Kaohsiung yard.

In Malaysia, Malaysia Shipbuilding & Engineering Sdn., Bhd., has been busy with repair work as well as the reactivation of two VLCCs.

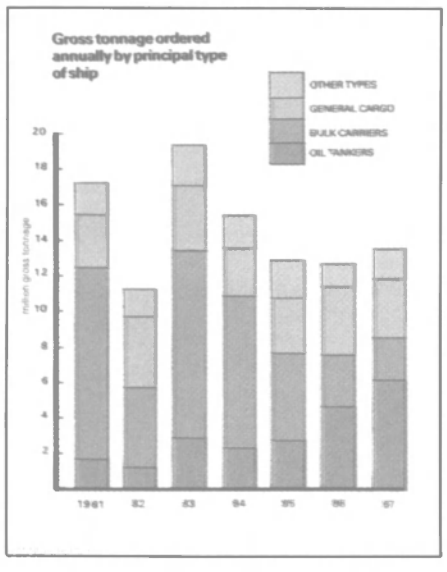
Europe

The big news in European shipbuilding in 1987, was the construction of Royal Caribbean Cruise Line's 874-foot Sovereign of the Seas, one of the largest and most luxurious passenger cruise ships ever built. She was constructed by Alsthom's Chantiers de l'Atlantique shipyard, St. Nazaire, France.

One of the most interesting marine contracts, the construction of a 700-cabin cruise ship for SITMAR, was also awarded to Chantiers de l'Atlantique.

Among a variety of vessels completed and under construction

(continued)



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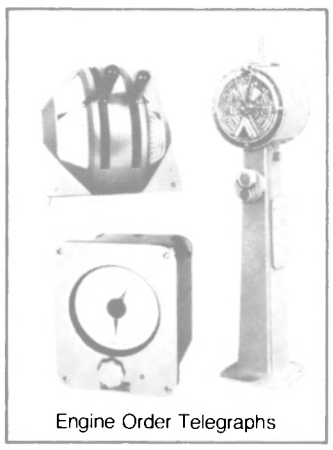
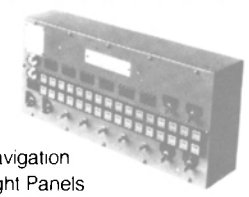
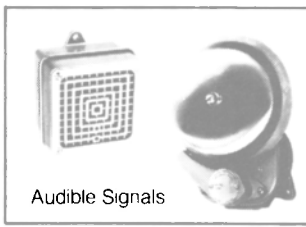

Engine Order Telegraphs

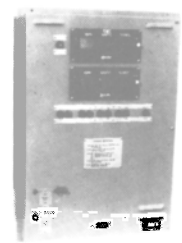

Whistle Timers


Navigation Light Panels


Audible Signals

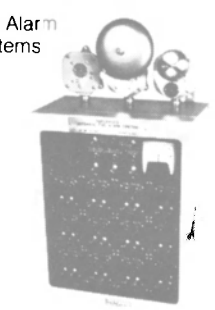

Throttle Control Levers


Shaft Speed Indicator Systems


Digital Master Clock Systems


Sound Powered Telephone Systems


Engineer's Alarm Panels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World Shipbuilding

(continued)
around the United Kingdom, the delivery of the 31,000-gt Norsea by Govan Shipbuilders was one of the most significant. The passenger ferry was put into service on the Hull-to-Rotterdam run, along with her sister ship, the Norsun.

During the year, Harland & Wolff of Belfast delivered the 173,000-dwt bulk carrier Ironbridge.

In the Federal Republic of Germany, Meyer Werft of Papenburg delivered three 8,400 m3 LPG carriers, the Grajau, Gurupa and Gurupi (another MARITIME REPORTER Outstanding Ship) to Petrobras, the state-owned Brazilian oil company. Additionally, Meyer Werft launched the cruise liner Crown Odyssey.

Howaldtswerke Deutsche Werft (HDW) of Kiel was busy with the construction of five new C-10 Class containerships for American President Lines (APL).

In the area of conversion work at German yards, the big story was the reengining of Cunard's QE2 at Lloyd Werft, Bremerhaven. She was fitted with the world's largest diesel-electric propulsion plant, consisting of nine MAN B&W Diesel engines and two GEC electric propulsion motors.

In Spain, state-owned Astilleros Espanoles yards struggled in 1987, but now, through a more aggressive management policy, seem to have turned things around. The company now has assured themselves of work well into 1989, and among its orders are six reefer vessels for the Del-Monte Fruit Co.

In Finland, Oy Wartsila Ab and Valmet Oy shipbuilding groups merged and formed a new company—Wartsila Marine Industries Inc. The new company has contracts to build three 70,000-gt cruisers, among the largest in the world.

Neighboring Sweden's shipbuilding industry delivered some notable vessels, foremost of which was the cruise ship Celebration by Kockums AB of Malmo.

Further south, in Italy and Yugoslavia, the conditions seemed to prove a better climate for shipbuilding. New government subsidy regulations in Italy resulted in the ordering of 11 vessels, comprising two 70,000-gt passsenger cruise liners, three containerships and six fishing trawlers. Fincantieri's Monfalcone works completed the Micoperi 7000, the largest semisubmersible crane vessel ever built.

In Yugoslavia, prospects were even brighter, as eighteen ships were under construction or on order to class. Seven ships delivered during 1987 collectively registered 265,272 dwt. Brodosplit's Split Shipyard delivered three 45,308-dwt oil tankers/caustic soda carriers, among which was the Kriti Color, a MARITIME REPORTER Outstanding Oceangoing Ship for 1987. The 3. Maj Shipyard in Rijeka completed an order for three bulk carriers. Uljanik Shipyard delivered a log/bulk carrier early in 1987.

Americas

The U.S. is experiencing an upturn in certain sectors of the shallow-draft market, particularly in the cruise vessel area. The U.S. large vessel shipbuilding industry continued to be supported by the ongoing U.S. Navy and Government vessel construction program. In fact, according to the Shipbuilders Council of America, government sources accounted for nearly 95 percent of the workload in major American yards.

The current U.S. Navy shipbuilding and modernization program calls for the expenditure of over $35 billion annually for a total of approximately $180 billion over 5 years (see the U.S. Navy report in this issue for details).

Among the notable deliveries in the commercial sector during 1987 were Bay Shipbuilding's completion of a three-containership contract for Sea-Land-Corporation, and McDermott's delivery of the hopper dredge Atlantic American.

However, the U.S. industry still suffers from the lack of a comprehensive maritime promotional package by the government.

North of the border in Canada, domestic shipyards suffered from a lack of commercial orders. MIL Davie's Lauzon, Quebec, yard began construction of a RO/RO-passsenger vessel, the sister ship of the Caribou.

Prospects look brighter for the coming year, as the Canadian Ministry of National Defense plans to initiate a $5-billion nuclear submarine construction program, St. John Shipbuilding will be working on a $2-billion frigate construction program for the government, and Versatile Pacific will begin plans for a Polar Class 8 icebreaker for the Canadian Coast Guard.

In Brazil, orders from the the state-owned oil company Petrobras and from the Brazilian Navy enabled the marine industry to maintain a steady workload.

Outlook

With some qualifications, certain encouraging signs for the 1988 outlook could be seen as the year unfolded. The respective sectors of the shipping industry each seem less overtonnaged than in recent years and with a slimmer orderbook in the dry bulk category, for example, the threat of excessive fleet expansion is correspondingly smaller than earlier in this decade. Successful resolution of trade frictions, together with prudent newbuilding activity, could buoy trading conditions.

According to the latest publication from Drewry Shipping Consultants Ltd. of London, "Forecast Tanker Profitability 1987-1992," there is reason for cautious optimism for the ship operator in the tanker sector over the next few years.

"Forecast Tanker Profitability" bases its optimism on the fact that ship supply will be reduced through scrapping, since 58 percent of the world tanker fleet are between 10-14 years old, so that a significant number of ships will reach their useful trading life during the next few years. ■

TANKERS DELIVERED AND TONNAGE ON ORDER OR UNDER CONSTRUCTION BY COUNTRY OF BUILD AND YEAR OF DELIVERY AS AT 1st APRIL 1988

(Number of vessels and tons deadweight)

Delivered Jan-Mar 1988		Country of Build	1988		1989		1990		1991 & later		Total	
		Belgium	2	90,600							2	90,600
		Brazil	6	230,000	9	293,000	4	176,000			19	699,000
		Bulgaria	1	29,900	1	29,900	2	59,800	2	58,900	6	178,500
		China, People's Republic	6	438,200			1	62,200			7	500,400
		China, Taiwan	1	103,000	1	32,000	2	515,000			4	650,000
2	141,728	Denmark	3	253,000							3	253,000
		Finland										
		France										
		Germany, West										
		India			1	86,000	1	86,000	1	86,000	3	258,000
		Italy					1	29,800			1	29,800
3	153,439	Japan	29	2,274,900	20	2,289,500					49	4,564,400
5	395,083	Korea, South	35	4,059,900	35	4,562,400	2	560,000			72	9,182,300
		Mexico	2	86,000							2	86,000
		Poland			2	59,800	1	82,000	5	201,600	8	343,400
		Portugal	1	88,900							1	88,900
		Rumania	10	618,300							10	618,300
1	10,039	Spain	5	80,400	4	566,000	2	220,000			11	866,400
		Sweden										
		United Kingdom					2	58,000			2	58,000
		United States	1	23,000	4	98,000	1	26,000	1	26,000	7	173,000
4	82,386	Yugoslavia	7	297,800	12	879,100	2	193,700			21	1,370,600
15	782,675	**Total**	109	8,673,900	89	8,895,700	21	2,068,500	9	372,500	228	20,010,600

Source: Clarkson Research Studies Ltd.

TANKERS ON ORDER OR UNDER CONSTRUCTION AS AT 1st APRIL 1988

(Number of vessels and tons deadweight)

Delivered Jan-Mar 1988		Deadweight Groups	1988		1989		1990		1991 & later		Total	
1	10,039	10,000/ 15,999	4	46,700	4	53,600					8	100,300
3	48,423	16,000/ 24,999	8	152,600	8	148,600					16	301,200
2	63,391	25,000/ 34,999	13	384,800	12	361,700	8	239,600	7	204,500	40	1,190,600
3	115,682	35,000/ 44,999	26	1,000,800	20	787,300					46	1,788,100
1	59,054	45,000/ 59,999	5	245,600	2	110,000	2	110,000			9	465,600
		60,000/ 79,999	9	574,200			1	62,200			10	636,400
2	167,710	80,000/ 89,999	18	1,507,100	4	326,000	3	251,700	2	168,000	27	2,252,800
3	318,376	90,000/119,999	4	415,000	5	524,000	3	330,000			12	1,269,000
		120,000/159,999	10	1,363,300	19	2,695,000					29	4,058,300
		160,000/199,999										
		200,000/219,999										
		220,000/254,999	10	2,465,800	7	1,740,000					17	4,205,800
		255,000/319,999	2	518,000	8	2,149,500	4	1,075,000				
		320,000/& Above										
15	782,675	**Total**	109	8,673,000	89	8,895,700	21	2,068,500	9	372,500	214	16,268,100

Source: Clarkson Research Studies Ltd.

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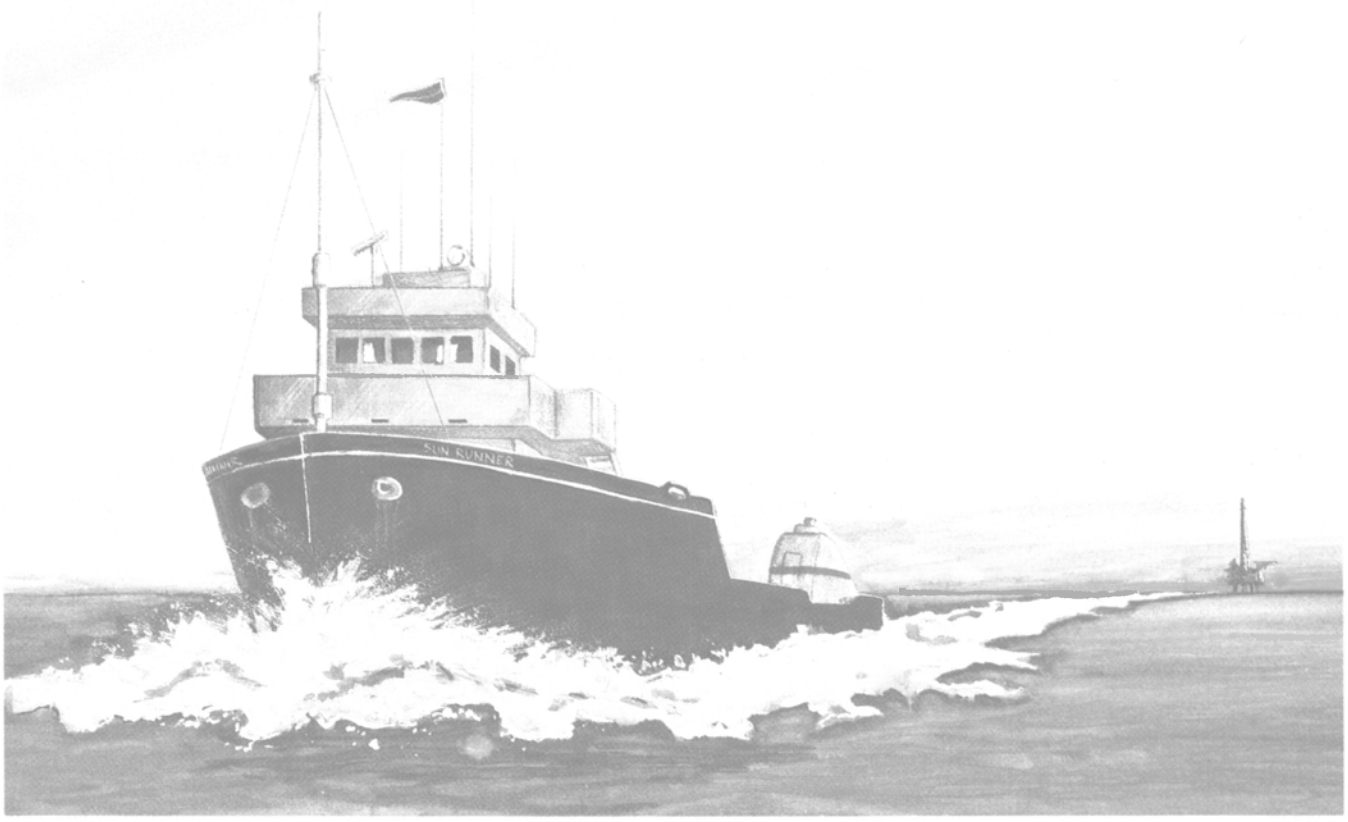

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OFFSHORE DRILLING RIGS

OFFSHORE MOBILE DRILLING RIGS UNDER CONSTRUCTION, ON ORDER, OR WITH LETTERS OF INTENT TO SHIPYARDS—MAY 1988

RIG OWNER	RIG NAME	DESIGN	WATER DEPTH	SHIPYARD	ESTIMATED COST ($MM)	DELIVERY DATE	CONTRACT
			JACKUPS				
IFESM Petromar	Jupiter	Sonat Orion, 4 triangular legs	300′	Galatz - Galatz, Romania	$ 45.0e	Indef	IFESM Petromar - owner operated
IFESM Petromar	Saturn	Sonat Orion, 4 triangular legs	300′	Galatz - Galatz, Romania	$ 45.0e	Indef	IFESM Petromar - owner operated
ONGC	Sagar Kiran	Baker Marine BMC 300 IC, Independent leg, Class M, cantilever	300′	Mazagon Dock - Bombay, India	$ 45.0	04/88 indef	ONGC - owner operated - India
U.S.S.R.	U.S.S.R. Unnamed Jackup 01	Arctic Class	300′	Rauma Repola Mantyluoto - Finland	$ 67.0	1988	USSR - 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	1988	USSR - owner operated - Arctic
U.S.S.R./Vletsovpet ro	Tam Dao	MSC CJ-50	300′	Far East Levingston - Singapore	$ 45.0	03/88 indef	Vltsovpetro - owner operated
			SEMISUBMERSIBLES				
Ben Odeco Britoil	Ocean Alliance	Odeco Ocean Ranger modified, 8 columns, self propelled, dynamic positioning or conventional mooring	4,500′	Scott Lithgow - Greenock, Scot, U.K.	$180.0	06/88	Britoil - owner operated - U.K.
Boelwerf	Boelwerf Unnamed Semi 01	Dyvl Super Yatzy, self propelled, dynamic positioning capability	2,500′	Boelwerf - Temse, Belgium	$ 65.0	01/89	Available
Drillmar	Drillmar Unnamed Semi 01	Friede & Goldman L-1033, Enhanced Pacesetter, self propelled, thruster assist	1,500′	Astano - El Ferrol, Spain	$ 96.0	02/89	Drillmar - owner operated
Odeco	Ocean America	Odeco Ocean Odyssey, 8 columns, self propelled	3,000′	Hyundai - South Korea	$ 65.0	12/88	Available
Odeco	Ocean Valiant	Odeco Ocean Odyssey, 8 columns, self propeilled	3,000′	Hyundai - South Korea	$ 65.0	06/88	Available
Petrobras	Petrobras 18	Gotaverken GVA 4500, 4 columns, self propelled	3,000′	Ishibras - Brazil	$ 65.0e	08/89e	Petrobras - owner operated
Petrobras	Petrobras 19	Gotaverken GVA 4500, 4 columns, self propelled	3,000′	Ishibras - Brazil	$ 65.0e	08/89e	Petrobras - 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	12/88	Available
Sonat	Sonat Richardson	Gotaverken GVA 4500, 4 columns, self propelled	3,000′	Daewoo - South Korea	$ 70.0	07/88	Available
U.S.S.R.	Shelf 05	Friede & Goldman Enhanced Pacsetter, 6 columns, self propelled	650′	Astrakhan Shipyard - Astrakhan, U.S.S.R.	$ 65.0e	Undet	U.S.S.R. - owner operated
			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	06/88e	U.S.S.R. - owner operated

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, Texas 77224. For full details on this and other publications and services from Offshore Data Services, contact **Loran R. Sheffer,** president, or **Jerry Greenberg,** editor, at 3200 Wilcrest #170, Houston, Texas 77042. Telephone: (713) 781-2713. Telex: 794-573 ODS HOU

OFFSHORE MOBILE DRILLING RIGS UNDER CONSTRUCTION OR ORDERED

MAY 1988
MOBILE RIGS UNDER CONSTRUCTION
BY AREA OF WORLD
(Location of Shipyard)

	ARCTIC	JACKUPS	BARGES	SEMISUBMERSIBLES	SHIPS	SUBMERSIBLES	TENDERS	TOTAL
LATIN AMERICA	0	0	0	2	0	0	0	2
NORTH SEA	0	0	0	2	0	0	0	2
EUROPE OTHER	0	2	0	1	0	0	0	3
MEDITERRANEAN	0	0	0	2	0	0	0	2
INDIA	0	1	0	0	0	0	0	1
SOUTHEAST ASIA	0	1	0	0	0	0	0	1
FAR EAST	0	0	0	3	0	0	0	3
U.S.S.R.	0	2	0	1	1	0	0	4
TOTAL	0	6	0	11	1	0	0	18

MOBILE RIGS UNDER CONSTRUCTION
BY DELIVERY DATE
MAY 1988

	ARCTIC	JACKUPS	BARGES	SEMISUBMERSIBLES	SHIPS	SUBMERSIBLES	TENDERS	TOTAL
1988	0	2	0	5	1	0	0	8
1989	0	0	0	5	0	0	0	5
1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
UNDETERMINED	0	4	0	1	0	0	0	5
TOTAL	0	6	0	11	1	0	0	18

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	N/A	N/A	52/88
AMERICAN AUTOMAR INC.					
1025 Thomas Jefferson Street, Suite 308, Washington, D.C. 20007					
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	D-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 MarAd

AMERICAN PRESIDENT LINES, LTD.					
1800 Harrison Street, Oakland, CA 94612					
President Arthur	Container	36,799	44,256	D-28,800	87
President Buchanan	Container	36,799	44,256	D-28,800	87
President Cleveland	Cargo	16,000	22,200	T-24,000	69
President Eisenhower	Container	36,900	45,900	D-43,200	80/84
President F.D. Roosevelt	Container	36,200	45,900	D-43,200	80/84
President 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 Jefferson	Container	21,500	18,500	T-28,500	73
President Johnson	Container	21,500	18,500	T-28,500	74
President Wilson	Container	16,500	19,300	T-22,000	64/72
President Lincoln	Container	40,600	29,800	D-43,200	82
President Madison	Container	21,500	18,500	T-28,500	73
President Monroe	Container	40,600	29,800	D-43,200	83
President Pierce	Container	21,500	18,500	T-28,500	73
President Taft	Container	17,800	17,500	T-24,500	67/72
President Tyler	Container	26,700	37,300	T-32,000	72/78/83
President Washington	Container	40,600	29,800	T-43,200	82
***President Adams**	Conbulk	42,276	54,565	D-57,000	88
***President Jackson**	Conbulk	42,276	54,565	D-57,000	88
***President Kennedy**	Conbulk	42,276	54,565	D-57,000	88
***President Polk**	Conbulk	42,276	54,565	D-57,000	88
***President Truman**	Conbulk	42,276	54,565	D-57,000	88

*APL's new C-10 Class vessels. They will replace some of the vessels listed above. The President Truman entered service in May. The others will be phased into service throughout the year.

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

Owner or Operator Name of Ship	Type	GT	DWT	HP T = Turbine D = Diesel	Year Built/ Rebuilt
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
Altair	Bulk/Container	33,337	64,152	D-15,800	86
American Heritage	Tanker	44,000	91,849	T-24,500	78
Archon	Bulk	33,784	63,463	D-12,300	84
Arion	Bulk/Carrier	33,337	64,152	D-15,800	86
Aspen	Bulk/Carrier	33,337	64,152	D-15,800	86
Aurora	Bulk	33,784	63,739	D-12,300	84
Baltimore	ITB	23,913	47,247	D-18,200	83
Beaver State	Tanker	44,900	91,849	T-24,500	78
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.					
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, N.J. 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
S.S. Mobile Bay	Tanker	18,810	N/A	D-14,850	54
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
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

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
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
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	5,995	D-10,000	80
Senator	RO/RO	13,498	3,995	D-10,000	81
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
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 from Connecticut National Bank

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
FALCON SHIPPING GROUP					
1111 Fannin Street, Suite 1060, 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 Duchess	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 INCORPORATED					
One Whitehall Street, New York, NY 10004					
Argonaut	Container	17,904	16,205	T-17,500	79
Export Champion	Cargo/Container	11,000	10,990	T-13,750	63
Export Freedom	Container	17,904	16,230	T-17,500	72
Export Patriot	Containership	17,904	16,345	T-17,500	73
Austral Rainbow*	LASH	26,456	29,749	T-32,000	72
American Resolute	Container	17,904	16,205	T-17,500	80

* chartered by MSC

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
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 Magnacham/ SCC 3902	ITB	18,671	39,344	D-14,000	77
INTEROCEAN MANAGEMENT CORPORATION					
Three Parkway, Philadelphia, PA 19102					
Brooks Range	Tanker	74,250	165,037	T-26,700	78
Thompson Pass	Tanker	74,250	165,037	T-26,700	78
U.S.T. Atlantic	Tanker	189,416	398,143	T-45,000	79
U.S.T. Pacific	Tanker	189,416	398,143	T-45,000	79
***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 Gnome**	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
***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

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
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
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
Stella Lykes	Container	14,082	15,288	T-17,500	64
Sue Lykes	Cargo/Cont.	16,000	22,200	T-24,000	69
***ex-Almeria Lykes**	Container	36,800	44,263	D-25,000	86
***ex-Dr. Lykes**	Container	36,800	44,263	D-25,000	86
***ex-James Lykes**	Container	36,800	44,263	D-25,000	86
***ex-Tillie Lykes**	Container	36,800	44,263	D-25,000	86

*chartered to APL

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
MAERSK LINE, LTD.					
Giralda Farms, Madison Avenue, P.O. Box 884, Madison, N.J. 07940-0884					
***Cpl. Louis J. Jauge Jr.**	RO/RO	38,412	23,068	D-16,800	84
***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
1st Lt. Alexander Bonnyman Jr.	RO/RO	38,412	23,068	D-16,800	85

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
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
PACIFIC-GULF MARINE, INC.					
P.O. Box 6479, 3010 Gen. DeGaulle Drive, Suite 100, New Orleans, LA 70114					
American Cormorant	Semi-Submersible	10,195	55,092	D-19,700	75/82
American Eagle	RO/RO	15,632	20,972	D-21,600	81
Moku Pahu/HSTC 1	Bulk carrier (ITB)	17,286	37,107	D-14,000	81
Sugar Islander	Bulk carrier	15,544	29,984	D-12,000	73
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
Bayamon	RO/RO	15,131	14,180	T-32,000	70
Caguas	RO/RO	17,513	16,943	T-30,000	74
Fortaleza	RO/RO	15,135	13,969	T-32,000	72
Ponce	RO/RO	17,513	16,943	T-32,000	68/81
Puerto Rico	RO/RO	14,770	14,090	T-30,000	75
San Juan	Container	18,455	17,897	T- 9,000	45/69

*Will add five Lancer Class vessels later this year.

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
RAINBOW NAVIGATION, INC.					
P.O. Box 801, Red Bank, N.J. 07701					
M.V. Rainbow Hope	Con/Breakbulk	983	2,000	D-3,000	84
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.					
P.O. Box 800, Iselin, N.J. 08832					
Achiever	Container	42,720	58,907	D-28,000	84
Adventurer	Container	17,376	15,128	D-17,400	78
Anchorage	Container	19,311	21,000	D-22,000	87
Atlantic	Container	42,720	58,907	D-28,000	85
Challenger	Container	19,168	25,508	T-26,000	68
Commitment	Container	42,720	58,907	D-28,000	85
Consumer	Container	23,764	25,373	T-32,000	73
Crusader	Container	18,389	24,938	T-26,000	69
Defender	Container	30,085	29,861	D-30,150	80/85
Developer	Container	30,085	29,818	D-30,150	80/85
Discovery	Container	18,876	20,319	T-26,000	68
Economy	Container	24,744	23,485	T-32,000	71
Endurance	Container	30,085	29,738	D-30,150	80/85
Enterprise	Container	28,222	30,982	T-28,500	80/83
Expedition	Container	21,688	21,694	T-28,500	73/81
Explorer	Container	30,085	29,811	D-30,150	80/85
Express	Container	30,085	29,943	D-30,150	80/85
Freedom	Container	30,085	29,831	D-30,150	80/85
Galveston Bay**	Container	42,720	58,907	D-28,000	85
Hawaii	Container	21,688	21,564	T-28,500	73/81
Independence	Container	30,085	29,790	D-30,150	80/85
Innovator	Container	30,085	29,860	D-30,150	80/85
Integrity	Container	42,720	58,907	D-28,000	85
Kodiak	Container	19,311	21,000	D-22,000	87
Leader	Container	17,376	15,298	D-17,400	78
Liberator	Container	30,085	29,764	D-30,150	80/85
Long Beach	Container	17,184	16,977	T-9,900	45/66
Mariner	Container	30,085	29,903	D-30,150	80/85
Navigator	Container	28,492	30,810	T-28,500	72/77/83
Nedlloyd Holland*	Container	42,720	58,907	D-28,000	84
Nedlloyd Hudson*	Container	42,720	58,907	D-28,000	85
Newark Bay**	Container	42,720	58,907	D-28,000	85
Oakland	Container	17,184	17,091	T-9,900	45/66
Pacer	Container	17,376	15,241	D-17,400	78
Pacific	Container	28,222	30,776	T-28,500	79/83
Panama	Container	17,193	17,014	T-9,900	45/66
Patriot	Container	30,085	29,748	D-30,150	80/85
Performance	Container	42,720	58,907	D-28,000	85
Pioneer	Container	17,376	15,246	D-17,400	78
Producer	Container	23,764	25,196	D-32,000	74
Quality	Container	42,720	58,907	D-28,000	85
Raleigh Bay**	Container	42,720	58,907	D-28,000	84
Tacoma	Container	19,311	21,000	D-22,000	87
Trader	Container	28,492	31,158	T-28,500	73/77/83
Value	Container	42,720	58,907	D-28,000	84
Venture	Container	24,774	23,485	T-32,000	71
Voyager	Container	30,085	29,911	D-30,150	80/85

*Will fly Nedlloyd colors under space chartering agreement; **will fly Trans Freight colors under space chartering agreement.

SEALIFT, INC.					
68 West Main Street, Oyster Bay, N.Y. 11771					
Bravado	Tanker	2,110	4,400	D-2,880	77
Inger	Bulker	14,192	23,977	T-7,240	45/62
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

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
TOPGALLANT GROUP, INC.					
510 Thornhall Street, Edison, N.J. 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

Owner or Operator Name of Ship	Type	GT	DWT	HP T=Turbine D=Diesel	Year Built/ Rebuilt
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
***President Taylor**	Cargo	16,000	22,200	T-24,000	69
*under charter from APL					
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
WESTERN HEMISPHERE CORPORATION					
P.O. Box 2401, Santa Monica, CA 90406-2401					
Lion of California	Tanker	10,473	16,692	T-7,000	54

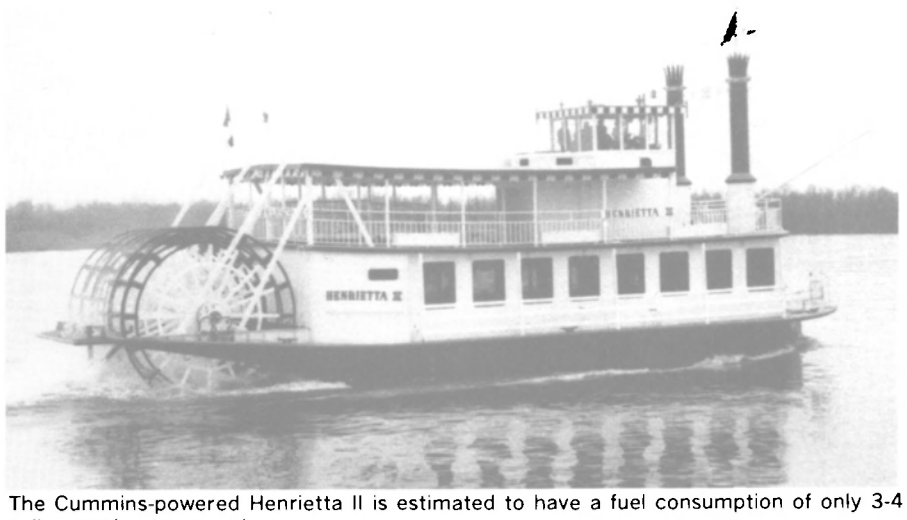
U.S. Parent Company Foreign Flag Merchant Ships As of January 1, 1987

SUMMARY

	TOTAL			FREIGHTERS*			BULK & OIL CARRIERS			TANKERS		
	No Ships	Gross Tons	Deadweight Tons	No. Ships	Gross Tons	Deadweight Tons	No. Ships	Gross Tons	Deadweight Tons	No. Ships	Gross Tons	Deadweight Tons
Total All Flags	**394**	**18,665,070**	**36,795,388**	**58**	**563,505**	**501,023**	**67**	**1,682,162**	**3,205,346**	**269**	**16,419,403**	**33,089,019**
Liberia	201	10,655,377	21,567,626	16	243,289	247,424	34	825,033	1,653,555	151	9,587,055	19,666,647
Panama	62	2,779,576	5,382,527	23	225,729	155,378	10	120,172	200,846	29	2,433,675	5,026,303
Bahamas	26	1,970,174	3,817,704				1	71,208	128,320	25	1,898,966	3,689,384
France	8	751,803	1,493,163							8	751,803	1,493,163
United Kingdom	28	696,325	1,207,942				8	124,027	200,945	20	572,298	1,006,997
Saudi Arabia	4	565,138	1,110,130							4	565,138	1,110,130
British Colonies	20	485,650	871,784	10	43,046	45,172	10	442,604	826,612			
Argentina	13	232,232	392,837							13	232,232	392,837
Netherlands	3	187,245	388,187				2	60,302	127,356	1	126,943	260,831
Singapore	10	161,163	286,741	2	20,763	26,202				8	140,400	260,539
Norway	4	66,197	113,303							4	66,197	113,303
Vanuatu	1	23,891	41,262				1	23,891	41,262			
South Africa	1	18,939	31,102							1	18,939	31,102
Greece	3	21,570	27,823	2	6,645	1,373	1	14,925	26,450			
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	11,214							1	6,444	11,214
Finland	1	4,370	6,954							1	4,370	6,954
Cyprus	2	3,076	4,139	2	3,076	4,139				1	1,360	2,962
Japan	1	1,360	2,962									

*Includes ten passenger ships.

SOURCE: Maritime Administration



The Cummins-powered Henrietta II is estimated to have a fuel consumption of only 3-4 gallons an hour per engine.

Cummins-Powered Paddlewheeler Delivered By Superior Boat Works

The Henrietta II, a 85-foot by 26-foot passenger vessel built by Superior Boat Works of Greenville, Miss., is now offering sightseeing luncheon and dinner cruises on the Cape Fear River near Wilmington, N.C. The vessel is homeported in Wilmington and is owned by Cape Fear Riverboats, Inc.

While decorated inside and out to resemble a vintage paddlewheeler, the boat's propulsion system is state-of-the-art. A pair of Cummins 6BT5.9 diesels, supplied by Cummins Mid-South, Jackson, Miss., power hydraulic pumps that boost hydraulic pressure sufficiently to drive two hydraulic motors that turn a 16-foot-diameter split paddlewheel. Each diesel develops 134 hp running at a constant 1,800 rpm. A pair of Newage 35-kw generators are also powered by the same two Cummins engines. Both are keel cooled using Fernstrum equipment.

"The hydraulic system is simple, yet effective," explained **Birney Rousselle,** vice president and general manager of Skipper Hydraulic in Gretna, La., designer and installer of the system. "Each of the two levers on the Morse controller located in the pilothouse is mechanically connected to the control arm of a hydrostatic transmission pump powered by each engine. The hydraulic fluid is pressurized to 2,000-2,500 psi and pumped to hydraulic motors that turn the split paddlewheel at 17-20 rpm." Mr. **Rousselle** explained that the hydraulic system is reversible, enabling the paddlewheel to turn in either direction. In addition, each main hydraulic circuit operates only one-half of the paddlewheel, enabling the operator to use it for steering by varying the speed of each half of the wheel.

Steering as well as propulsion is hydraulic. The two steering rudders are controlled via a hydraulic valve connected to the chain drive on the wheel in the pilothouse. The two flanking rudders are also hydraulically controlled. A 'jog' controller in the pilothouse sends electric signals to modulate a hydraulic valve open and closed.

The Henrietta II features an enclosed main deck cabin and a covered second deck. The pilothouse is elevated a few feet above the second deck for pilot visibility.

For further information and free literature on Cummins engines,

Circle 10 on Reader Service Card

For free literature on the facilities and capabilities of Superior Boat Works,

Circle 11 on Reader Service Card

Red River Shipping Wins $35.4-Million Contract

Following a competitive procurement of small and disadvantaged business concerns, the Navy's Military Sealift Command has awarded a firm-fixed price contract in the amount of $35,366,660 to Red River Shipping Corp. of Phoenix, Ariz., for the time charter of the M/V Tacna II. The dry cargo ship will be reflagged to the Unitied States and renamed prior to delivery to the Military Sealift Command, on or before October 31, 1988. Upon delivery to the MSC, the ship will be used for the prepositioning, transportation, and safe stowage of essential war materials that will be used by U.S. forces deployed to forward sites in a contingency. The contract performance period is 17 months with two 17-month options.

Ingalls Awarded $14.1-Million Contract For Destroyer Work

The Ingalls Shipbuilding Division of Litton Systems Inc., Pascagoula, Miss., received a $14.1-million U.S. Navy contract for planning yard services for DD-963 and DDG-993 Class destroyers. The work is expected to be completed in March 1993. The contract (N00024-88-C-2081) was awarded by the Naval Sea Systems Command.

Leslie Controls Announces DLO-1 Series 80 Valves —Literature Available

Leslie Controls, Inc., is launching its new Class DLO-1 Series 80 line of diaphragm control valves that provide higher overall flow capacity, size for size and at lower initial cost, than competitive models now on the market.

The new Series 80 model is a single-seated, unbalanced cage retained trim valve that features a cast iron actuator and new packing and gasket materials, assuring maximum, trouble-free performance over long periods of time. Depending upon the specific application and requirements, the user may be able to use a smaller size valve, reducing costs even further.

Ideal for a wide range of steam, water, gas and process installations, the Series 80 permits maximum interchangeability of parts without removing the valve body from the line. Trim, flow characteristics, even actuator size can be changed to suit job requirements. A substantial reduction in spare parts is possible, since trim parts and actuators are interchangeable between iron and steel valves.

All Leslie sales representatives have complete valve sizing manuals and selection data to assist the customer in choosing the most economical model for the specific requirements or application.

For more information and free literature,

Circle 87 on Reader Service Card

Aeroquip Offers Hydraulic Troubleshooting Bulletin

The often time-consuming and costly task of fluid power system troubleshooting can be greatly simplified by using the four "tools" provided by nature: sight, smell, hearing and touch.

Aeroquip Bulletin 2027A, a practical, easy-to-read manual for equipment operators or maintenance personnel, explains how the senses can be used to diagnose common, hydraulic system malfunctions and how to interpret the information gathered by these "tools."

Aeroquip Corporation of Jackson, Mich., is a Trinova company. A worldwide leading manufacturer of fluid power and fluid system components, Aeroquip produces flexible hose, fittings and assemblies; quick disconnect and V-Band couplings; hydraulic and pneumatic cylinders; swivel joints; custom engineered rubber products; spring brakes; cargo control equipment; refrigeration/air conditioning components; diagnostic monitoring devices; and aerospace, automotive and railroad products.

For more information and a free copy of the bulletin from Aeroquip,

Circle 35 on Reader Service Card

The President Truman, a new class containership, was recently christened at Howaldtswerke-Deutsche Werft in Kiel, West Germany, for American President Lines.

HDW Christens Two Containerships For American President Lines

First Two Ships Of New Class Of Five

American President Lines (APL) recently christened two 902-foot containerships of a new class of five vessels at Howaldtswerke-Deutsche Werft (HDW) in Kiel, West Germany. The fuel-efficient C-10 Class ships, each capable of carrying the equivalent of 4,300 TEU containers, have an efficient new "wide-body" hull design and are propelled as fast as 24 knots by some of the largest, most powerful diesel engines ever built.

The ships, the President Kennedy and President Truman, have a 129-foot beam, maximum draft of 41 feet, displacement of 75,862 long tons and a deadweight of 53,648 long tons. The vessels have been classed by the American Bureau of Shipping, +AI E, Container Carrier + AMS + ACCU. The vessels will be used in APL's Pacific Basin service.

Bruce Seaton, chairman of California-based American President Companies (APC), APL's parent organization, said the C10s will become a key component in the company's complex land and sea distribution system.

During a ceremony at HDW, **Hannelore Kohl,** wife of West German Chancellor **Helmut Kohl,** christened the M.V. President Kennedy. The M.V. President Truman was christened by **Joyce Seaton, Bruce Seaton**'s wife.

A third C10, the President Jackson, is nearing completion in the HDW yard, while two additional C10s are being constructed by Bremer-Vulkan, of Bremen. The President Truman will be the first to enter service, while the remaining four C10s will be phased into service later this year.

The C10 ships are the first container-carrying vessels to have a "post-Panamax" beam, meaning their width exceeds the limitations of the Panama Canal. As with the development of wide-bodied aircraft, the increased capacity and efficiency requirements for these vessels led to the new design concept. APL president **Timothy J. Rhein** said the company's focus on the Pacific Basin and Indian Ocean regions, coupled with American President's extensive intermodal (rail and truck) service to the Midwestern and Eastern regions of North America, made it possible to design ships unconstrained by the canal's dimensions.

APL C-10 CLASS
Equipment List

Main engine	Sulzer
Propeller	Ostermann
Generator engines	Krupp MaK
Aux. generator engine	Caterpillar
Generators	A. von Kaick
Bowthruster	KaMeWa
Central automation	Siemens
Boilers	HDW
ARPAs	Raytheon
GPS loran	Trimble
SatNav & integrated navigation system	Raytheon
Doppler log & echo sounder	JRC
Gyrocompass & autopilot	Anschutz
Rudder angle	Stein-Sohn
Fog signal	Elaplan
Radio equipment	ITT Mackay
Distallation	Alfa Laval Nirex
Waste disposal	Format Chemie
Sewage treatment	Hamworthy
Cathodic protection	Electrocatalytic
Anchoring	Blohm & Voss
Anchor chain	Ramnas
Mooring winches	Norwich
Lifeboat	Fassmer
Davits	Schat
Life rafts	Viking
Monorail	ASEA Hagglund
Steering gear	Brown Brothers

"These are the first ships to be designed specifically for trans-Pacific service," Mr. **Rhein** said. "By removing the limitation on the ships' beam, we were able to significantly increase their capacity, while optimizing their speed, fuel efficiency, and stability."

The 129-foot beam makes it possible to load containers 12 rows across, below deck, and 16 rows across, above deck, compared with a maximum of 10 rows below deck and 13 rows above deck for ships of a traditional "Panamax" design. The greater stability achieved as a result of the wide beam also enables APL to stack containers five-high above deck, while eliminating the need to carry excessive water ballast during trans-Pacific voyages—a drag on vessel performance. It also means the ships can be loaded and unloaded more quickly, because containers can be stowed on the basis of logistical efficiency, with less regard for weight.

Each C10 is propelled by a 57,000 horsepower, 12-cylinder diesel engine—the most powerful internal combustion engine ever built. Designed by Sulzer of Switzerland, and manufactured in Korea, these power plants meet APL's high service-speed requirement with a single propeller, eliminating the need for less fuel-efficient twin-propulsion systems.

By replacing smaller, less efficient ships, the C10s will help the company reduce marine costs on a per container-mile basis by 50 percent from 1984 levels, Mr. **Rhein** said. The C10s will contribute to an annual eastbound capacity increase of approximately 24 percent in 1988, which includes the full-year impact of four other large, diesel-propelled vessels introduced in April 1987, and by an additional 17 percent in 1989.

For free literature on the shipbuilding services of HDW,

Circle 12 on Reader Service Card

The EMD-diesel-powered Seattle Express is capable of transforming fish into low-cholesterol fish paste (surimi), used to make imitation crab meat, shrimp and other products.

Bender Shipbuilding Delivers Fish Processing Vessel 'Seattle Enterprise'

Bender Shipbuilding & Repair Co., Inc. of Mobile, Ala., has completed a major reconstruction of a fish processing vessel for Arctic Alaska Fisheries Corporation of Seattle. The redesigned Seattle Enterprise is one of only four U.S. vessels capable at sea of transforming fish, primarily Alaskan pollock, into low-cholesterol fish paste (surimi), used to make imitation crab meat, shrimp and other products.

Originally a 220-foot steel-hull boat used for offshore oil and gas research, the Seattle Enterprise will be employed primarily for fishing and surimi production in the waters of the Pacific Northwest.

With the assistance of a team of maritime professionals, including Arctic Alaska chairman of the board **Francis Miller,** Bender's in-house engineering and design group severed the ship at its midsection and inserted a 50-foot midbody to add a main fish net deck, processing deck, freezer compartments and freshwater processing area. The converted Seattle Enterprise now measures 270 feet from bow to stern with a 44-foot beam.

The vessel is also capable of producing fish fillets for the domestic market, or headed and gutted fish for the Japanese market.

Arctic Alaska owns and operates one of the largest American-owned catching and at-sea processing fleets in the North Pacific. The Seattle Enterprise, manned by a crew of 50, will become the largest catcher/processor in the company's fleet when it is placed into service this month.

The Seattle Enterprise is equipped with a 47,000-cubic-foot freezer cargo hold and has the capacity to make 104,000 gallons of fresh water per day. The vessel's two main engines, 1,950 hp each, turn two 120-inch controllable pitch propellers inside kort nozzles and move the ship at 13 knots. Fuel capacity is 140,000 gallons. Four generators operate the ship's processing plant and crew facilities.

Founded in 1923, Bender is one of the largest builders of steel-hull fishing vessels in the world. The Seattle Enterprise is the ninth fishing processor boat delivered by the company for use in the North Pacific. The company also manufactures a variety of other boats ranging from passenger vessels to workboats and tugs. Bender is a full-service yard with complete drydock and repair facilities.

For free literature giving com-

SEATTLE ENTERPRISE
Equipment List

Main engines	EMD
Generator sets	Kato
Propellers	Berg
Bow thruster	Bird-Johnson
Hydraulic system	Delevan
Cranes	Alaska Marine
Winches	Rasmussen
Refrigeration System	Sabroe
Sewage Treatment System	Red Fox
Fresh Water Maker	Atlas Danforth

plete details on the facilities and capabilities of Bender Shipbuilding & Repair Co.,

Circle 88 on Reader Service Card

Navy Awards $10.7-Million Contract To Southwest Marine

Southwest Marine Inc., San Diego, Calif., has received a $10.7-million U.S. Navy contract for the Extended Drydocking Selected Restricted Availability (EDSRA) for the USS George Philip (FFG-12). The work is expected to be completed April 21, 1989. The contract (N00024-88-H-8221) was awarded by the Naval Sea Systems Command.

DEFCO Offers Free Literature On Diesel Products And Services

Diesel Engine & Fabricating Co., Inc. (DEFCO) of Houston, Texas, one of the world's largest precision remanufacturers of GM EMD, Detroit Diesel and Caterpillar engines, has published a free full-color brochure on the products and services offered by the company.

DEFCO remanufactured engines and parts have been extensively used for over 20 years for marine propulsion, land and offshore drilling rigs, mining, and general construction equipment besides prime power and standby generator sets. According to the literature, the quality and reliability of these remanufactured engines led to the U.S. Army's selection of DEFCO engines for the prime propulsion power for the new Logistics Support Vessel (LSV) program.

The brochure notes that DEFCO is one of the few companies in the world that can rebore an EMD on the customer's location to exacting specifications, and that DEFCO engines, whether rebuilt, remanufactured as a complete package, or serviced at the site are 100 percent guaranteed to perform as specified.

According to the company, customers will also find DEFCO's pricing policy to be more than just competitive. Engines, parts and service are priced to assure the highest quality at a lower cost than most are probably accustomed to paying.

For more information and a free copy of the literature from DEFCO,

Circle 44 on Reader Service Card

Waugh Offers Literature On Head Modules And TNF Joiner Systems

The Waugh Co., Jacksonville, Fla., is offering free color brochures on its Acra-MoldTM Acrylic Head Modules and Rockwool (TNF) Joiner Systems.

The Acra-Mold Acrylic Head Module is manufactured by Waugh as a one piece, seamless unit, which is prefabricated to include all plumbing and electrical systems, as well as toliet and shower facilities, cabinets and tiled floor.

The color brochure, which contains more than a dozen photographs, details the full advantages of the Waugh head module and provides full specifications for the unit. The publication points out that the module's acrylic surface requires very little maintenance and no refinishing. Because of its prefabricated construction, the unit only requires four hours to install.

The Waugh Co. is also offering a free color brochure on Rockwool TNF Joiner Systems. The company is the exclusive distributor for Rockwool TNF Joiner Systems in the U.S.

Rockwool TNF Marine Products, which have been installed on over 1,000 projects ranging from cruise liners, merchant vessels, supply and workboats, and dinner/ferry vessels, provide the major advantages of high noise reduction, low weight, ease of installation and aesthetic appearance.

For free copies of the color brochures offered by The Waugh Co. on their Acra-Mold Acrylic Head Modules or the Rockwool TNF Joiner System,

Circle 47 on Reader Service Card

Electrocatalytic Acquires DEM Cell Technology

Electrocatalytic, Inc., has announced the purchase of the Seltech Group businesses including DEM (Dished Electrode Membrane) Cell Process Technology from Steetley Engineering Limited, West Midlands, England. DEM Cell products will be manufactured in Electrocatalytic's plants in Portskewett, Gwent, England, and Union, N.J.

This acquisition by Electrocatalytic is consistent with the company's strategic planning process and commitment to growth in electrochemistry driven by value-in-use products and processes.

The patented DEM Cell was specially developed by the Electricity Council Research Centre in England as a general purpose electro-synthesizer and provides the electrochemist with an innovative tool for inorganic and organic process manufacturing. The DEM Cell can be assembled as a divided or membrane cell incorporating two dished electrodes and a membrane or as an undivided cell using one dished and one flat electrode. Both share a majority of common components and proprietary anodes which allow cells to be used in a variety of ways including developmental work and small-scale fine chemical manufacture.

The end use applications of DEM Cell technology include: pharmaceuticals, cosmetics, flavors and fragrances and various environmental sectors.

For additional information and free literature,

Circle 58 on Reader Service Card

Phillips Cartner Wins MarAd Contract To Perform Technical Study

The Maritime Administration recently announced a $98,000 contract to Phillips Cartner & Co., Inc., Alexandria, Va., to perform a technical study entitled "Vessel Productivity Assessment." The objective of the study is to determine the most efficient and effective balance of manning, organization, management, and technology for future U.S.-flag commercial ships.

The study is designed to determine future requirements for ship technical operations, evaluate foreign technology and its applicability to the U.S. fleet and formulate incentives for U.S. ship operating companies.

The Vessel Productivity Assessment is expected to be completed in 12 months.

For details on services and products available from Phillips Cartner,

Circle 36 on Reader Service Card

McElroy Offers Free 47-Page Brochure On Deck Machinery

McElroy Machine and Manufacturing Company of Biloxi, Miss., is now offering a free 47-page brochure package on its line of deck machinery.

The package includes dimensional drawings and technical data on some of the products within McElroy's manufacturing range such as fishing winches, capstans, windlasses, anchor winches and tow winches.

McElroy is a full service facility offering engineering and design capabilities to produce a product that meets each customer's particular requirements. Along with McElroy's limited warranty, each product is backed by qualified service personnel who stand ready to assist with any problems which may arise in the future regardless of the customer's geographical location.

Vessels served by McElroy include offshore supply boats, utility boats, tugboats, crewboats and line handling boats; commercial fishing vessels, freezer ships and research vessels; military vessels for U.S. Coast Guard, U.S. Navy, U.S. Army Corps of Engineers and foreign navies. Specialized vessels employing specialized deck equipment also play a large part in McElroy's endeavor including ferries, seismic research, fireboats and dredges.

For more information and a free copy of the brochure package from McElroy,

Circle 22 on Reader Service Card

Kaltenbacher Joins ZF Of North America As Director Of Corporate Purchasing

Helmut A. Kaltenbacher

Helmut A. Kaltenbacher recently joined ZF-NA as director of corporate purchasing responsible for all purchasing functions of ZF North America, interaction with ZF AG, West Germany, and all North American subsidiaries.

Mr. **Kaltenbacher** will be focusing his efforts on securing competitive sources of materials and services from North America and Mexico to support ZF's expanding worldwide business concept. His office will be in ZF-NA's OE sale/application engineering offices in Farmington Hills, Mich.

For more information and free literature on ZF-NA,

Circle 25 on Reader Service Card

Indicator Switch From Nupro Connects To Air Actuated Bellows Valves

A new indicator switch for use with normally closed, miniature air-actuated bellows valves is now available from Nupro Company, Willoughby, Ohio.

The switch threads into the top of the actuator. It activates when the valve is open, sending an electrical signal to another component such as a programmable controller or panel readout. The switch assembly includes 24-inch leads with an in-line clip for easy installation.

A retrofit kit is available for the appropriate Nupro air-actuated valves.

The valves incorporating the switch have service ratings from vacuum to 3,500 psi (24,100 kPa), and −40° to 200° F (−40° to 93° C). Models are available in 316 stainless steel, brass, and Alloy 400. End connections can be Swagelok Tube Fittings, metal gasket or O-ring face seal fittings, socket weld or butt weld. Sizes are ¼-inch, ⅜-inch and ½-inch.

Applications include systems involving semiconductor processing, toxic or corrosive fluid control, high vacuum, high purity and ultra-clean requirements.

For additional information and free literature from Nupro Company,

Circle 34 on Reader Service Card

Spare Parts Amendment Passes House

The House of Representatives recently passed the Marine Machinery Association's amendment to the FY89 Department of Defense Authorization bill requiring that critical spare parts for ships meet the same qualification standards and quality control levels as the originals. As originally drafted, the Authorization bill required only that aircraft spare parts meet these standards. MMA members received a special report dated April 15, 1988, which detailed how Congressman **Frank McCloskey** gave his support for broadening the bill to include ship spare parts.

Under the procedures governing House consideration of the Authorization bill, the amendment was grouped with other noncontroversial amendments, which were then offered as a package by Congressman **Les Aspin**, Chairman of the Armed Services Committee. The vote on passage of these amendments, including MMA's amendment, was 367-4.

For more information on the Marine Machinery Association,

Circle 21 on Reader Service Card

Shipyard 'Pride Program' Instituted At PSRY —Brochure Offered

As part of a joint effort of the Portland Metal Trades Council and the Port of Portland Ship Repair Yard (PSRY), a "Pride Program" has been instituted at the yard to instill pride and confidence in workers as well as call attention to Portland's shipbuilding and ship repair heritage.

Large-scale commercial ship repair in Portland commenced in 1903, when the first drydock between San Francisco and Seattle took shape in a sheltered cove on the east side of the Willamette River. Ship repair activities remained at this site until 1953, when they were consolidated at the northern tip of Swan Island. These facilities, which have been modernized and rehabilitated along with major new facilities, including one of the largest drydocks on the West Coast, give Portland one of the most efficient and modern shipyards in the country.

The facilities at PSRY, a $250-million investment, are publicly owned. Contractors rent the facilities as needed.

Using the theme "100 Years of Ironclad Integrity," the "Pride Program" calls attention to the fact that there are second and third generations represented in the highly skilled and motivated work force at the shipyard, carrying on a tradition of quality work with integrity—traits forged by their ancestors. The "100 Years" theme looks back to the start of ship repair activities in Portland, and also looks to the future and a new century of confidence in the continued success of PSRY.

For free literature giving full details on PSRY's facilities and capabilities,

Circle 30 on Reader Service Card

$250-Million Order For 12 Reefers Given To Klevens Shipyard

Gustaf Erikson AB, the Finnish shipping company, has ordered 12 new refrigerated ships costing $250 million.

The Norwegian Klevens Shipyard is scheduled to deliver six of the ships within the next two years, and the other six by 1991.

As a result of the creation of the Norwegian International Sea Register last year, the new ships will probably sail under the Norwegian flag. Erikson currently has 11 medium-sized refrigerated ships sailing under the Cypriot flag.

Ward Offers Brochure On Manufacture Of Marine Components

The Ward Machinery Company of Cockeysville, Md., manufacturers of components and systems for the military and commercial markets, is offering a free 12-page, full-color brochure describing the company's facilities and capabilities.

Discussed are the precision machining Ward can perform in its state-of-the-art machine shop with more than 50 machine tools including 18 numerically controlled; the 40-member engineering department; the industrial engineering department; and quality assurance.

Among the products mentioned in the publication are the Sea Plow V, capable of handling the world's largest-capacity trans-Atlantic telecommunications cable; and the Waterjet Propulsion Pump Assemblies, of which Ward is the sole manufacturer, used to power and steer causeway pontoons.

Since 1983, Ward has played an important role in the U.S. Navy's Sealift Support Facilities Program and is now offering the Waterjet Propulsion Pump used in this program to NATO navies and commercial concerns.

For more information and a free copy of the 12-page full-color brochure from Ward Machine,

Circle 46 on Reader Service Card

Conrad Industries Delivers 650-Ton-Capacity Drydock To French West Indies

A drydock built by Conrad Industries, Inc. of Morgan City, La., has arrived for service in Pointe-A-Pitre, Guadeloupe, French West Indies. Chief executive officer **J. Parker Conrad** said the 650-ton-capacity structure contracted by Naval Drydock Guadeloupe will be used to drydock and repair both pleasure and cargo vessels.

With an inside clearance of 42 feet and wingwalls of 14 feet, the vessel measures 90 by 50 feet with a hull depth of 7 feet.

In addition to its expanding international market, Conrad Industries is experiencing a viable increase in its domestic market base. In for repairs and offseason maintenance recently was a Morgan City-based fleet of menhaden boats that work the Gulf.

New vessel deliveries recently include a barge measuring 135 by 55 feet with a hull depth of 8 feet.

Conrad completed mud conversion and reconditioning on two supply vessels recently. The vessels are now contracted for work in offshore drilling and exploration in the Gulf of Mexico.

Another recent delivery was a 900-ton-capacity floating drydock measuring 120 by 52 by 7 feet with 15 by 3-foot wingwalls.

For more information and free literature on Conrad Industries,

Circle 38 on Reader Service Card

Maersk Agrees To Buy JGC Enterprises Corp.

An agreement to buy the parent company of Universal Maritime Service Corp., one of the largest marine terminal operators in the Port of New York and New Jersey, was recently signed by Maersk Inc.

Maersk, one of the world's largest containership operators, and Universal's parent, JGC Enterprises Corp., did not disclose terms of the accord.

Jotun Cathodic Protection Wins R&D Contract From Conoco Norway Inc.

Conoco Norway Inc. has signed a research contract worth 1.32 million NOK (about $214,500) with Jotun Cathodic Protection A/S (JCP) (formerly Skarpenord Corrosion A/S) in Langesund, Norway. The experimental work will be carried in cooperation with Marintek, at their seawater laboratory in Sandefjord.

The objective of this research project, which is entitled Cathodic Protection Optimization, is to study the synergistic effects of cathodic protection and organic coating systems on long-term corrosion protection of submerged offshore structures.

For free literature on Jotun Cathodic Protection A/S,

Circle 43 on Reader Service Card

Damen Shipyards B.V. To Build Fishing Boats For Northern Ireland

Damen Shipyards B.V. of Gorinchem, the Netherlands, have received an order to build two fishing boats for shipowners in Northern Ireland. The new trawlers are intended for single and pair trawling.

The 75-foot trawlers are equipped with a shelter deck to enhance workability. They are powered by a Caterpillar diesel engine with a rated output of 705 horsepower. In addition, the vessels are fitted with advanced navigation, fish-finding and communication equipment.

For free literature on Damen Shipyards,

Circle 42 on Reader Service Card

Jered Brown Names Caskey And Fedorko To Management Positions

Maurice R. Caskey | Michalina E. Fedorko

Maurice R. Caskey has been appointed director of program management and **Michalina (Michey) E. Fedorko** has been named manager of customer support at Jered Brown Brothers, Inc. a Troy, Mich., engineering and manufacturing company.

Mr. **Caskey** joins Jered Brown Brothers after a 2-1/2-year stint as a management consultant in Pascagoula, Miss. He was with Ingalls Shipbuilding in Pascagoula for 12 years prior to that.

Prior to this appointment, Ms. **Fedorko** had been sales manager for the company's parts and service group based in Auburn Hills, Mich. She held prior posts at General Magnetic Corporation in Dallas and the Department of Justice (Office of Attorney General) in Washington, D.C.

As customer support manager, Ms. **Fedorko** will be responsible for the support of both Jered and other Vickers Marine Engineering Division companies in service. This includes spare parts, provisioning documentation, and field service.

Delegation From China Visits Sperry Marine

Shown above during the recent visit to Sperry Marine headquarters in Charlottesville, Va., are, left to right: Sperry marketing manager **Nolasco Da Cunha; Shi Youkui,** Navy Equipment Department (NED); **Guo Bingyi,** CSSC System; **Tan Zhenfan,** HSEI; **Ken Bowes,** Sperry Marine manager for market development; **Hao Yanling,** HSEI: **Luo Chao,** chief delegate, HSEI: **Shi Weizhong,** Commission of Science; **Shan Fulin,** NED; and Sperry marketing manager **George X. Tsirimokos.**

A seven-member delegation from China's Harbin Shipbuilding Engineering Institute (HSEI) recently traveled to Sperry Marine Inc.'s main headquarters in Charlottesville, Va., to discuss Sperry's new Integrated Bridge System and one of its key components, the RASCAR touch-screen radar and ARPA.

Hosted by Sperry Marine manager for market development Ken Bowes and marketing managers Nolasco Da Cunha and George Tsirimokos, the group was shown how Sperry's new Integrated Bridge can help modernize bridge equipment in China's growing shipbuilding program.

For full information on Sperry Marine Equipment,

Circle 86 on Reader Service Card

Marine Travelift 35BFM Mobile Hoist Available With Four-Wheel Drive

The 35BFM mobile boat hoist from Marine Travelift, Inc., offers an optional four-wheel drive feature that is available on the 15-, 25-, 35-, and 50-ton capacity hoists.

The 35BFM allows operators to serve customers faster, more efficiently and more economically. It features an open-end beam forward design with all slings power adjustable from the enclosed operator's compartment. The unit has a four-hoist winch design with double the hoist speed of previous comparable models and independent hoist control of all four corners.

The four-wheel drive option provides hydrostatic direct drive on all wheels for improved traction, adding extra gradeability and rough-terrain mobility to the units.

For complete details on the Marine Travelift 35BFM, four-wheel drive system, or their complete line of mobile boat hoists with capacities from 15 to 500 tons,

Circle 69 on Reader Service Card

MarAd Approves $21-Million Sale Of Three Supertankers To Belmont VLCC Of Boston

The sale of three supertankers to Belmont VLCC, Boston, for a total of over $21 million has been approved by the Maritime Administration.

All three vessels weigh over 264,000 deadweight tons, and all were built with construction subsidy in the mid-1970s.

Belmont will acquire the Massachusetts from Boston VLCC Inc. for $6 million and will pay MarAd $7.1 million for the New York and $8.1 million for the Maryland.

The New York and the Maryland were acquired by MarAd following foreclosure proceedings.

Watercom Offers Extra Convenience Of Fax Machine Message Transmission —Literature Available

Subscribers to Watercom are discovering a unique feature of the only direct dial, marine telecommunications system available. They're discovering that Watercom operates with facsimile (FAX) machines.

Prior to the advent of Watercom, essential vessel information had to be transmitted verbally or through the mail. Errors frequently occurred through misunderstanding of verbal information, and delays of up to two weeks were commonplace when sending information via regular mail. Now a vessel captain can transmit exact copies of information in less than a minute and retain the originals for his records.

John G. Smith, vice president of marketing and sales for Watercom, said the company's customers see FAX capability as an efficient, money-saving tool. Vessel captains find FAX machines especially convenient, because they can transmit information after regular business hours or on weekends, and they can send up to 99 copies of reports during one transmission.

New, state-of-the-art FAX machines currently in use with Watercom are similar to copy machines. The FAX machines at the home office may be placed on "auto record," allowing the captain to transmit when he has time. When he is ready to transmit, he enters the home office FAX number on the Watercom keypad. After receiving a tone, he pushes a button on the FAX machine and begins his transmission. The information transmitted will then be available to home office personnel when they arrive the next morning, after a holiday or weekend.

Reports which may be transmitted using FAX include: boat order; deck logs; tow diagrams; vessel status; fuel levels; engineer logs; requisitions; personnel records; and for insurance claims, even photographs of boats or tows that have been damaged.

Richard A. Baker, president of Waterway Communications Systems, Inc., commented, "The time and communications cost savings our customers realize when they purchase FAX in conjunction with Watercom are significant. There is no chance of misunderstanding, saving the vessel captain time and the company money."

Watercom commenced commercial service in March 1987, along 4,000 miles of inland waterways, including the Mississippi, Ohio and Illinois rivers, as well as the Gulf Intracoastal Waterway.

For further information and free literature,

Circle 70 on Reader Service Card

Sensitive Regulator From Circle Seal Assures Accuracy For Corrosive Or Ultra-Pure Fluids

A highly sensitive pressure reducing regulator from Circle Seal, called the PVR Series, is said by the manufacturer to be ideal for corrosive or ultra pure fluids. Its design, featuring a large diaphragm and small seat, provides performance equal to constant bleed type regulators.

Made with a rigid PVC body, Teflon diaphragm, Kel-F seat with synthetic sapphire ball, and 316 stainless steel or Monel trim, the PVR regulator provides outstanding corrosion resistance.

Five pressure ranges are available to assure sensitive, accurate control of outlet pressures: from 2 inches to 18 inches of water, 0 to 6 psi, 0 to 20 psi, 0 to 40 psi and 0 to 60 psi. Inlet pressures are to 3,000 psi. It can also be supplied for back pressure regulation for inlet pressures to 60 psi. Flow capacity is Cv = .001; ESEOD = .025 inch. Withstands temperatures from 0 F. to +125 F. One-quarter-inch female pipe ports. Panel mounting is optional.

These sensitive and accurate regulators are ideally suited for use in chromatography, process stream sampling, bubbling operations, calorimetry, instrument calibration and in research laboratories where systems require a high degree of sensitive pressure control.

For more information and free literature from Circle Seal Controls,

Circle 78 on Reader Service Card

Shipmate Introduces RS-8100 Handheld Radiotelephone

Robertson-Shipmate, Inc. of Hauppauge, N.Y., recently introduced a new full-featured, synthesized marine VHF/FM radiotelephone, the RS-1800, with all functions controlled directly from the compact plug-in handset. A second identical handset is standard, thereby providing the additional benefit of a built-in intercom. All other electronics are contained in a "hideaway" box that can be installed in any convenient location.

The RS-1800 is an advanced system, with simplex/semiduplex operation, all U.S., International and Weather channels, dual watch, scanning of all or any 10 preprogrammed channels, display and keyboard backlighting, remote splash-proof speakers, built-in P.A. and hailer capabilities, main station priority, and rugged spray resistant construction that permits handset installation in even the most exposed locations.

For complete information and free literature on the new RS-1800,

Circle 66 on Reader Service Card

Gulf Coast Fabrication Delivers Fuel Barge

Gulf Coast Fabrication, Inc., recently completed the 75,000-barrel fuel barge Tesoro Energizer at their Port Bienville shipyard.

The barge, which has an overall length of 340 feet, beam of 90 feet and draft of 19 feet 3 inches, will carry gasoline and diesel fuel from Alaska to Hawaii for her owner, Pacific Hawaiian Line, Inc., of Portland, Ore.

Gulf Coast Fabrication operates shipyards in Pass Christian and Port Bienville, Miss. The Tesoro Energizer is the 72nd vessel delivered by the company since its founding in 1981.

For free literature fully detailing the construction facilities of Gulf Coast Fabrication,

Circle 29 on Reader Service Card

Versatile Pacific Receives C$17-Million Contract To Build Survey Ship

The Vancouver Division of Versatile Pacific Shipyards Inc. has been awarded a C$17-million contract by the Canada's Department of Fisheries & Oceans to build a hydrographic survey vessel.

The vessel will have an overall length of 168 feet, breadth of 34.4 feet, depth of 16.4 feet and full displacement of 818 tons.

The ship is scheduled to be completed 16 months from acceptance of the final design.

For free literature detailing the shipbuilding and ship-repairing facilities and services of Versatile Pacific Shipyards,

Circle 56 on Reader Service Card

Electrocatalytic Offers New Capability Brochure

Electrocatalytic, Inc. (Elcat) recently announced the completion of the their new capability brochure.

The eight-page, full-color brochure contains important information concerning Elcat's products, technical and research capability and manufacturing expertise. A comprehensive list of sales representatives and worldwide offices are included along with a logistical map. The thrust of the brochure is centered on products, quality, a highly trained technical staff and a worldwide service network.

Elcat products described in the attractive brochure are Chloropac®, used to prevent marine fouling in offshore facilities, ship cooling systems, land-based power and petrochemical plants and Capac® cathodic protection systems for the prevention of corrosion on most wetted structures, particularly ship hulls in the naval and commercial markets.

For additional information and a free copy of the new capability brochure from Elcat,

Circle 55 on Reader Service Card

Simrad Receives Canadian Contract —Literature Available

Mesotech Systems Ltd. of Vancouver, a Simrad subsidiary, has been awarded a contract by the Canadian Hydrographic Service to supply the Simrad EM100 Multibeam Echo Sounder for two of their vessels, the Louis M. Lauzier and a newbuilding.

CHS will use the new equipment to improve the quality of their navigational charts and plan to start in the Gulf of St. Lawrence.

The EM100 continuously measures water depth with 32 sharp beams and thus covers a swath width of 2.5 times the water depth. Measurements are compensated for all vessel movements as well as ray-bending due to sound velocity variations.

For more information and free literature on the Simrad EM100 Multibeam Echo Sounder,

Circle 75 on Reader Service Card

Circle 289 on Reader Service Card ➔

Houston Ship Repair Busy With Work —Literature Available

Houston Ship Repair, Inc., headquartered in Channelview, Texas, operates facilities at Brady Island (Port of Houston), Galveston, Orange and Corpus Christi, Texas.

The company's Houston Ship Channel berth on Brady Island accommodates ships up to 780 feet, with full utilities, a 25-ton-capacity tower crane and complete workshops.

The Brady Island facility just completed topside repairs, lay-up and systems draining on the Chesapeake under a $299,985 contract from the Maritime Administration. Additionally, the facility completed work on the tanker Mount Washington under a $549,000 contract awarded to Houston Ship Repair.

The Orange, Texas, facility offers two working berths that can accommodate ships up to 700 feet in length, has full utilities, a 50-ton-capacity floating crane and complete fabrication and machine shops.

The company's Galveston facility handles full topside repair, cleaning and oil spill clean-up services.

At Houston Ship Repair, experienced and reliable personnel handle all phases of ship repair, diesel repair and reconditioning (the company is a licensed service representative for MAN B&W Diesel and Sulzer engines), electric motor rewinding and trouble-shooting, cleaning, exterior painting, and tank lining.

For free literature fully detailing the ship repair and service facilities offered by Houston Ship Repair,

Circle 62 on Reader Service Card

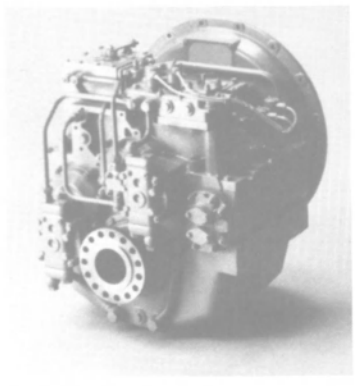
Gotaas-Larsen Sells Two Large Tankers

The sale of two very-large crude carriers to an unspecified buyer described as a substantial London-based Greek company was recently announced by Gotaas-Larsen Shipping Corp.

Both vessels, the 1972-built Golar Kansai and the 1974-built Golar Kanto, were built in Japan and have a capacity of 215,000 deadweight tons. They will be delivered to their new owners during the second quarter of 1988, after completion of their current voyages. Gotaas did not disclose the sales price.

Gotaas-Larsen is an international shipping group with a fleet (existing and on order) of 32 modern vessels, including nine cruise ships, five liquefied natural carriers, and 18 other cargo vessels.

ZF Introduces Trolling Valves For Transmissions



ZF of North America, Inc., recently announced the introduction of trolling valves for models BW-250 (-S) and BW-255 (-S) marine transmissions.

The trolling valves provide the ability to obtain slower than normal propeller shaft speeds than what are normally available at engine idle speeds. Consequently, operation in "no wake" zones is easier.

The BW-250 family of marine transmission includes a propeller shaft-driven auxiliary lube oil trailing pump as a standard feature. The feature can allow ZF customers to obtain longer cruising ranges in multiple engine boats by permitting operation under single engine propulsion while the other engines are stopped.

For more information and free literature from ZF of North America,

Circle 32 on Reader Service Card

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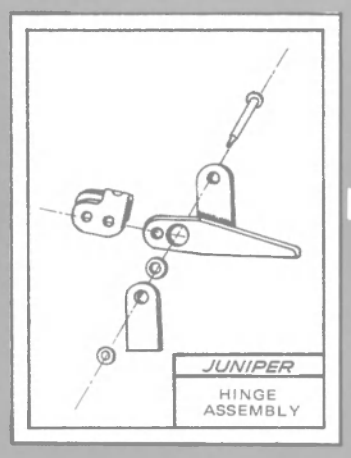
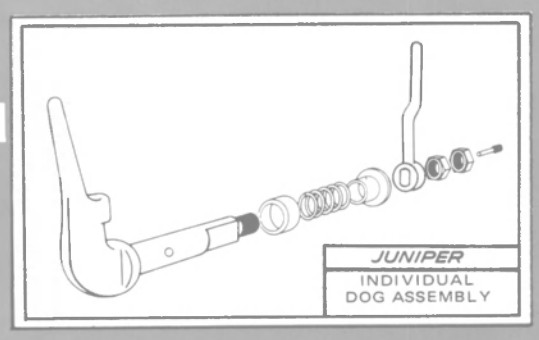
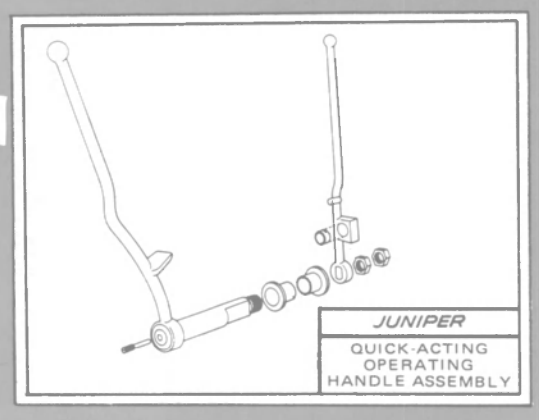
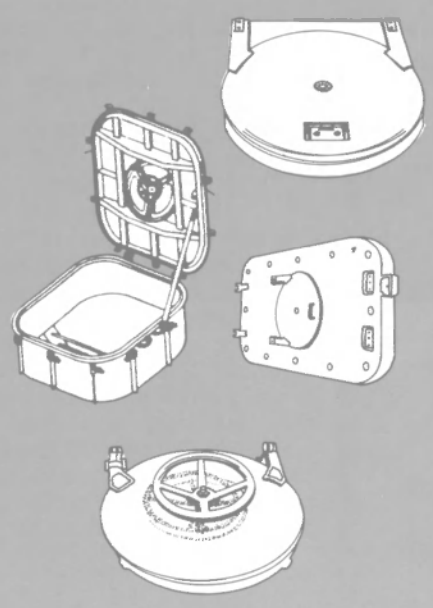
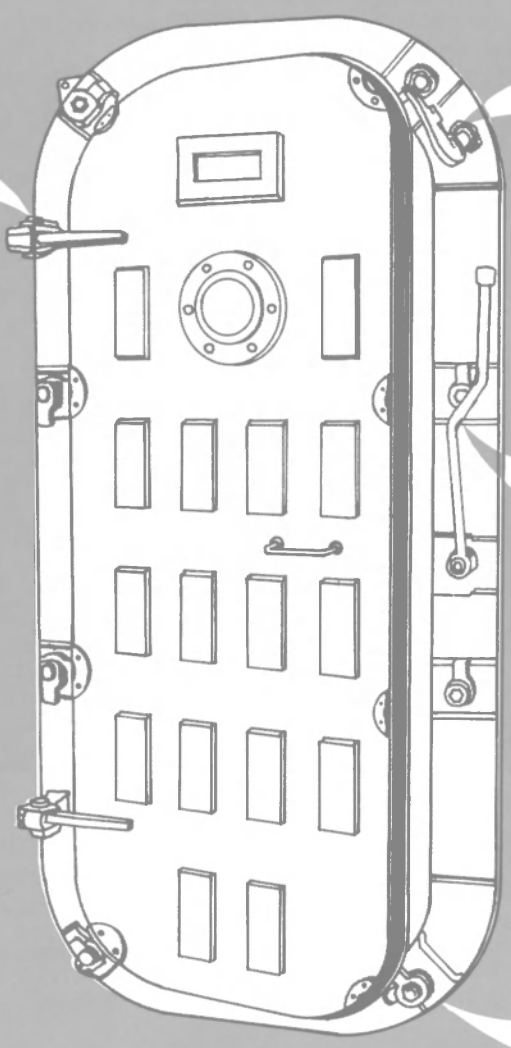
loves it when a plan comes together...

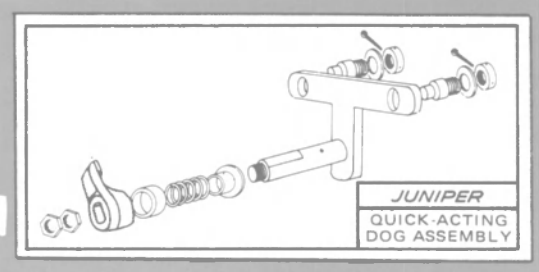












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Stewart & Stevenson Expands Diesel Engine Sales/Service Network

Named Exclusive Distributor Of EMD Engines In 10-State Area, Mexico And Central America

Stewart & Stevenson Services, Inc., Houston, Texas, recently announced that the firm has been appointed the exclusive distributor for General Motors Electro-Motive Diesel (EMD) engines in a 10-state area, as well as Mexico and Central America. In a second announcement, the company also outlined plans for a major expansion of its marine and oil industry engine sales and service operation in southern Louisiana.

According to **C. James Stewart II,** chairman of the board of Stewart & Stevenson, the company has been appointed the exclusive distributor for General Motors Electro-Motive Diesel (EMD) engines in a 10-state area along the western Gulf of Mexico and in the Rocky Mountain area as well as throughout Mexico and Central America. Mr. **Stewart** also referred to the company's long association with General Motors Diesel engines and noted Stewart & Stevenson's extensive experience in building equipment powered by EMD engines and as a specialist in complete EMD engine repair and overhaul.

"This distributorship opens a whole new era in our capabilities and services for both domestic and international customers," said Mr. **Stewart.**

The territory includes the states and coastal waters of Texas, Louisiana, Mississippi and Alabama, and encompasses a large portion of the Mississippi River. Other states in the distributorship include: Colorado, New Mexico, Kansas, Oklahoma, Arkansas and Tennessee, as well as all of Mexico and Central America.

In addition to the distribution, Stewart & Stevenson will continue to supply and service EMD-powered systems for both land and offshore drilling rigs, generator sets for prime and standby power applications as well as ship service, and for propulsion of supply boats and tug boats.

Mr. **Stewart** also announced that the firm opened new operations on the Harvey Canal site in southern Louisiana, which would expand its marine and oil industry engine sales and service. The site was formerly occupied by George Engine. Stewart & Stevenson will acquire certain assets of the operation from the Detroit Diesel Corporation.

The company will be the authorized sales and service representative for Detroit Diesel engines and products of the Allison transmission and Electro-Motive Diesel (EMD) divisions of General Motors.

Primary industries to be served by the new center will be oceangoing vessels, fishing and workboats and both inland and offshore drilling and production operations.

Ralston Cole has been named branch manager at the Harvey facility. **David Whisenhunt** will be the eastern region manager responsible for the Harvey location as well as the firm's Houston and Beaumont branch operations.

Bob H. O'Neal

In other company news, **Bob O'Neal** was elected president of Stewart & Stevenson Services, Inc., succeeding the late **Thomas H. Langham.** Mr. **O'Neal** was also appointed to the board of directors of Stewart & Stevenson.

Mr. **O'Neal,** who has been with Stewart & Stevenson for over 23 years, has extensive knowledge of the company and its products. Prior to his appointment as president, he was vice president in charge of the company's Engineered Power Systems Division with responsibility for manufacturing and sales of diesel and turbine-powered products.

For free literature detailing Stewart & Stevenson's marine and oil industry engine sales and services,

Circle 19 on Reader Service Card

Central Gulf Lines Awarded $25-Million Contract By MSC

Following a competitive procurement, the Navy's Military Sealift Command has awarded a firm-fixed price contract in the amount of $25,074,939 to Central Gulf Lines, Inc., of New Orleans, La., for the time charter of the M/V Woerman Mercur. The dry cargo ship will be reflagged to the United States and renamed prior to delivery to the Military Sealift Command, on or before October 31, 1988, and will be used to transport Department of Defense cargo from the U.S. West Coast to mid-Pacific islands and Far East ports. Itineraries include Midway and Wake Islands and other areas where there is little or no commercial service. The contract performance period is 17 months with two 17-month options.

Sperry Marine Awarded Submarine Navigation Radar Contract

Sperry Marine Inc. has been awarded a multiyear contract by the U.S. Navy for the design, development, and production of a new submarine navigation radar.

"This is one of the largest programs we have ever received," said **Guy S. Barnocky,** program manager for military radar. "It will utilize the latest in radar technology in both RF and digital circuitry and techniques."

The system, which includes a new radar mast design for hoisting the antenna, will interface with other electronic systems onboard the submarine.

According to Mr. **Barnocky,** the first two years in the contract are valued at $7.2 million and cover the development effort. The following year is a test and evaluation period followed in turn by three fiscal years of production awards totaling 12 units per year. When funded, the total contract is valued at $27.5 million.

Sperry Marine Inc., a subsidiary of Newport News Shipbuilding, was awarded the contract after bidding against several major defense firms.

For more information and free literature on Sperry Marine,

Circle 31 on Reader Service Card

McDermott Awarded $10.9-Million Contract To Build Navy Test Craft

McDermott Shipyards, Amelia, La., was awarded a $10.9-million U.S. Navy contract to construct a Torpedo Test Craft (YTT). The work is expected to be completed in May 1990. The Naval Sea Systems Command awarded the contract (N00024-88-C-2093).

Rexroth Introduces New Hydraulic Radial Piston Motor—Literature Available

The Rexroth Corporation of Bethlehem, Pa., has introduced a new hydraulic radial piston motor, the Rexroth/Calzoni, Model MRP, Series motor designed for pressure to 3,050 psi (210 bar) continuous duty, with 3,625 psi (250 bar) intermittent pressure, and 4,600 psi (315 bar) peaks.

The motor is available in seven sizes: 12.2 in^3/rev (200 cm^3/rev) maximum speed 650 rpm; 15.3 in^3/rev (250 cm^3/rev) maximum speed of 600 rpm; 18.3 in^3/rev (300 cm^3/rev) maximum speed of 600 rpm; 27.5 in^3/rev (450 cm^3/rev) maximum speed of 510 rpm; 36.6 in^3/rev (600 cm^3/rev) maximum speed of 475 rpm; 48.8 in^3/rev (800 cm^3/rev) maximum speed of 430 rpm; and 61.0 in^3/rev (1000 cm^3/rev) maximum speed of 400 rpm.

This motor features increased maximum speeds, high starting torque, excellent overall efficiency, and extremely low noise. The splined and female shafts are standard and these motors are bi-directional. SAE flanged connections, and electronic speed transducers are optionally available on the economical and rugged MRP design.

The Rexroth Corporation is a major manufacturer of hydraulic components and electronic controls.

For more information and free literature,

Circle 33 on Reader Service Card

Spears Associates Gets $5.3-Million Contract For Navy Antenna Systems

Spears Associates, Inc., Norwood, Mass., was awarded a $5.3-million U.S. Navy contract modification for the manufacture of operational and training Towed Buoy Communications Antenna Systems in support of the Navy's Trident submarine program.

Spears Associates is a major supplier of undersea, surface and airborne antenna and communications equipment for the U.S. Navy and Air Force.

For free literature on the products offered by Spears Associates,

Circle 57 on Reader Service Card

ELECTRONICS UPDATE

Trimble Introduces NavGraphic Loran Track Plotter, And New Digital Version Of 10X Loran

Trimble Navigation of Sunnyvale, Calif., recently introduced a new product, the NavGraphic loran track plotter, as well as a new digital version of their 10X loran.

The NavGraphic loran plotter enables a navigator to see at a single glance where he is relative to significant waypoints, hazards, and intended course, where he'll be in one hour maintaining current speed and heading, and where he's been. One can choose the appropriate visual (1 mile to 125 miles or the entire route) and a graphics and text screen that can be seen from 15 to 20 feet away. A convenient waypoint and route library is available for easy data review and retrieval. Waypoints can be named and/or numbered. Symbols are also available for quick recognition of types of waypoints and routes. Once the NavGraphic is set up, there is no need to manipulate the unit again, unless you want to make a change or adjust the brightness and contrast or reverse out the screen for easy night viewing.

The NavGraphic is easy to install, easy to support, and easy to expand with simple plug-ins to other onboard instrumentation.

The new digital 10X loran from Trimble was developed specifically to address the problem of dealing

NavGraphic loran track plotter.

with environmental anomalies, signal jammers, and interference of all types. The digital architecture of the new receiver provides consistency and precision in signal processing, while 100 fixed notch filters and eight spectrally tuned notch filters work hand in hand to create a loran that not only expands the overall utility range of loran coverage by tracking very weak signals, but also improves the repeatable accuracies of the loran answers.

Digital version of Trimble's 10X loran

A secondary benefit of Trimble's digital approach to receiver design is that only half the number of parts are required, allowing reduction in size and a major reduction in the number of things that could go wrong. According to the manufacturer, reliability is greatly enhanced with a digital architecture.

For more information and free literature on Trimble's NavGraphic loran plotter,

Circle 16 on Reader Service Card

For free literature giving complete information on the new digital 10X loran from Trimble,

Circle 17 on Reader Service Card

Conrad Industries Sees Signs Of Optimism In Offshore Industry

Supply boats, some of which have been anchored since the early 80s, are going back to work in the offshore drilling and exploration industry in the Gulf of Mexico, according to Conrad Industries of Morgan City. La.

The yard recently completed a renovation and liquid mud conversion on one vessel that is now working, and a second vessel now being similarly renovated and converted will be on assignment when the conversion work is complete.

Noting optimism on the new viability of the offshore industry, Conrad's CEO **J. Parker Conrad** said the Point Sally (nee Ada Lee Fagan) is working, and the Point Mark (nee Grady Fagan) is scheduled for assignment. The vessels are operated by Point Marine, Inc. of Morgan City.

The Point Sally is 166 by 38 by 13 feet, and the Point Mark is 180 by 38 by 14 feet.

According to data compiled by Offshore Fleet Economics (OFE) and reported in Offshore Data Services, the demand for supply vessels over 150 feet with liquid mud capability is steadily increasing. During a recent week, 191 vessels out of a fleet of 203 were working for a 94 percent utilization rate. The survey conducted by OFE involved 33 companies situated along the Gulf Coast who own and operate support vessels.

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

Circle 37 on Reader Service Card

Electro-Motive Awarded USCG Engine Contract Worth $9.2 Million

The U.S. Coast Guard has awarded a $9.2-million contract to the Electro-Motive Division (EMD) of General Motors for 32 marine propulsion engines, as part of an ongoing program to modernize existing Coast Guard vessels which are used throughout the coastal waters and the Great Lakes.

Among other considerations, the EMD propulsion units were selected because of their demonstrated reliability. The Coast Guard currently has eight vessels which have been repowered with EMD engines.

For free literature describing the complete line of marine propulsion engines offered by the Electro-Motive Division of GM,

Circle 28 on Reader Service Card

Free 8-Page Brochure Offered on Airjax Marine Ventilators

F.M.I. Engineered Sales Co. of Ramsey, N.J., representative for Airjax marine ventilators, is offering an eight-page brochure on Airjax air movers, which have been described as "a better mousetrap."

Airjax ventilators are available in various mounts, portable hand-held free-hanging mount, female or male thread and flange mount, including Airjax Model "C" designed to mate with the standard "butterworth" opening.

The ventilators are all-aluminum construction, meet OSHA requirements, and are very portable (approximately 34 pounds).

For more information and a free copy of the brochure on Airjax portable marine ventilators,

Circle 24 on Reader Service Card

Meyer Werft Awarded $150-Million Contract To Build Cruise Ship

Meyer Werft, Papenberg, West Germany, was recently awarded a $150-million contract to build a 1,400-passenger cruise ship for Chandris Fantasy Cruises.

The 45,000-grt ship will have 680 cabins. Seating for over 1,000 passengers will be provided in the vessel's two dining saloons and the two-deck show lounge will have modern sound and light systems providing what is described as "a new generation of shipboard entertainment."

The vessel is expected to be delivered in the spring of 1990. Chandris plans to use the ship in Caribbean service.

The contract boosts Meyer Werft's present orderbook to three passenger ship newbuildings and one ferry lengthening.

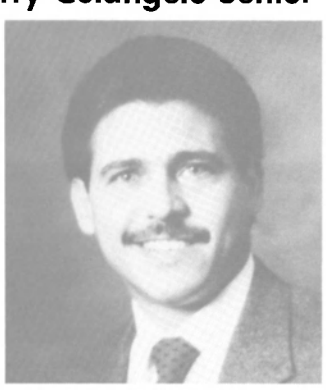
For free literature on the shipbuilding services of Meyer Werft,

Circle 48 on Reader Service Card

Navy Awards $14-Million Contract To Northwest Marine

Northwest Marine Iron Works, Portland, Ore., has been awarded a $14-million Navy contract for the regular overhaul of the USS Okinawa (LPH-3). The work is expected to be completed January 27, 1989. The contract was awarded by the Supervisor of Shipbuilding, Conversion and Repair, San Diego, Calif. (N00024-85-H-8197).

SPD Technologies Names Larry Colangelo Senior VP



Larry A. Colangelo

Larry A. Colangelo was recently elected senior vice president and chief financial officer at SPD Technologies.

In his new position, Mr. **Colangelo's** responsibilities are expanded to include external business acquisitions, internal product development projects, inventory management, productivity, producibility and cost improvement programs. He continues to be responsible for all aspects of finance, contracts, legal administration and management information systems.

He previously served as vice president and chief financial officer. He had been vice president and controller for Gould Inc., Systems Protection Division prior to last year's management buy out of the unit to create SPD Technologies.

Prior to that, he held a succession of management positions with Gould, including manager, financial planning and analysis; manager, cost and budget; manager of production and inventory control; manufacturing manager; director of operations engineering and director of manufacturing. He had been with Gould since 1979.

Mr. **Colangelo** previously held various financial positions with Rockwell International and also was manager, government manufacturing for RCA's Government Communication System Division.

SPD Technologies is a world leader in the design, development and manufacture of electronically controlled electrical systems protection equipment for military applications and other harsh operating environments. Headquartered in Philadelphia, the company has service operations across the U.S.

The CW3 Harold C. Clinger, the second in a series of four landing support vessels being built by Moss Point Marine for the U.S. Army, is propelled by two GM-EMD 16-1645-E2 diesel engines.

Moss Point Marine Delivers Second Of Four Army Landing Craft

Moss Point Marine, Inc., has delivered the CW3 Harold C. Clinger (LSV-2), the second of four 273-foot logistic support vessels being built by the Escatawpa, Miss., shipyard for the U.S. Army in a $40.7-million contract.

The ship is the second of a new class landing craft with roll-on/roll-off (RO/RO) capabilities which permit their use where there are no ports. The RO/RO capability is made possible by bow and stern ramps which enable off-loading of cargo to undeveloped beaches and unloading from other vessels or wharfs.

The CW3 Harold C. Clinger is equipped with an on-board computer linking it with logistic data files at U.S. Army and Navy stock points.

The all-steel landing ship is 273 feet in length with a 60-foot beam and 16 foot-five inch depth. Propulsion is provided by two General Motors EMD 16-1645-E2 diesel engines. She can transport between 900 and 2,000 short tons of cargo depending on the type of operation. The LSV is capable of approximately 12 knots sustained speed and has a range of over 5,500 nautical miles at loaded displacement. It has a crew of six officers and 24 enlisted personnel.

All living quarters are above the main deck, away from the noise and intensity of work areas. Crew quarters are two and four-person staterooms, and officer quarters are near the bridge and damage control areas.

The ship is named in honor of Army Chief Warrant Officer Harold C. Clinger, who was killed on active duty in Korea in February 1986.

The Clinger has been assigned to the U.S. Army WESTCOM, 605th Transportation Detachment, Ford Island, Hawaii.

The Army contract was awarded by the Navy's Military Sealift Command and is being administered by the Navy's Supervisor of Shipbuilding, Conversion, and Repair (SUPSHIPS) in Pascagoula, Miss.

John Dane III, president of the Trinity Marine Group which includes Moss Point Marine, Inc., said the two remaining sister ships will be delivered at approximate 60-day intervals.

The Trinity Marine Group is owned by Trinity Industries, Inc., Dallas, Texas. Other shipyards in the group are Halter Marine Inc.'s facilities in Moss Point, Miss., and Lockport, La., Equitable Shipyards, Inc.'s plants in New Orleans and Madisonville, La., and Gretna Machine and Iron Works Inc., in Harvey, La.

For free literature on the shipbuilding facilities and services of the Trinity Marine Group,

Circle 14 on Reader Service Card

Powered by four GE LM2500 gas turbine engines, the USS Normandy (CG-60) is the third Aegis cruiser built by Bath Iron Works.

Bath Iron Works Launches Guided Missile Cruiser 'Normandy'

Bath Iron Works, Bath, Maine, recently launched the USS Normandy (CG-60), the third Aegis guided missile cruiser built by the company, for the U.S. Navy at recent ceremonies.

The Normandy is 567 feet long, has a beam of 55 feet and displaces 9,500 tons. The cruiser is powered by four GE LM2500 gas turbine engines, which enable the vessel to attain speeds in excess of 30 knots.

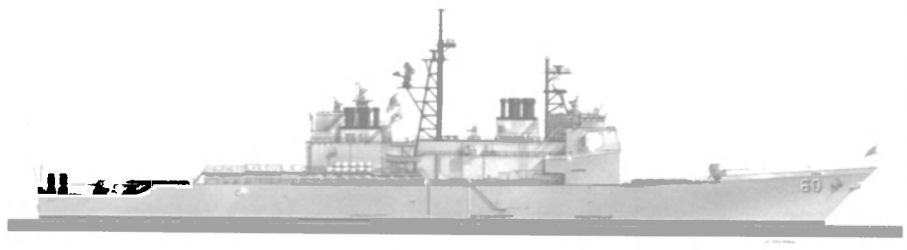
The principal speaker at the ceremony was **John Sheldon Doud Eisenhower,** son of the late President **Dwight D. Eisenhower.** Mrs. **Gayle Wilson,** wife of California Senator **Pete Wilson,** was the ship's sponsor.

The Normany is a Ticonderoga (CG-47) Class cruiser built to provide the primary anti-air warfare protection for the U.S. Navy's battle forces. Equipped with the Aegis combat system, the ship will be able to detect, track and destroy enemy aircraft, missiles, submarines and surface ships.

The Normandy is named in commemoration of the invasion of the Normany, France beaches by the Allied Expeditionary Force during World War II. She is the first U.S. Navy ship to bear that name.

For free literature completely describing the shipbuilding services provided by Bath Iron Works,

Circle 49 on Reader Service Card



National Specialty Offers Free Literature On Full Line Of Marine Products

National Specialty Products of Houston, Texas, is offering free literature on the full line of marine products available from the company.

Included are 40-, 50-, and 60-foot aluminum truss gangways with options of stanchions, rope or aluminum handrails, cleats or curved treads and roller wheels. All gangways are constructed with stainless steel hardware and welded construction. Anti-skid deck is standard.

Also available are barge gangways of 10 to 30 feet. There are rental gangways up to 50 feet.

Repair on damaged gangways is usually on a 24-hour turnaround unless repair is extensive. Repair cost is approximately 40 percent to 50 percent of original cost.

For free literature on the full line of marine products available from National Specialty,

Circle 39 on Reader Service Card

PetroCom Completes First Cellular/Satellite Phone Service in Gulf Of Mexico —Literature Available

Art Petranek, president of Petroleum Communications (PetroCom), has announced the completion of its Cellular/Satellite telephone service for the entire Gulf of Mexico's marketplace.

PetroCom reports it is the first cellular telephone company in the Gulf of Mexico and first in the world to use satellite and, today, PetroCom is the first to provide total cellular telephone service for the Gulf, making PetroCom the largest cellular telephone company in the world. PetroCom covers 68,000 square miles of Gulf, from lower Mobile Bay, Alabama, to Brownsville, Texas, and extending 150 miles offshore.

More than just a cellular telephone service, Mr. **Petranek** explains, "PetroCom's Cellular/Satellite system is designed to fulfill the needs of anyone conducting business in the Gulf of Mexico." PetroCom's system features Facsimile Machine Interface, Computer Modem Access, Loran-C Vessel Locator, Weather Reporting, Coast Guard 911 Emergency, Three-Way Conference Call, No Answer Transfer or Call Waiting and Call Forwarding. Mr. **Petranek** states, "Our system provides you with clear, private and reliable communications."

For more information and free literature from PetroCom,

Circle 77 on Reader Service Card

Joseph Le Blanc Jr. Retires From Trinity Marine Group

Joseph H. Le Blanc Jr., a nationally known figure in the shipbuilding industry for almost 25 years, recently retired from his post as sales manager of the Trinity Marine Group, which is owned by Trinity Industries, Inc.

Mr. **Le Blanc** joined Halter Marine Services, Inc., in January 1969, as production manager of the New Orleans Division and was later promoted to general manager. In October 1971, he became executive vice president and was named president in December 1977.

He resigned in May 1979, and later became sales manager for Moss Point Marine, Inc.

When that company was acquired by Trinity Industries Inc., in 1987, and **John Dane III,** Moss Point's president, was named president of the Trinity Marine Group, Mr. **Le Blanc** assumed the sales manager's position of the four shipbuilding companies in the group. In addition to Moss Point Marine, the other companies of the Trinity Marine Group are Halter Marine, Inc., Equitable Shipyards, Inc., and Gretna Machine and Iron Works, Inc.

Mr. **Dane** said Mr. **Le Blanc** brought unparalleled experience to his new company and credited him with guiding Halter Marine through much of its growth and acquisitions while increasing its profitability.

Circle 310 on Reader Service Card →

Dynamic Corporation Buys Research, Analysis & Management Corporation

Dynamic Corporation, one of the Washington, D.C., area's leading professional services companies, recently announced that it has acquired Rockville-based Research, Analysis & Management (RAM) Corporation. RAM will operate as a wholly owned subsidiary of Dynamic. Both companies are headquartered in Rockville, Md.

Founded in 1976, RAM is known for its expertise in the areas of naval architecture and marine engineering, program management, systems engineering, technical publications, integrated logistics, and computer systems support to the U.S. Department of Defense and Industry—both nationally and internationally. Included among its customers are some of the nation's leading naval architects and companies who contract with the U.S. Navy, U.S. Army, U.S. Coast Guard and other federal government agencies.

Derecktor Shipyard Lays Keel For First Of Two Tugboats For U.S. Army

"Laying-of-the-Keel" ceremonies for the first of two 128-foot tugboats for the U.S. Army took place recently at Derecktor Shipyard in Middletown, R.I. The ceremony designates the achievement of a major milestone in the planned scheduled construction of the vessel.

The U.S. Army Large Tug's (LT) design offers operational and survival capabilities to meet firefighting, salvage, rescue assistance, ship docking, and barge-handling missions. Inherent features of the LT will provide a high level of maneuverability, superb seaworthiness and optimum efficiency.

The first tugboat, known at the present time as Hull 130A, is scheduled for delivery in July 1989. The tugboats will be named after signers of the U.S. Constitution. The contract could extend for the construction of a total of 10 tugboats if all funding is released to the program.

For free literature giving full information on the facilities and capabilities of Derecktor Shipyard,

Circle 90 on Reader Service Card

Wartsila Diesel Presents Paper At ASTM Symposium

Wartsila Diesel recently presented a paper entitled "Fuel Oil Characteristics That Are Considered Most Important For Modern Marine Diesel Engine Operation And Development" at the ASTM Marine Fuels Symposium held at the Hyatt Regency Hotel in Orlando, Fla.

The paper, authored by **Karl Yannes** of Wartsila Diesel, Inc., Greenwich, Conn., explains how Wartsila Diesel first approached the problems of burning today's residual fuels by designing their diesel engines from the very beginning to cope with poor quality marine fuels over the entire load range from start to stop. As a result of this modern development program and the proven operation of this advanced design, most of the characteristics of residual marine fuel oils that were generally considered important are no longer of importance to the future development of the Wartsila vasa engine types.

The paper goes on to explain how and why fuel oil characteristics, such as aromaticity, will increase in important for modern diesel engine operation and development and what design techniques can be utilized to overcome the problems that may be encountered both now and in the future.

A copy of the paper is available upon request. For your free copy,

Circle 91 on Reader Service Card

Aeroquip Introduces Reusable Fittings For Convoluted Teflon Hose —Literature Available

A leading manufacturer of reusable fittings for over 45 years, Aeroquip is now introducing reusable fittings for Aeroquip convoluted Teflon™ hose, ideal for tough chemical processing and fluid transfer applications.

The reusable fitting features a three-piece, bolt-together stainless steel socket and Aeroquip's patented lead-in nipple which screws into the convolutions of the Teflon tube. Nipples are available in carbon steel or stainless steel, with complete fittings available in sizes -16 (1-inch) and -32 (2-inch) sizes.

Aeroquip reusable fittings can save up to 70 percent on the cost of replacement hose lines. When fitting replacement is necessary, the fittings which are on the equipment and matching bulk hose provide the ability to make any needed hose line. Hose assemblies can be made on the job using a simple Allen wrench.

Detailed information, including assembly instructions, on Aeroquip's convoluted Teflon hose can be found in Bulletin IEB-319. For a free copy,

Circle 41 on Reader Service Card

Hyde Offers Independent Power Unit Systems To Meet SOLAS Requirements

SOLAS Regulation II-1/29.20 requires that all tankers 40,000 gross tons and over fit an independent means of quickly regaining control of the rudder should a single failure occur in the steering gear piping system. The deadline for the steering system upgrades is September 1, 1988.

Hyde Products, Inc., of Cleveland, Ohio, a long-established manufacturer of ship's steering gears and other shipboard machinery, has developed a series of independent power unit systems to meet the SOLAS requirements. More than 60 Hyde IPU systems have been delivered for installation on tankers worldwide.

Hyde offers a series of four standard power units, from 10 to 30 hp, each available in two configurations. Hyde also offers a variety of cylinder-mounted "Fast Acting Valves" which can be fitted to any make or type of steering gear. The Hyde IPU system provides a recharging capability if steering system oil is lost, a rudder-locking capability and limited steering capability within 15 degrees of rudder angle. Hyde's Type "A", two-stage design also provides full rudder torque steering capability to or from the hardover angle without increasing the horsepower requirement. Non-follow up steering control is provided from the steering gear room and, if desired, from the bridge or other locations.

The Hyde systems have been approved by ABS, Lloyd's, the U.S. Coast Guard, NK (Japan) and Bureau Veritas. Steering gears built by most U.S., Japanese and European manufacturers have been upgraded with Hyde IPU Series independent power unit systems. Hyde's highly engineered, efficient design has made its IPU system's price competitive in the world market.

Circle 92 on Reader Service Card

SKF Introduces Keyless Bushing; Will Market Nilos Rings In U.S. —Literature Available

SKF Component Systems has announced the availability of a new mechanical friction joint, the SKF SH-Bushing. Also announced by the company was the organization of a new unit to market the Nilos Ring, a metallic seal for bearings.

The SH-Bushing makes it easier to join any hub to a shaft quicker and with less chance of failure than with conventional key joints. The bushing/hub remains infinitely adjustable radially and axially on the shaft.

The SH-Bushing will not create stress in the shaft, and in some applications, the shaft diameter may therefore be reduced. There is no need to machine keyways and axially secure the joint. Retrofit is another advantage, the quickest method of repairing a key joint is to simply install an SH-Bushing over the old keyway.

SH-Bushings may be used in extreme hot or cold environments and are designed to accommodate the tolerances of cold-rolled, commercial grade, unground shafting. They are available from SKF and its distributors in over 70 standard metric and inch sizes.

The Nilos Ring, manufactured by Ziller & Co., West Germany, forms a direct contact sealing lip with either the inner or outer bearing ring so precisely that performance is never affected. After a short break-in period, a groove is formed in the bearing ring surface that effectively becomes a miniature labyrinth seal.

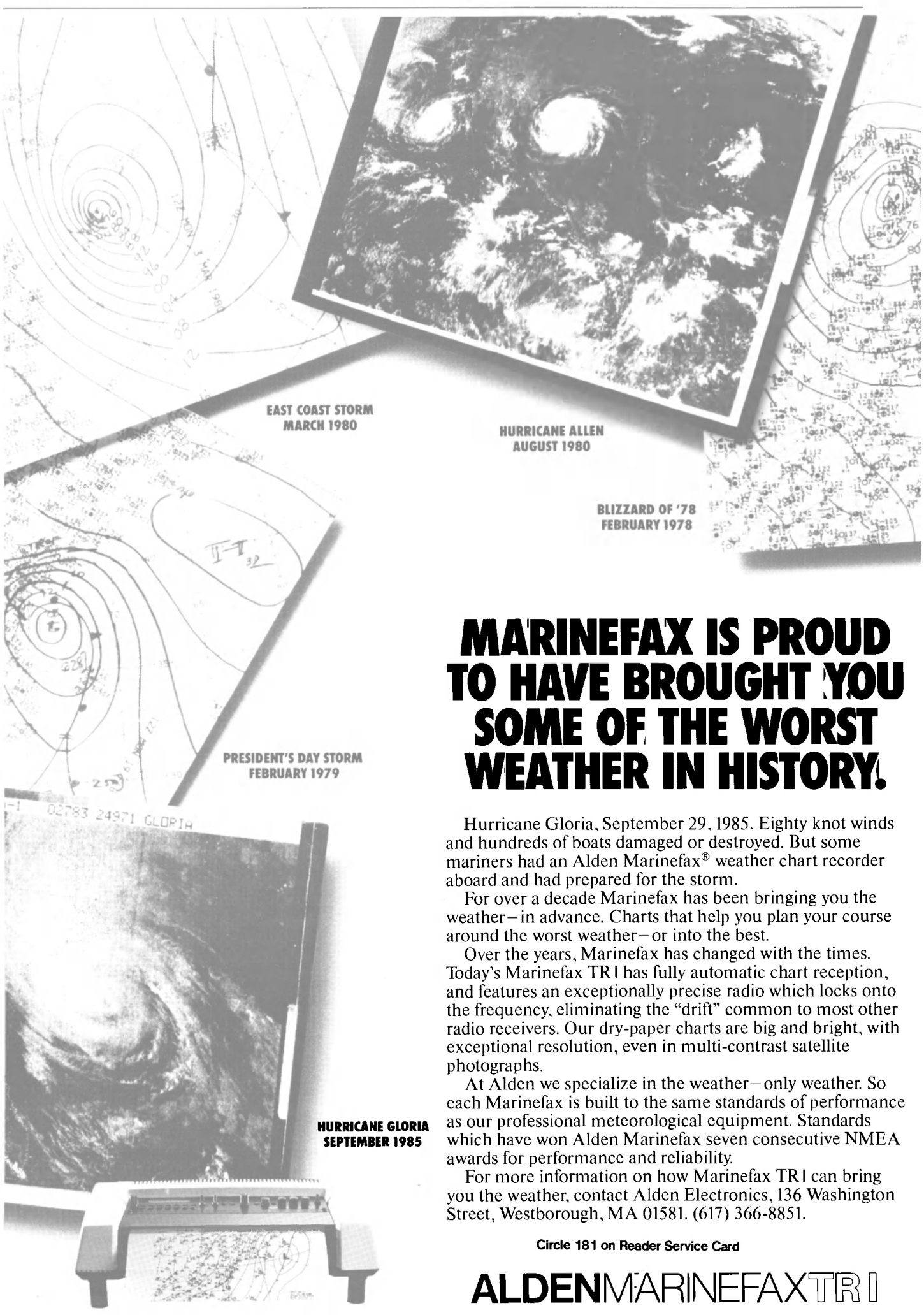
Nilos Rings are available from SKF for virtually any bearing size, type or application. Even sealed bearings are further protected by utilizing the Nilos Rings. All-metal Nilos rings are also available in stainless steel or brass.

For more information and free literature on the SKF SH-Bushing,

Circle 93 on Reader Service Card

For free literature containing full information on the Nilos Ring,

Circle 94 on Reader Service Card



The Eagle, built by McDermott Shipyard, New Orleans, La., is powered by two GM 1,500-hp diesel engines.

McDermott Shipyard Delivers 1,475-Passenger Ferry

—Free Literature Available—

McDermott Shipyard, New Orleans, La., has delivered a 1,475-passenger ferry to the Woods Hole, Martha's Vineyard and Nantucket Steamship Authority in Massachusetts.

The 3,000-horsepower, twin-screw vessel, named the Eagle, is 233 feet long, with a 60-foot beam, loaded draft of 9 feet 9 inches and depth of 16 feet. She is designed to also carry 70 automobiles or 37 automobiles and six 18-wheel trucks and has a displacement of 1,778 long tons. The ferry will provide service between Hyannis and the offshore islands of Martha's Vineyard and Nantucket.

The Eagle is propelled by two 1,500-hp GM 12-645E6A diesel engines and equipped with a Harbormaster bowthruster. She has a loaded speed of 12 knots. The Eagle is equipped with two Reintjes WAV 1830 reduction gears and two Coolidge propellers. Three 185-kw Caterpillar 3406BT diesel power generators supply the vessel's electrical power along with a 135-kw emergency generator, Caterpillar D-3306BT.

On-board electrics include a Sperry gyrocompass, Raytheon radars and UHF radio, sound-powered telephones from Hose-McCann and a public address system from Bogen.

EAGLE
Equipment List

Main engines	GM
Propellers	Coolidge
Reduction gears	Reintjes
Main generators	Caterpillar
Emergency generator	Caterpillar
Motor controls	Westinghouse
Engine room & vessel automation	Engine Monitor
Switchgear	Trinity Power
Gyrocompass	Sperry
Radars	Raytheon
UHF radio	Raytheon
Sound-powered telephones	Hose-McCann
Public Address system	Bogen
Firefighting system	Halon
Heating & A/C	Bailey/Burnham
O/W separators	Pace
Anchor windlasses	New England Trawler
Raw water, bilge, ballast & fire pumps	Crane Denning
Fuel, lube & hydraulic pumps	Gorman Rump
Air compressors	Ingersoll-Rand
Bow & stern doors	MacGregor-Navire
Elevators	Unidynamics
F/O purifier	Alfa Laval

For free literature fully detailing the shipbuilding and ship-repairing services and capabilities of McDermott Shipyard,

Circle 61 on Reader Service Card

Royal Caribbean And Admiral Cruises Plan To Join Forces But Keep Separate Identities

The shareholders in Royal Caribbean Cruise Line (RCCL) and Admiral Cruises, Inc., recently announced a preliminary agreement to combine their companies under a new privately owned holding company.

Under the new holding company, both Miami-based Cruise Lines (RCCL and Admiral) will retain their distinct identities. It is expected, however, that both lines will benefit from belonging to a larger group with a stronger financial base and offering a broader, more diverse range of products.

MonArk's Workboat Division Delivers 28-Foot Patrol Boat

MonArk 28-foot "Protector" achieved 48 mph powered by twin 225-hp Yamaha V-6 outboards.

The Workboat Division of MonArk Boat Company in Monticello, Ark., recently delivered a new 28-foot aluminum patrol boat to the Marine Police of the Department of Natural Resources and Environmental Control near Little Creek, Del. This new boat is based on the 28-foot "Protector" hull design which was developed by MonArk and features an aluminum superstructure offering a large enclosed cabin which will house electronics and provide shelter for two officers during patrol missions.

The Protector hull was selected for this patrol role because of it shallow draft, rugged construction and performance characteristics proven during testing of previous 28-foot Protectors built for the Coast Guard, the U.S. Navy and state agencies.

Based in Lewes, Del., the boat will be used to conduct law enforcement and search and rescue missions in the Delaware Bay and Atlantic Ocean front.

Powered by two Yamaha V-6 outboard motors rated at 225 horsepower each, the boat performed at speeds of up to 48 mph (42 knots) during builder trials conducted in the Arkansas River.

Other features include a raised sheer forward for increased freeboard, bow deck safety railing, recessed after deck and shallow gunwales for small boat inspection, extruded rubber bumper installed at the sheer and on the hull sides, and a heavy-duty tow post for use when assisting disabled vessels. A 100-gallon fuel capacity was provided with installation of two independent 50-gallon aluminum tanks.

Upon receipt of the vessel, the owner will install electronics, including radar, Loran C, Video Screen Depth Sounder, two UHF radios, direction finder, and state law enforcement radio.

At the present, MonArk's Workboat Division is building 26-foot personnel boats and 41-foot patrol boats for Naval Sea Systems Command in Washington, D.C., in addition to other craft now under construction for various government and commercial accounts.

For more information and free literature on the Workboat Division of MonArk Boat,

Circle 68 on Reader Service Card

ELECTRONICS UPDATE

Raytheon Marketing New Electromagnetic Speedlog Series

—Free Literature Available—

The new Navi Series of Electromagnetic Speedlogs from Raytheon offers economy and performance in a rugged, commercial-quality design. Available in two speed ranges, the Navi Series is made for use aboard fishing vessels and workboats.

A large analog speed dial is switchable from 0-10 knots to 0-30 knots; or from 0-25 knots to 0-50 knots, depending on range selected. Each unit has a built-in distance indicator.

Featuring standard 200 pulse-per-nautical-mile outputs, these speedlogs can be easily interfaced with satellite navigators, plotters and other microprocessor-controlled systems. Operation is selectable from 12 to 24 vdc.

The new Navi Series is less sensitive to cavitation disturbances because of its electromagnetic design, so that positioning of sensors is less critical. Two models are available, a Navi 3 EM Speedlog with through-hull, flush-mounted sensing unit, and Navi 5 EM Speedlog with gate valve assembly.

Built by Yokogawa Navitec, the Navi Series is marketed by Raytheon Marine Company, with exclusive sales distribution in the U.S., South America, the Middle East and Europe. Yokogawa is one of the world's leading manufacturers of electromagnetic speedlogs, gyrocompasses, and steering control systems. The exclusive distribution agreement enhances Raytheon's capability to offer complete bridge systems which interface with other Raytheon navigation and communication equipment.

The new Navi 3 EM Speedlog from Raytheon.

For free literature fully detailing the new Navi Series,

Circle 15 on Reader Service Card

Tracor Unit To Perform Ship And Sub Analyses Under $3.9-Million Pact

Tracor Hydronautics, Inc., a subsidiary of Tracor, Inc., was awarded an indefinite delivery/indefinite quantity contract estimated at $3.9 million from the U.S. Navy David Taylor Research Center for ship and submarine performance analysis.

According to **William C. Moyer**, group vice president for Tracor Applied Sciences, the company will construct ship and submarine models and perform analyses on them in the Tracor Hydronautics Ship Model Basin to test stability, control and seakeeping capabilities. In addition, the company will conduct separate studies related to ship mooring, simulation of vehicle performance, laboratory instrumentation, model construction and propulsors.

For more information about the products and services offered by Tracor Hydronautics,

Circle 76 on Reader Service Card

$7.3-Million Navy Contract Awarded E-Systems, Inc.

E-Systems, Inc., has received a $7.3-million contract from the U.S. Naval Sea Systems Command to add an anti-jam capability to antennas used with the Terrier and Tartar missile program.

The electronically steered phased-array antennas, originally designed and built by E-Systems ECI Division in St. Petersburg, Fla., will be returned to the ECI Division for retrofitting and an overall refurbishing.

E-Systems is a major worldwide developer and producer of defense electronic systems and products in the areas of intelligence, reconnaissance and surveillance systems, command and control, electronic warfare, specialized aircraft maintenance and modification, guidance, navigation and control, communications and data systems.

For more information and free literature from E-Systems,

Circle 74 on Reader Service Card

McMurray Appointed Sales Manager —Literature Available

Newpark Shipbuilding & Repair, Inc., Houston, Texas, recently announced the appointment of E. D. **(Ned) McMurray** to the position of sales manager. He will be located at corporate offices in Metairie, La.

Mr. **McMurray,** a 27-year veteran in the marine industry, was fomerly employed by Dravo Corporation and Exxon Corporation. His most employment was an independent marine equipment broker.

Newpark Shipbuilding is equipped to construct or repair inland towboats, tank barges, offshore boats, geophysical vessels and coastal trading vessels. Additionally, Newpark operates one of the most technologically advanced gas-free cleaning plants on the Gulf Coast.

For free literature on the facilities and capabilities offered by Newpark Shipbuilding,

Circle 95 on Reader Service Card

Call For Papers For American Welding Society's 70th Annual Convention

The American Welding Society is extending an invitation worldwide to authors engaged in metalworking to participate in the professional program of its 70th annual convention to be held April 2 to 7, 1989. Consisting of the 70th AWS Annual Meeting Technical Papers Sessions and the 20th International AWS Brazing and Soldering Conference, as well as related activities, the convention will be held in conjunction with the 1989 AWS Welding Show, April 4 to 6, in Washington, D.C.

Authors interested in participating may obtain author applications from the Secretary, AWS Technical Papers Committee, P.O. Box 351040, Miami, Fla. 33135, phone (305) 443-9353 or 1 (800) 443-9353. In Florida, phone 1 (800) 423-9353.

The 1989 AWS Welding Show will feature the exhibits of internationally known manufacturers with their live demonstrations of processes, consumable materials, and welding, brazing/soldering, cutting and nondestructive testing equipment.

Hall-Buck Marine Leases Port Of Portland's Terminal 4 Bulk Unloader

As a result of a lease agreement approved by the Port Commission, Hall-Buck Marine, Inc., of Burnside, La., recently assumed the Port of Portland's bulk unloading operations at Terminal 4.

The lease agreement gives Hall-Buck operation of all of the port's dry bulk handling, as the Louisiana firm is currently building a replacement facility for the Port's bulk outloader (export).

The bulk unloader currently averages approximately 40,000 tons a year, while the bulk outloader does more than 250,000 tons. Hall-Buck is projecting that the new bulk outloader will handle more than 500,000 tons.

COMSAT And MCI Sign Interconnection Agreement

COMSAT Maritime Services recently announced that it has signed an agreement with MCI International (MCII) to interconnect MCII's long distance telephone network with COMSAT coast earth stations for telephone service to and from ships at sea. As a result, MCI telephone subscribers with international dialing capability will be able to direct-dial vessels equipped with International Maritime Satellite Organization (INMARSAT) ship earth stations. In addition, the cost of COMSAT satellite telephone calls can be charged to MCI credit card accounts.

COMSAT is a publicly traded company based in Washington, D.C. As the U.S. member of the International Telecommunications Satellite Organization (INTELSAT) and the International Maritime Satellite Organization (INMARSAT), it links the United States by satellite with more than 160 other nations and over 6,500 ships at sea and offshore facilities.

For additional information and free literature,

Circle 96 on Reader Service Card

JJH Inc. Appoints Thomas R. Sarnecky

Dan Weiler, vice president and general manager of JJH Inc.'s Washington office, has announced the appointment of **Thomas R. Sarnecky** to the position of head of the combat systems department.

Mr. **Sarnecky** brings to his new position a strong background in naval architectural, hull, mechanical and electrical aspects of ship design as it interfaces with the combat system. Prior to joining JJH Inc., he held the position of director, combat systems design and test subgroup for NAVSEA, where he was responsible for directing the development of all surface ship combat systems designs.

JJH Inc. is a leading naval engineering organization with facilities located in Crystal City, Va., Portsmouth, Va., Cherry Hill, N.J., Bath, Maine, Panama City, Fla, and Long Beach, Calif.

Navy Awards $7.6-Million Contract To Southwest Marine

The U.S. Navy has awarded a $7,611,149 contract to Southwest Marine, Inc., San Diego, Calif., for the drydocking of the amphibious cargo ship USS Durham (LKA-114). The work is expected to be completed in July of this year.

New 138-Page Level And Flow Sensor Catalog Offered Free By GEMS

GEMS Express Service is offering a free comprehensive level and flow sensor catalog that contains 138 pages of complete technical information as well as prices. The catalog is designed to allow products to be ordered from a toll-free number, and since most are in stock, shipment will be made within 72 hours.

A few of the level sensor products described include single- and multi-station switches in various materials, externally mounted versions, sounding tapes, ultrasonic controls, and controls for electrically conductive liquids. Also included are manually and electrically operated indicators and switches for 30 and 55 gallon drums, switches that monitor both temperature and level, indicators to replace sightglasses, plus a full line of continuous level indicators, and much more.

The flow section of the catalog includes many different switch types: shuttle, piston, paddle, in-line and viscosity compensating. Continuous flow sensors are also included along with receivers, batch controllers, and fittings.

The relay section describes a full line of intrinsically safe relays and zener barriers. And the accessory section describes annunciator cubes and panels, junction boxes and alarm panels.

For more information and a free copy of the catalog from GEMS,

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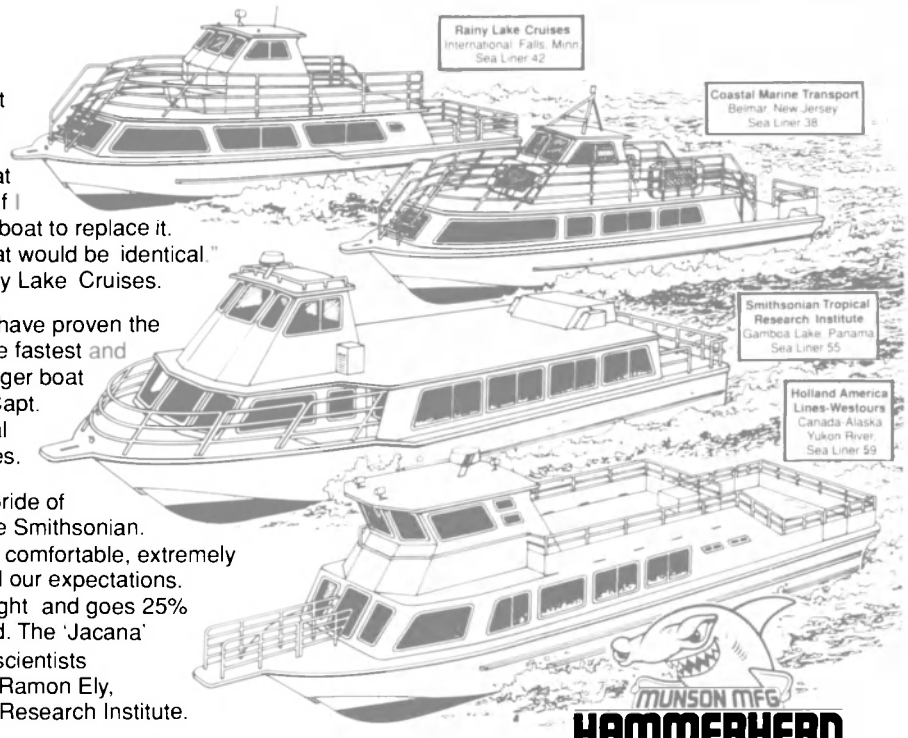

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The 'Yukon Queen' is under construction and will be put into service June 1988. She is powered by three 585 hp diesels coupled to water jet drives.

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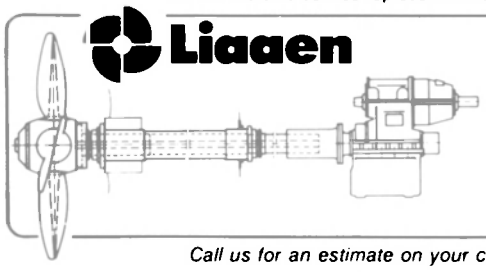

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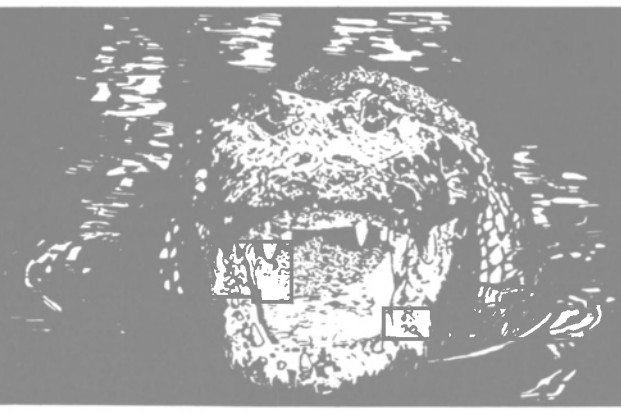

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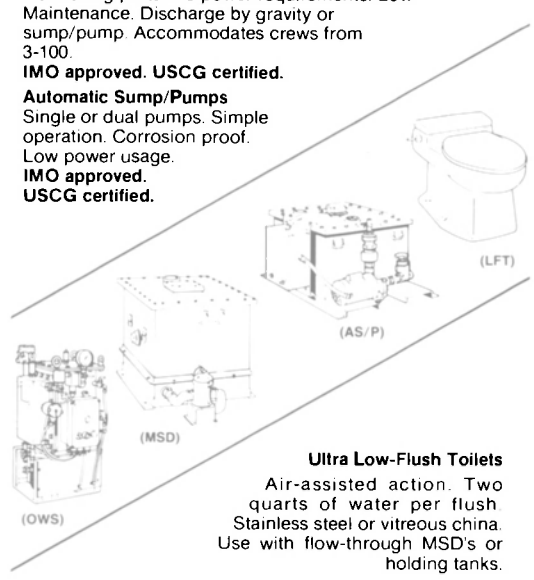

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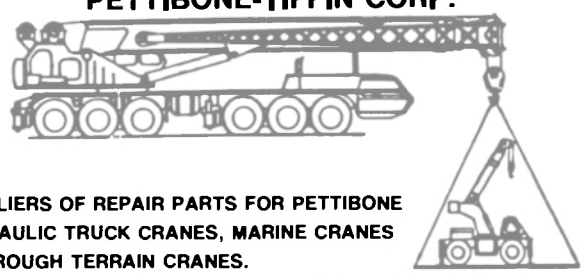

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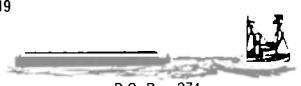

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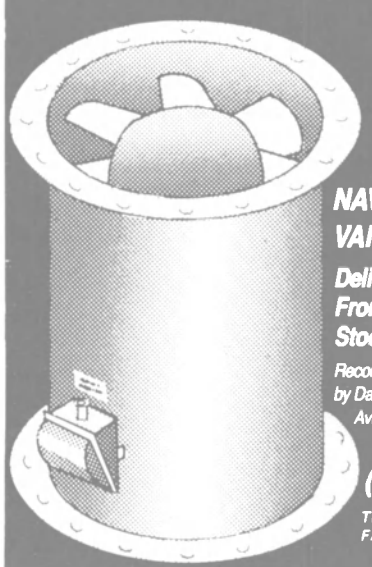

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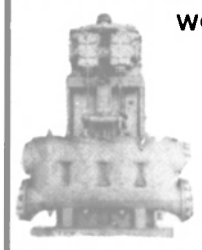

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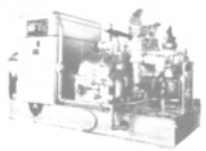

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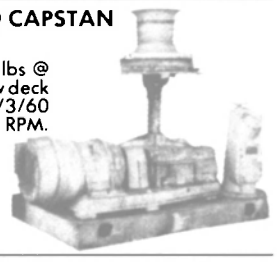

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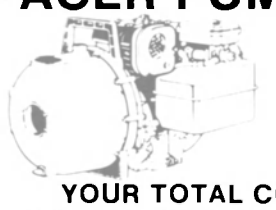

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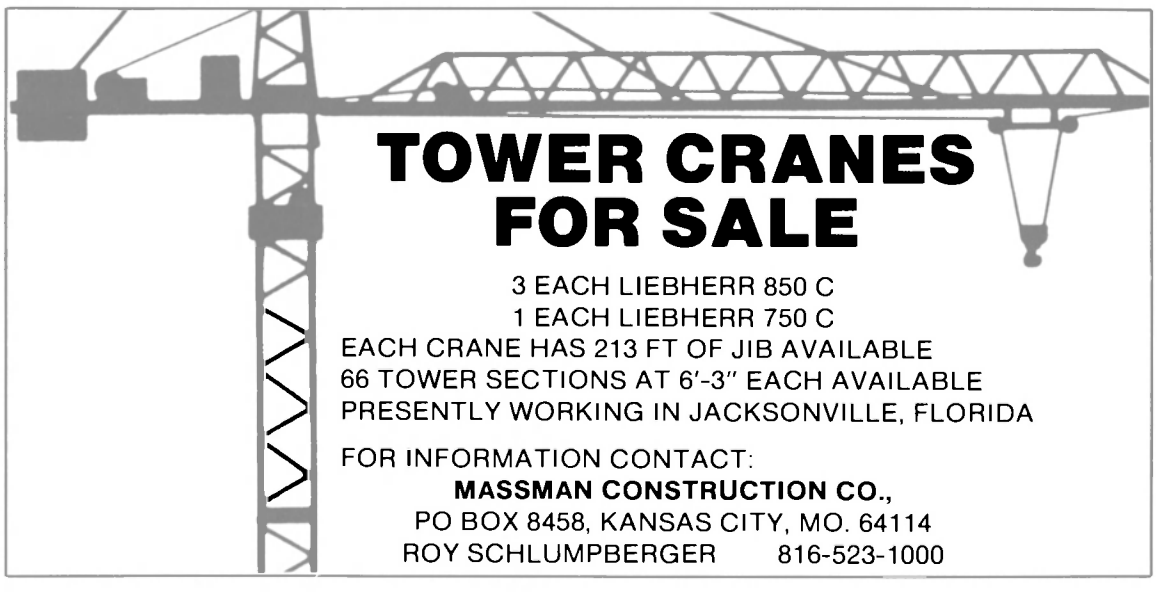

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Crew And Supply Boat Conversion Can Be A Profitable Venture

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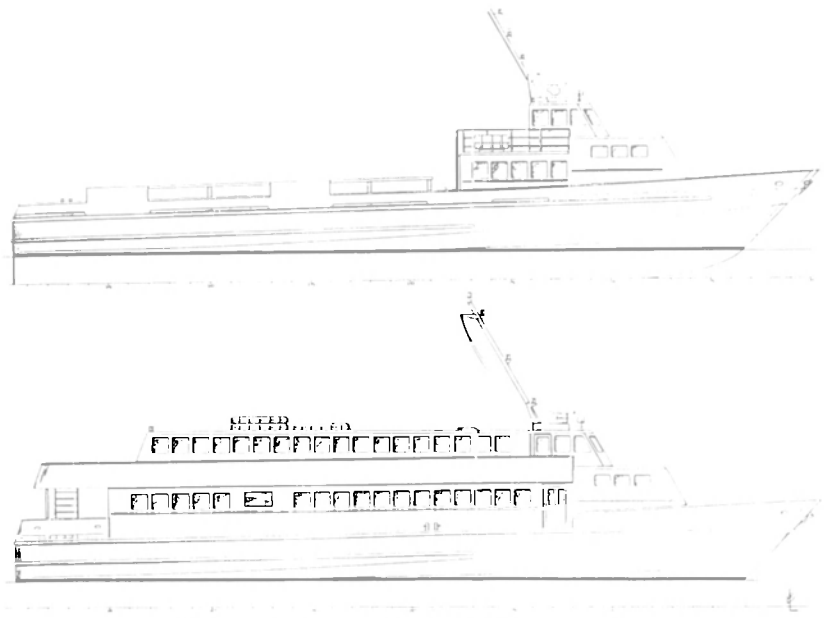


122′ Crewboat converted to 122′ Passenger Ferry

Supply vessels and crewboats are the lifeline of the offshore oil and gas industry. These sturdy vessels perform a multitude of functions, from carrying potable water and fuel oil to valuable deck cargoes and important operating personnel.Due to the reduced level of activity in the offshore industry, many of these versatile vessels have become available for other uses.

The following article is based on a technical paper, "Alternate Applications of Surplus Offshore Support Vessels," presented by **Anil Raj,** director, support services, and **John Moreau,** engineering manager, Trinity Marine Group, at a recent Gulf Coast Society of Naval Architects and Marine Engineers (SNAME) meeting in Pascagoula, Miss.

Trinity Marine Group operates Halter Marine Shipyards at Lockport, La. and Moss Point, Miss., Moss Point Shipyard, Moss Point, Miss., Equitable Shipyards, at New Orleans and Madisonville, La., and Gretna Machine & Iron Works, Harvey, La.

Applications For Supply Vessels

Supply vessels, which usually range from 110 to 225 feet long, are characterized by pilothouses, accommodations forward and large clear decks aft. These shallow-draft vessels often have single or double-chined hulls, which provide superior roll damping characteristics. They lend themselves to simple and economical conversion, primarily because of their large open deck aft, which permits: (1) easy access to the engine room for repowering or refitting of machinery; (2) modification, conversion or removal of tanks below deck; (3) erection of additional accommodations or superstructure modification; (4) addition of special mission-related equipment such as cranes or winches; and (5) use of the available space for alternate cargoes such as containers.

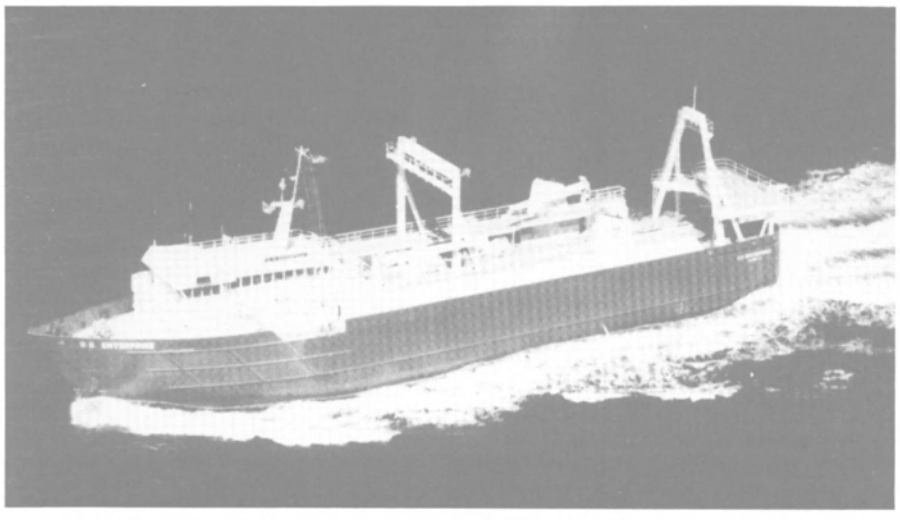
In addition, large freezer and reefer spaces once used for transporting perishables, can be used to increase the vessel's galley services for a larger crew. Because of their relatively square midbodies, supply boats are simple to jumboize.

One example of an alternate use, is the conversion of a 224-foot tug/supply vessel into the first U.S.-flag surimi catching/processing vessel. The conversion operation involved the addition of a large shelter deck with a built-in stern ramp and the covering of the weather deck. A Flume stabilization system was added to suppress roll and maximize working time for the processing crew. Gantries for trawl gear handling, freezer holds, a fresh-water distilling system, telescoping cranes as well as various electronics and hydraulics were added to complete the conversion. The shelter deck area houses a complete processing factory, including machines for heading, gutting, filleting and skinning fish. The on-board Surimi processing line converts the catch to a paste-type substance for the making of imitation crab, scallop and shrimp products.

A second conversion example is the modification of a supply vessel for Military Sealift Command roll-on/roll-off (RO/RO) service. The work involved the addition of a large midbody as well as a stern ramp for loading and discharge operations.

Conversion to a cruise vessel is another viable alternative for a supply vessel. In one example, electrical capacity of the vessel was increased through the addition of generators to handle the increased power loads imposed by passenger service. Sound dampening materials were added to reduce noise levels and superstructure and fashion plate were fitted to incorporate the details of a much larger cruise liner.

Proven applications in other marine areas include conversions for: national defense and drug trafficking interdiction; seismic; diving support; subsea maintenance; remotely operated vehicle support; vehicle and passenger ferry service; manned submersible support; and crab processing/catching.



224′ Tug/Supply Vessel converted to Surimi Catching/Processing Vessel

Applications For Crewboats

Ranging in size from 35 to 125 feet overall, crewboats are generally built of light gauge steel or aluminum, in single and double-chined hull configurations. They are almost always planing crafts. Since crewboats are primarily offshore passenger ferries, boasting high maneuverability and speed, they naturally lend themselves to passenger ferry service.

In addition, their high speeds, rugged construction and good seakeeping characteristics make them suitable for conversion for military, patrol boat and search-and-rescue applications.

Although crewboats may not be as cosmetically appealing as yachts, some slight modifications can easily convert them to this type of service. Wide open passenger spaces allow the installation of additional and luxurious accommodations including lounge areas.

Other converted crewboat applications include: offshore charter fishing, oil spill clean-up operations, pilot boats, pleasure cruise vessels, single-point mooring assist, line handling vessels and a variety of launches and ferries.

For example, one crewboat was converted to a fisheries partol boat for a foreign government. The quarters were equipped for extended operations. Gun mounts and extensive electronic surveillance equipment were added.

In another recent conversion, a 122-foot crewboat was modified for passenger ferry service. The passenger capacity of the vessel was increased from 94 to 250, and extra power generation was added to handle increased power loads.

Other proven applications include conversion to pilot launches, single point mooring assist and pollution control vessels, line handling vessels and pleasure craft.

Converting and modifying crewboats and supply vessels for dozens of alternate operations is just good common-sense business. It adds up to lower costs for the vessel owners, more work for shipyards and additional business for manufacturers of every conceivable type of equipment required, including everything from complete repowering, electrical generation, air conditioning, new navigation, communications, safety and sanitary equipment to new filters, bearings, paint and passenger accommodations.

For free copies of the full technical paper presented by Mr. **Raj** and Mr. **Moreau** and complete details regarding the full range of vessel conversion, new construction and reapir services offered by Trinity Marine,

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Rauma-Repola Wins $50-Million Order

Finnish shipbuilder Rauma-Repola was recently awarded a $50-million order by Delphin Cruises to build a 300-passenger cruise ship.

The ship, which will be operated in the Baltic by the Finnish owner, is scheduled to be delivered in the summer of 1989.

The ship will be about 5,700 gross tone, have an overall length about 354 feet and speed of about 17 knots.

Rauma-Repola also has received an order from the Goliath Group for two 76-passenger vessels.

Southwest Marine Gets $3-Million Contract For Ship Maintenance

Southwest Marine Inc., San Diego, Calif., recently received a $3-million contract for the Phased Maintenance Availability (PMA) of the USS Tripoli (LPH-10). The work is expected to be completed July 15, 1988. The contract was awarded by the Supervisor of Shipbuilding, Conversion and Repair, San Diego, Calif. (N00024-85-H-8221).

Tom Bunyan, Inventor Of 'Pilgrim' Products Marketed By Mapeco, Honored By Queen Elizabeth

In recognition of his contribution to engineering, **Tom Bunyan** was recently presented with the civil honor, "Officer of the Order of the British Empire," by Her Majesty Queen **Elizabeth II** at Buckingham Palace.

Mr. **Bunyan** is the inventor of commercially available products, sold worldwide under the name "Pilgrim," which contribute significantly to the safety of shafting and propellers in ships and, more recently, to personnel safety in nuclear power reactors.

Mr. **Bunyan** is a frequent visitor to the U.S. and has read papers in SNAME symposia and taken part in technical meetings at other U.S. institutions.

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JJH Inc. Awarded NOAA Contract For Naval Architecture And Marine Engineering Services

JJH Inc. recently received a one-year contract to provide naval architecture and marine engineering services to the National Oceanic and Atmospheric Administration (NOAA).

JJH Inc. is a leading naval engineering company with facilities in Crystal City, Va., Portsmouth, Va., Bath, Maine, Cherry Hill, N.J., Panama City, Fla., and Long Beach, Calif.

For more information and free literature on JJH Services,

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Comsat Announces SafetyNet Service For Ships At Sea —Literature Available

Comsat Corporation's Maritime Services Division recently announced its intention to offer a new maritime safety broadcast system through its coast earth stations in Southbury, Conn., and Santa Paula, Calif. The announcement was made at a meeting of the International Maritime Organization (IMO).

The new system, called SafetyNet Broadcast Service, is a service of the International Maritime Satellite Organization (Inmarsat) that provides maritime safety information and distress alerts through Inmarsat's satellite system. Comsat is the U.S. Signatory to Inmarsat and its largest owner.

Comsat said the Inmarsat SafetyNet broadcast service is expected to be available in late 1989 to U.S. Government authorities to warn ships of marine hazards, provide storm warnings, and carry routine weather broadcasts and chart corrections. The SafetyNet service will use Inmarsat's new Standard C ship terminal technology with Enhanced Group Calling (EGC) features. This shipboard equipment is very compact, relatively inexpensive, and utilizes a small omnidirectional antenna.

For further details and free literature on Comsat's new SafetyNet Broadcast Service,

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MarAd Awards $517,200 Repair Contract To Industrial Welding

The Maritime Administration (MarAd) has awarded a $517,200 contract to Industrial Welding & Machine Inc., Portland, Maine, for repairs of the Maine Maritime Academy's training ship State of Maine.

New Class DBOY-2 Valve Line Now Available From Leslie Controls, Ltd.

A new line of Class DBOY-2 cage throttling balanced control valves, featuring a cast iron actuator and new packing and gasket materials, is available from Leslie Controls, Inc., Tampa, Fla.

The DBOY-2 valve line is designed especially for use in steam, water, gas and vapor service where high pressure drops are required. They provide excellent throttling action for accurate process control, plus maximum flow through specially designed ports that assure resistance to cavitation, increased stability and reduced internal friction.

The cast iron actuators provide high thrust and stability at all air loading pressures up to 60 psig for normally open or normally closed valve action. The actuators are interchangeable on many valve sizes, enabling rapid field installation and increased flexibility. A large selection of springs is available to handle a wide range of applications and pressure drops. Seat tightness is precision engineered to provide the same low leakage characteristics as single seated, unbalanced valve designs.

The bonnet gasket is spiral wound 316 stainless steel with asbestos filler for a tight seal between body and bonnet. Minimal leakage between seat and body minimizes the possibility of erosion and prolongs service life. The stainless steel seat ring is type 410 hardened for normal service, with optional stellited surface available for more severe conditions.

Founded in 1900 as The Leslie Company, Leslie Controls has its corporate offices and plant in Tampa. The company has a network of sales representatives throughout the U.S. and the world, handling a complete line of control valves, pressure reducing and small flow reducing valves, regulators, steam water heaters, instrumentation and viscosity control systems.

For more information and free literature on the DBOY-2 valve line from Leslie Controls,

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The Annabel Lee features luxurious interior appointments that combine the authenticity of a Mississippi River paddlewheeler with complete passenger comfort and safety. She'll have a completely equipped on-board galley, two full bars, two dance floors, a very sophisticated sound and PA system, and 40 tons of air-conditioning. Even prior to construction, the attractiveness of the Annabel Lee's design and features has resulted in an extraordinary number of advance bookings.

But the Annabel Lee is more than just good looking. At Service Marine we've built her using both the most modern safety and engineering equipment, and old-fashioned quality workmanship for years of dependable performance.

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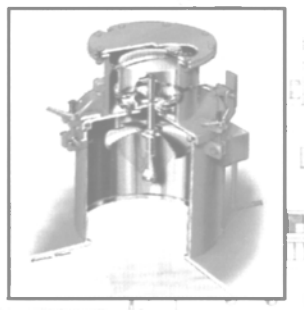

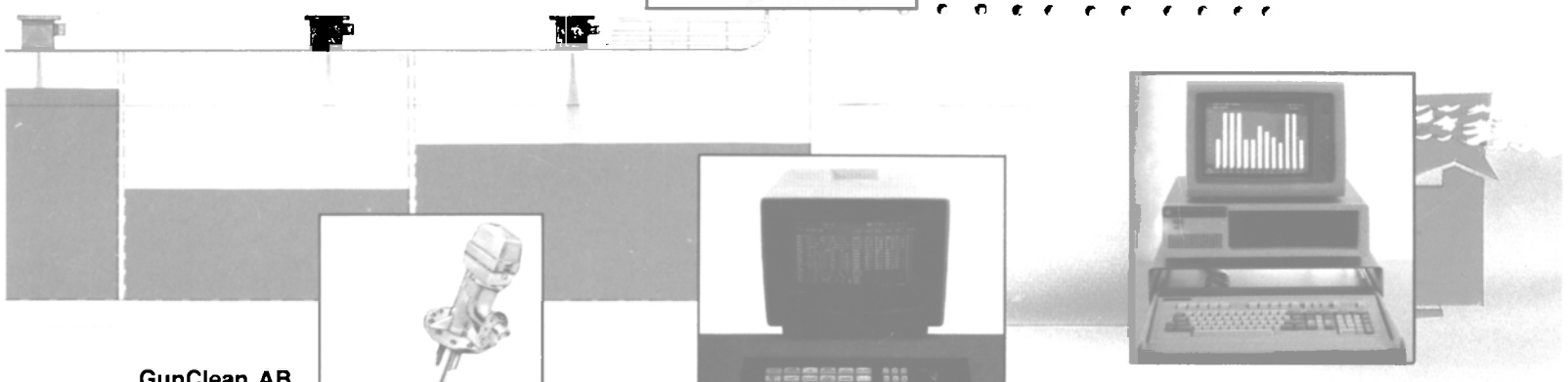

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SAAB TANK CONTROL

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