MARITIME
REPORTER
AND
ENGINEERING NEWS

1989 NAVY ANNUAL

MARINE COATINGS & CORROSION CONTROL REVIEW

FEBRUARY 1989 ISSUE

GIVING NATIONAL DEFENSE A BIG LIFT.

Theodore Roosevelt (CVN71), the first aircraft carrier built making extensive use of modular construction, was commissioned 16 months before contract delivery date, saving the U.S. Navy and American taxpayers over $80 million.

Abraham Lincoln (CVN72) and George Washington (CVN73) are the next two aircraft carriers being built through modular construction. At Newport News Shipbuilding, we're proud our 900 ton lifts give a big lift to our nation's ability to meet its global commitments.

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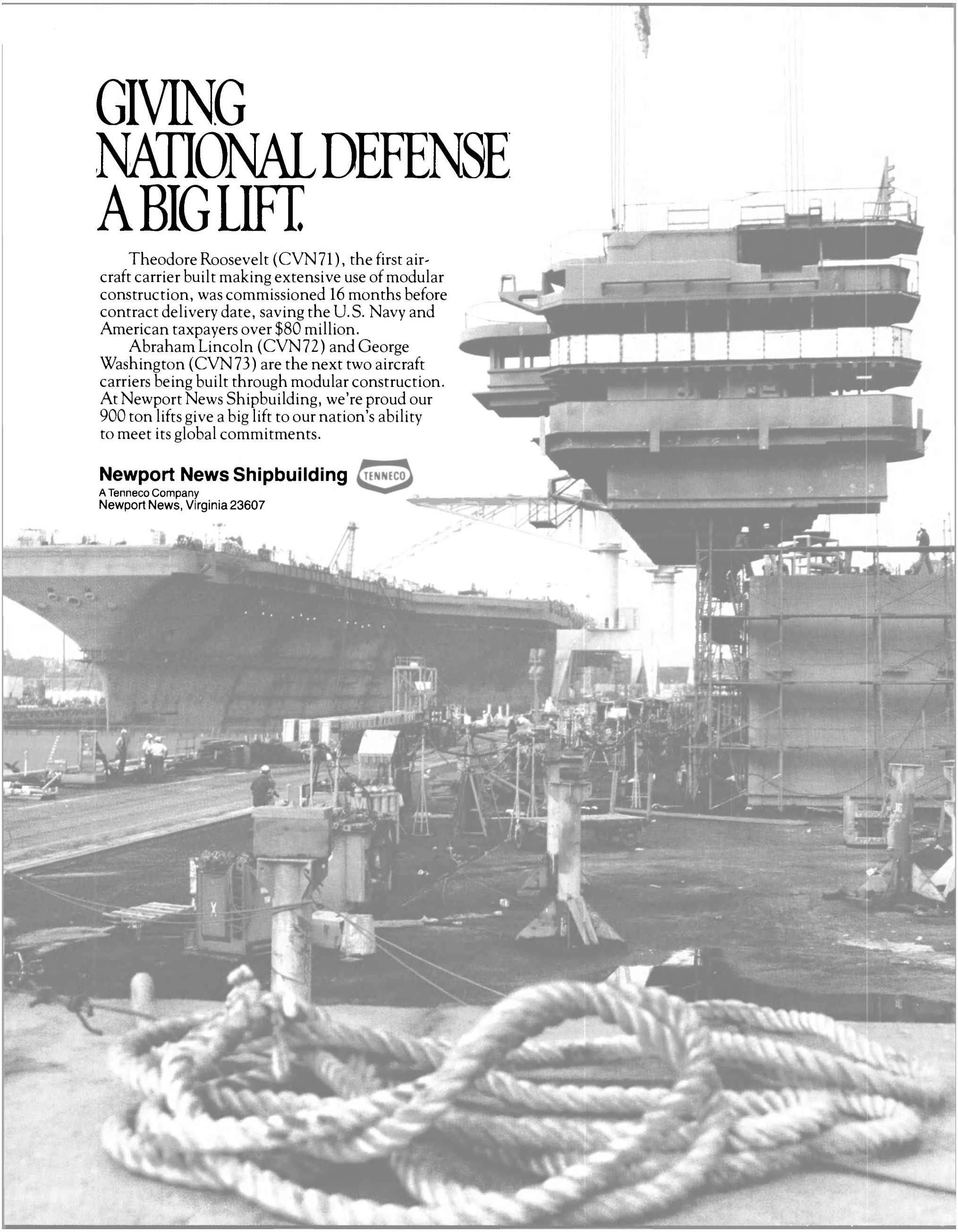

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ON THE COVER

Photo: The battleship, USS Iowa (BB-61) anchored at sunset. US Navy Photo.

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NEXT MONTH

AWO ANNUAL EDITION

Shipyard Opened By North Carolina DOT; Features New Synchrolift

Federal, state, and local government officials recently gathered at the new North Carolina Department of Transportation Marine Maintenance Facility in the coastal community of Manns Harbor to commemorate the shipyard's official opening.

The $13.6-million complex replaces an old facility that occupied the same site. The new facility will provide maintenance and repair of DOT Ferry Division ferries and support vessels and, on occasion, will service other state-owned vessels. The facility has a 1,000-ton-capacity Synchrolift system, supplied by NEI Synchrolift, Inc., of Miami, Fla., which will be able to handle any of the state's 16 ferries, the largest of which is 221 feet long at about 737 gross tons. The Synchrolift consists of a lifting platform, a transfer table and three work platens. Two of the work platens are sufficient for all but the five largest ferries in the N.C. state fleet. The third platen will support any ferry in the fleet.

The complex also has an office building, parts inventory warehouse, and support workshops.

For literature fully detailing the features of the Synchrolifts offered by NEI Synchrolift,

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Unitor Announces New Owner Structure

Unitor Ships Service AS recently reported that its major stockholder, Hafslund of Norway (a major power, paper and medical holding company), has successfully completed the sale of its 44.5 percent share in Unitor to a number of individual Norwegian and U.K. investors and funds.

Unitor expressed its satisfaction with the new owner structure, leaving no one stockholder with more than 5 to 10 percent of the company stock.

Unitor reports at the same time that its third quarter '88 results were the best ever and that the positive trend is continuing and is expected to give Unitor a record year.

Unitor has a network of 50 branch offices and 220 agents covering 450 ports worldwide servicing the international shipping and shipbuilding industries. The company serves more than 15,000 vessels from 70 nations annually. Main products are welding gases and equipment; refrigerants and equipment; refrigeration service; airtools; high pressure cleaning systems; marine chemicals; firefighting, rescue, safety equipment and services.

For further information and free literature from Unitor,

Circle 48 on Reader Service Card

Caterpillar Wins $1.4-Million Navy Mine Plow Contract

Under a recently awarded $1.4-million U.S. Navy contract, Caterpillar Inc. will develop a highly specialized mine plow for the Marine Corp's Assault Amphibious Vehicle (AAV) in a two-year program.

Managed by the Naval Coastal Systems Center, Panama City, Fla., the contract covers design, manufacturing and testing of four prototype plows. The track-width plows are designed to provide protection of AAVs during amphibious landings, uncovering and moving aside enemy anti-personnel and anti-tank mines placed in the surf and on beaches. Each AAV can carry 28 Marines from ship to shore.

Caterpillar's Defense Products and Research Departments concepted the plow for use on the AAV (built by FMC Corporation). Designed to remove and displace, rather than detonate mines, the plow can sustain limited blast forces and continue operations.

The four plows are currently scheduled to undergo a six-month test at Camp Pendleton, Calif., beginning January 1990.

For more information and free literature from Caterpillar,

Circle 74 on Reader Service Card

Marine Electric Moves To New Facilities; Divides Into Three Separate Firms

A series of recent moves has resulted in a number of significant changes in the Marine Electric organization, a leading manufacturer and supplier of the product lines of Galbraith Pilot Marine (temperature monitoring, salinity monitoring, audio equipment); CML-Macarr (power supplies, wide band power amplifiers); Wayne (custom-made specialty transformers) and Marine Electric (motor rewinding and repair).

One significant change is that the company has moved its entire operation from its former Brooklyn, N.Y., location to more modern and spacious facilities at 50 Carol Street, P.O. Box 1135, Clifton, N.J. 07014-1135.

A second major move was to divide the company into three separate and distinct firms—Marine Electric RPD, Inc., for all Mil-Spec products, salinity monitoring, temperature monitoring, power supplies, etc.; Clifton Power Group, for all commercial power supplies, audio systems, wide band power amplifiers, etc.; and Marine Electric Corporation, for motor repairs and rewinding.

For free literature detailing the product lines covered by the three companies,

Circle 35 on Reader Service Card

PACECO Acquired By Mitsui Engineering —Literature Available

PACECO Corporation is now a subsidiary of Mitsui Engineering & Shipbuilding Corporation after MES acquired all of the patents, drawings, trademarks and technology, as well as license agreements, including the name PACECO from the Fruehauf Corporation.

From its new headquarters in San Mateo, Calif., the MES subsidiary along with its licensees plans to utilize and further develop state-of-the-art technology for container-handling equipment and systems. The firm will design, manufacture, market and service, in cooperation with its licensees, all of PACECO's container-handling equipment in the world market.

PACECO Corporation will be headed by president and chief executive officer **Masao Iwane**. **Shuji Hasegawa** has been named vice president, marketing and engineering, and **Motoki Ichikawa** was appointed vice president, administration and finance.

PACECO, Inc., Gulfport, Miss., has been renamed Coast Engineering & Manufacturing Co. (CEMCO). PACECO Corporation has acquired 20 percent of the stock of CEMCO, and is assured of a production based at the Gulfport plant to satisfy the requirements of the U.S. and export markets.

For free literature detailing the products and services of PACECO Corporation,

Circle 33 on Reader Service Card

OMI Announces Key Promotions

OMI Corporation, New York, N.Y., a major bulk shipping company, has announced the promotions of several executives.

Peter P. Long was promoted to senior vice president, administration; **Fredric London**, general counsel, to vice president; and **William Hogg** to assistant vice president, government contracts.

Earlier last year, **Anya Starosolska** was elected corporate secretary, and **Robert Hayes** was appointed assistant treasurer.

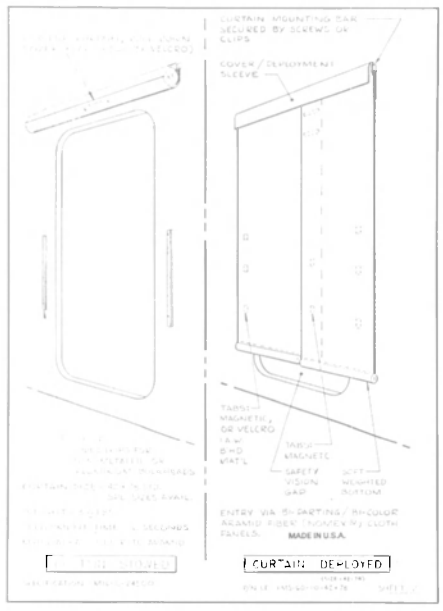
HMS Marine Hardware Offers Smoke-Gard Curtains For Shipboard Smoke Containment Uses

Free Literature Available

Fire aboard ship is a major emergency, no matter how small the fire. On a very small ship the crew can usually escape overboard should the fire get out of control.

On a large ship, however, the situation is far more serious and difficult. Passengers and crew may find it difficult, if not impossible to find their way out visually through the maze of smoke-filled passageways and deck levels. The fire-smoke can quickly render sight useless by toxic and particle irritants. Additionally, a firefighting team must quickly find their way to the source of the fire through these same passages.

With this knowledge, it seems obvious that a primary responsibility for any ship would be the immediate or near immediate containment of fire-smoke to the area or compartment of the fire outbreak.



The use of smoke curtains can provide that containment. Smoke containment curtains can also reduce the time necessary for the fire team to get to the emergency area by providing improved visibility in the passageways. Smoke curtains also allow the fire team to enter the emergency area, dragging hoses, etc., without having an open doorway for the smoke to rush out of, as the curtain will continue to contain the smoke.

With the benefit of modern technology, smoke containment curtains are now available made form lightweight, fully fire-rated aramid fiber cloth (similar to that used in race driver suits and military pilot flight suits).

Smoke-Gard curtains manufactured by HMS Marine Hardware, Inc., Valley Stream, N.Y., which weigh only 3-1/2 pounds each, are mounted above doorways which are considered potential smoke-path hazards, such as machinery spaces, galley areas, berthing areas, etc. Smoke-Gard curtains are installed with screw fasteners or optional clip-mounting system which allows the Smoke-Gard curtains to be relocated from doorway to doorway, thereby having one curtain available to service a multiple of doorways in a given area of the ship. This is mostly applicable to large ships.

Smoke-Gard curtains deploy with a single downward pull of the stowage sleeve. The curtain fully deploys within two seconds, and the curtain self-adheres to the adjoining bulkhead with fire-rated velcro fasteners or magnets, but they easily separate for fire team passage. The Smoke-Gard curtain is brightly bicolored of blue/international orange to assist the fire team in locating the exit in limited visibility.

After use (and cleaning), the curtain is easily re-rolled back into its overhead stowage/deployment sleeve, ready for redeployment if needed.

The use of smoke containment curtains aboard ship is not new. The Royal Navy has been using smoke-containment curtains for more than 20 years. The Royal Navy's recent experience in the Falkland Islands Campaign strongly reaffirmed the value of smoke curtains in fire emergencies.

In view of the Falklands experience, and the USS Stark experience, the U.S. Navy has become interested in smoke curtains. A recent Naval Sea Systems report states that actual fire-testing aboard the USCG test ship USS Watts showed smoke curtains to be "effective in curtailing the spread of smoke, toxic gases, and heat."

For free literature fully detailing Smoke-Gard curtains from HMS Marine Hardware,

Circle 43 on Reader Service Card

NY/NJ Port Authority Passes 1989 Budget Of $2.2 Billion

The Port Authority of New York/New Jersey recently passed a 1989 operating, capital and expenditure budget of $2.2 billion. The budget will provide funds for many port and terminal improvements.

In a move to strengthen the competitive position of the port, the authority included funds in the 1989 budget for such key projects as the channel dredging and berth deepening at Port Newark/Elizabeth, rehabilitation of the Brooklyn Port Authority Marine Terminal, facility improvements at the Port of Newark/Elizabeth-Port Authority Marine Terminals, completion of the Port Authority Auto Marine Terminal in Jersey City and Bayonne, N.J., and improvements at Howland Hook cargo terminal, Staten Island, N.Y.

Foss Maritime Signs 20-Year Lighterage Pact

Foss Maritime Company, Seattle, Wash., has signed a 20-year contract with Cominco Alaska Incorporated for seasonal lighterage service in northwestern Alaska commencing 1990.

The contract calls for Foss to move Cominco's "Red Dog Mine" annual ore concentrate production to deep-draft ships waiting four miles offshore.

Foss plans to utilize two 3,000-hp oceangoing tugs and two 6,000-dwt barges fitted with ore transfer systems for the lighterage service.

Joseph A. Martin Named VP, Operations, NOLA Centurion Fabricators

Joseph A. Martin

Joseph A. Martin has been appointed vice president of operations for NOLA Centurion Fabricators, a division of NOLA Fleet Management, Inc.

NOLA Centurion operates a barge and vessel repair and fabrication facility on a 30-acre site in Braithwaite, La.

Prior to assuming his present responsibilities for NOLA Centurion, Mr. **Martin** served two years as operations manager for the parent company, NOLA Fleet Management. He also directed special projects for Marec, Inc., another corporate division.

Mr. **Martin** has an extensive background in the marine maintenance and fabrication field, having served for five years with Bergeron Industries, Inc., in various capacities including sales, purchasing, planning, production, and as general manager of the firm's Demopolis, Ala., operation.

He also spent four years with Halter Marine Services, Inc., New Orleans, in various capacities.

Sperry Marine Offers Six-Page Full-Color Brochure On RASCAR

Sperry Marine Inc. of Charlottesville, Va., has published a six-page full-color brochure on RASterscan Collision Avoidance Radar (RASCAR)

The brochure explains that Sperry Marine's revolutionary new RASCAR is a series of radars and APAs designed to meet or exceed all SOLAS and type-approval requirements for vessels in the 1,600-gt and above range. All RASCAR models include the super-fast CAS IV Collision Avoidance features. The RASCAR model 3400M is a fully compliant, type approved ARPA.

Among the features discussed which the RASCAR series incorporates are: (1) Touchscreen Controller—All radar and CAS™ functions are executed rapidly and accurately via the touchscreen. Controls are logically grouped within the operator's main field of view. The result is a fast, direct and intuitive link between man and machine. (2) First High Resolution Color Display—The RASCAR series includes the model 2500C display, the first high resolution color display for the big ship market. (3) The Highest Display Quality—The unique combination of high resolution, a non-interlaced raster and the highest refresh rate eliminates picture flicker. (4) Circularly Polarized Antenna—Circular polarization virtually eliminates rain clutter.

Illustrations include various configurations, and there is a listing of specifications for antennas, transmitters, receivers, displays, etc.

For more information and a free copy of Sperry Marine's brochure on RASCAR,

Circle 5 on Reader Service Card

MMC Offers Free Catalog On Tank Gauging Tapes And Vapor Control Valves

For over 30 years, MMC International Corporation, Inwood, N.Y., has been serving the maritime industry by manufacturing tank gauging systems, both portable and fixed, along with a variety of vapor control valves widely recognized for their durability, reliability and ease of operation.

Of even greater importance to shipbuilders and ship operators is the MMC record for constantly updating and improving these products to meet the stringent requirements of modern seagoing vessels.

All of the improvements are described in detail in a new eight-page color catalog that is now available from the company. MMC maintains manufacturing and marketing facilities in England and Japan to serve all their worldwide clients.

MMC's hand-held gauging tapes are marketed under the trademark "Flexi-Dip." They are designed for restricted and closed tank gauging, via vapor control valves, to depths up to 120 feet. Special order tapes are available from 165 to 330 feet.

The gauging tapes are designed to measure ullage, interface (oil/water) and temperature. There is one triple function model (trimode) which measures ullage, interface and temperature in a single penetration. If only ullage and interface or ullage and temperature are needed, two bimode variations are available. There are two single mode units available for temperature or ullage only.

The company reports accuracies to +/- 1/8 inch linear measurements. All systems are intrinsically safe via approvals from FM, BASEEFA, CSA or SAA.

MMC recently announced that it had been awarded a contract by Avondale Shipyards Division for the U.S. Navy, specifying that the new series of Navy T-AO fleet oilers would be fitted with MMC ullage/interface gauging tapes.

Since restricted hand-held tank gauging is performed in conjunction with vapor control valves, MMC provides a wide array of such devices. MMC offers a line of 6 different vapor control valves, which singularly or in combination, can satisfy any customer's requirements or specific need.

The latest MMC vapor valve entry is its U-Valve that can be installed directly on existing ullage hatches, without hot work or the need to gas-free tanks. This is a major advantage since it eliminates the need to remove the vessel from service to perform installation.

The new MMC catalog illustrates all of the gauges and valves available.

For free literature describing MMC gauging equipment and vapor control valves,

Circle 105 on Reader Service Card

Gulf Coast Fabrication Delivers First Of Three Wood Pulp Barges

Gulf Coast Fabrication, Inc. of Pass Christian, Miss., has delivered the first of three 300-foot by 72-foot warehouse barges for Scott Paper Company and McAllister Towing of New York.

The warehouses on deck can carry 360,000 cubic feet of wood pulp in bales or about 8,000 tons. They will carry the pulp from Nova Scotia, Canada, to Chester, Pa., for processing.

Gulf Coast Fabrication operates shipyards in Pass Christian and Port Bienville, Miss.

For more information and free literature on Gulf Coast Fabrication,

Circle 61 on Reader Service Card

Campbell Shipyards Chooses Sperry Marine Equipment For New Class Seiners

Campbell Shipyards of San Diego has selected a complete suite of Sperry main steering gear and controls for five new "Super Pacific" class purse seiners now being built for U.S. and Korean owners, according to **R.E. Northcutt**, Sperry Marine Western regional manager.

Steering control for the 265-foot tuna seiners will be provided by Sperry's well-known SRP-690 gyropilot. The Sperry Marine AP-8T magnetic autopilot will be installed for backup to the gyropilot. Main navigation heading reference is by the Sperry Marine MK37E gyrocompass, used worldwide as the industry standard. Sperry's unique dual-flow Cub Pumps and actuating cylinders will complete the rudder control package on all five of the new $12-million vessels.

For more information and free literature on Sperry Marine products,

Circle 47 on Reader Service Card

Southern Shipbuilding Completes Conversion Of Hopper Dredge

Southern Shipbuilding Corporation recently delivered the hopper dredge Sandy Hook to McCormack Aggregates, South Amboy, N.J., after the vessel underwent conversion at the Slidell, La., yard.

The 290-foot Sandy Hook was converted from the hopper barge Harold Smith, which formerly transported petroleum coke between Norfolk, Va., and Philadelphia, Pa.

The extensive conversion of the 60-foot-wide, 21-foot-deep barge included adding dredging and generating equipment. Installed were two 12-cylinder EMD 12-645 diesel engines, each developing 1,500 hp and generating 1,150 kw of electrical power for operating the dredging equipment and on-board lighting. The dredge is pushed by the tugboat Ben Candies.

McCormack Aggregates, a joint venture of 98-year-old Great Lakes Dredge & Dock Co., Oakbrook, Ill., and McCormack Sand Co., Highstown, N.J., operates the Sandy Hook in lower New York Bay between the New York and New Jersey shores, mining sand and gravel at a rate of about 800,000 cubic yards per year. The sand and gravel is transported 25 miles to McCormack Aggregates' plant at South Amboy, N.J.

For free literature detailing the shipbuilding services offered by Southern Shipbuilding,

Circle 29 on Reader Service Card

Bird-Johnson To Expand Pascagoula Facility

Bird-Johnson Company's Pascagoula, Miss., plant manager **Jim Elliott** has announced plans to expand their marine propeller manufacturing plant to meet the demands of new orders. The current 43,000-square-foot facility, which houses a modern foundry as well as a complete propeller machining and repair shop, will be enlarged by 15,000 square feet. About 9,000 square feet will accommodate a realignment of the molding stations in the foundry area and double potential monobloc propeller and controllable pitch propeller blade production. The other 6,000 square feet will be added to the machining area. Construction will begin immediately and is slated for completion in May 1989.

The expansion was necessitated by record sales in 1987 and 1988. During 1988 alone, Pascagoula has received 30 of 37 spare marine propeller orders placed by The Naval Sea Systems Command (NavSea). Recent NavSea orders have included spare propellers for the LKA Charleston class amphibious cargo ships, LCC Blue Ridge class amphibious command ships, FF 1052 Knox class frigates and the CV 67 John F. Kennedy class multipurpose aircraft carriers.

In addition to the NavSea orders, Bird-Johnson's Pascagoula operation is working on new construction propeller orders for several U.S. and foreign customers and are pouring controllable pitch propeller (CPP) blades for both intracompany and outside customer CPP system production. With orders booked into the 1990s, they have the largest work backlog in their history and expect to increase their personnel base by 20 before the end of 1989 to meet the demand. This will reflect a near tripling of staff since Bird-Johnson's 1986 acquisition of the facility.

Bird-Johnson Company has been a world leader in the manufacture of CPP systems for over 30 years. Since their 1986 purchase of the former Pascagoula and Seattle, Wash., Coolidge fixed pitch propeller manufacturing plants they have become the only fully integrated marine propeller manufacturer in the U.S.

Bird-Johnson Company is a wholly owned subsidiary of Axel Johnson Inc., a privately held, multi-industry corporation headquartered in New York.

For more information and free literature on Bird-Johnson,

Circle 66 on Reader Service Card

Marchand Reelected Head, Mid-Gulf Seaports Marine Terminal Conference

Doug Marchand, general manager/port director of the Port of Galveston, has been elected to serve a second term as chairman of the Mid-Gulf Seaports Marine Terminal Conference.

The Conference, founded on November 25, 1966 by the Ports of New Orleans, Lake Charles, and Baton Rouge, has grown to include all of the Gulf ports from Tampa, Fla., to Brownsville, Texas.

The Conference addresses port terminal rates, rules and regulations in connection with services and facilities provided by port authorities.

Other officials include vice chairman **James Pugh**, Port of Houston, and secretary/treasurer **Mike Steele**, Port of Galveston.

ELECTRONICS UPDATE

National Marine Names Deborah L. Dupre VP, Information And Planning

The New Orleans-based river transportation company of National Marine, Inc. recently announced that **Deborah L. Dupre** has been promoted to the position of vice president, information and planning.

Ms. **Dupre** joined National Marine in 1983 as a systems analyst and was promoted to manager, information systems in 1985. She is responsible for the development and implementation of TRAK, the computerized barge tracking system. Her new position will focus on cost and new venture analysis.

Lister Chain To Open U.S. Anchor Chain Plant —Literature Available

Lister Chain & Forge Inc., a recently incorporated U.S. company, associated with 78-year-old Canadian chain-making and steel forging concern Lister Bolt & Chain, Ltd., Vancouver, B.C., recently announced it would commence the manufacture of ship anchor chain in the U.S. by early April 1989.

Located near Bellingham, Wash., Lister Chain & Forge will occupy five acres of industrial land and a 16,000-square-foot concrete block building.

With chain-making, heat-treating and testing equipment supplied by ESAB AB, a subsidiary of Swedish company ASEA, Lister Chain & Forge will be able to produce all sizes of marine anchor and mooring chain from 3/4-inch through 4-3/4-inch diameter.

Lister Bolt & Chain, the Canadian parent and flagship of the Lister Group of companies, produces shipboard anchor chain for the U.S. and Canadian Navies, as well as other types of chain and steel forgings for commercial marine and industrial requirements.

Lister products and facilities are recognized by many classification societies including the American Bureau of Shipping, Lloyd's Register of Shipping and the American Petroleum Institute.

For free literature detailing the product line of Lister Chain & Forge,

Circle 9 on Reader Service Card

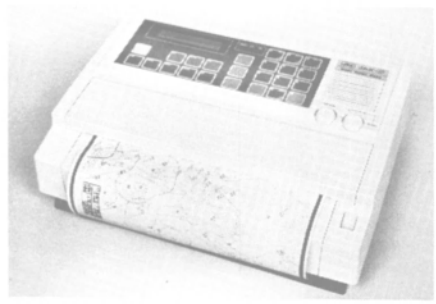
Compact Weather Facsimile From Raytheon Can Be Programmed For Unattended Operation

The new JAX 9 Weather Facsimile Receiver from Raytheon produces high-resolution satellite photos and other recordings in 16 gradation levels on 10-inch thermosensitive paper. Because of its built-in timer feature, the JAX 9 can be preset to start and stop during selected broadcasts, allowing fully unattended operation.

The JAX 9 offers automatic and manual control for phase matching, selection of scanning speed (60, 90, 120, or 240 scans per minute), index of cooperation (288 and 576), and paper feed.

Up to 100 weather station frequencies can be programmed into memory, using keypad controls.

The JAX 9 has a double superheterodyne, synthesized receiving system with a frequency range of 2-24.9999 MHz. It operates on 11 to 40 Vdc.



JAX 9 Weather Facsimile from Raytheon.

The JAX 9 has passed Raytheon's tough environmental tests for shock, vibration, temperature extremes, and resistance to corrosion, fungus, and water penetration.

For more information on Raytheon's new JAX 9 Weather Facsimile Receiver,

Circle 1 on Reader Service Card

Valve Cage Repairing: An Example Of MWH's Service To The Customer

—Literature Offered—

Valve cages, whether water-cooled or uncooled, may have some inherent weaknesses which can lead to serious defects after some thousand running hours. The sensitive spots are the cooling channels, weld area, seat coating and the anti-corrosion coating.

The damaged areas can be repaired economically in the factory and, according to Markisches Werk Halver (MWH), customers are delighted about the quality of the reconditoned cages, and about the fact that they are more cost effective than new replacement cages.

MWH offers a valve reconditioning service which is able to deal with nearly all types of cages, irrespective of whether these were originally manufactured by MWH.

First of all, the valve cages are checked completely in order to determine whether an economic repair can be effected, and to ensure that after repair the valve cages will operate for the designed period. Thereafter, some or all of the following work will be carried out, depending on the actual condition of each valve cage: seat repair with new armor coating followed by ultrasonic testing; reapplying the anti-corrosive coating; cleaning of the cooling channels; pressure testing of the cooling chamber, repairing if necessary; checking of the valve guides, replacing if necessary.

As a special service to customers, MWH will repair valve cages on modern machinery in the workshop.

One of the critical points of the repair work is the perfect matching of the valve head seat angle to the cage seat. This precision work can only be carried out on modern machinery in the workshop.

At the end of the reconditioning, each cage is submitted to the same control procedure as a new one. In this way customers can be sure that all cages reconditioned by MWH fully comply with their requirements.

In order to provide a quick service, MWH is in a position to supply reconditioned cages on an exchange basis.

For further information and free literature from MWH,

Circle 20 on Reader Service Card

Powered by two Detroit Diesel main engines, the Isabela II, converted from the oilfield supply boat Carl B. Downs by Runyan Machine & Boiler Works, Inc., Pensacola, Fla., will have a new life as a passenger excursion vessel operating in the Galapagos Islands.

Runyan Machine Completes Conversion Of Supply Boat Into Passenger Vessel

'Reborn'Cruise Boat Will Operate In Galapagos Islands

Runyan Machine & Boiler Works, Inc., Pensacola, Fla., has delivered the Isabela II, an oilfield supply boat converted to passenger service for Empresa Turistica Internacional, C.A. The boat will operate in the Galapagos Islands off the coast of Ecuador.

The 36-passenger Isabela II has an overall length of 183 feet 6 inches, beam of 38 feet and depth to main deck of 13 feet. Prior to conversion, the vessel was 166 feet long.

Main propulsion is provided by two Detroit Diesel 16V-149 engines, developing a total of 1,800 bhp at 1,800 rpm, driving two 60-inch diameter stainless steel propellers through reversing reduction gears. Electrical power is provided by two 220-kw Lima generators driven by Detroit Diesel 12V-71 engines. The generators have automatic starting and paralleling capability through the main switchboard during peak demand periods. The 75-kw emergency generator is driven by a Detroit Diesel 6-71 engine and also has automatic starting capability in accordance with SOLAS regulations.

Built from a design provided by the owners, Schuller and Allan and Rodney E. Lay & Associates, the vessel meets both SOLAS and American Bureau of Shipping standards. Passengers are accommodated in spacious outside cabins with two lower beds, shower and toilet. Each double occupancy cabin is fitted with individually controlled air conditioners, music-P/A system and emergency call system. She has a reading/game room, elegant bar, gift shop, and sun deck featuring a jacuzzi and exercise equipment. The dining room seats all 36 of the vessel's passengers at one sitting. The menu will feature Ecuadorian and Continental cuisine.

Fully equipped to meet SOLAS 1984 regulations for a 36-passenger cruise vessel engaged in international voyages, the Isabela II is equipped with two Mulder and Rieke 25-person, semi-enclosed motor lifeboats on Schat gravity davits, two 20-person and three 10-person inflatable life rafts, and a 5-ton hydraulic small boat crane.

Rockment TNF bulkhead system, continuous B class ceilings and joiner doors were installed throughout all passenger cabins, crew accommodations, public areas and the galley to achieve structural fire protection.

For free literature detailing the boatbuilding services of Runyan Machine,

Circle 17 on Reader Service Card

ISABELA II
Equipment List

Main engines (2)	Detroit Diesel
Generator engines	Detroit Diesel
Generators	Lima
Emergency generator engine	Detroit Diesel
Radar	Furuno
SSB radiotelephone	Radio Holland
VHF	Raytheon
SatNav	Magnavox
Switchboards	Contech
Engine alarms	Contech
P/A system	TOA
Telephone system	TOA
Windows	Beclawat
Hydraulic watertight doors	Walz & Krenzer
Joiner bulkheads, linings ceilings & doors	Rockment
Galley equipment	Hobart
A/C	Carrier
Desalinators	Offshore Marine Labs
Small boat crane	Alaska Marine Crane
Lifeboats	Mulder and Rieke
Davits	Schat

Willcox North America Opens New Service Center —Literature Offered

Willcox North America, Inc., a manufacturer of composite flexible oil and chemical hoses used for loading/unloading barges and tankers, recently opened a sales, service and distribution center in Houston, Texas.

The new center, which is located at 9366 Wallisville Road, Building 170, Houston, Texas 77013, telephone: (713) 675-6116, fax: (713) 675-5488, is headed by **Jack Marshall** with **Randy Francis** as sales manager and **Joseph Marentette** as supervisor of production. The Houston center will conduct sales and distribution of Willcox products for the Southern Region. Willcox's Garfield, N.J., office will continue to handle sales and distribution in the Northern Region.

Both locations will stock and service cargo hoses up to 10-inches in diameter with lengths up to 60 feet.

For free literature detailing the full line of oil and chemical hoses offered by Willcox North America,

Circle 32 on Reader Service Card

CANADIAN MARITIME INDUSTRIES ASSOCIATION'S 41st ANNUAL TECHNICAL CONFERENCE AND CANADIAN SHIPBUILDING & OFFSHORE EXHIBITION

Montreal, Canada, February 20-21

The Canadian Maritime Industries Association's (CMIA) 41st Annual Technical Conference will be held at Montreal's Queen Elizabeth Hotel on February 20-21, 1989.

"As a result of the resounding success of the Canadian Shipbuilding & Offshore Exhibition, we have decided to include CSOE '89 on the program for our 1989 conference," said CMIA president **J.Y. Clarke**. "This added feature has resulted in a tremendous interest in the conference, the largest technical marine conference held in Canada. CSOE'89 will be a major component of the conference."

Mr. **Clarke** pointed out that the technical conference's open sessions, which begin at 9 a.m. on February 21, will be presented in two adjacent rooms, the Jolliet Room and Marquette Room.

Some of the papers listed in the preliminary program include: "Design Development and First Experience with the Bergen Diesel Type B Medium Speed Engine," by **L.M. Nerheim**, Bergen Diesel A.S.; "Diesel Engines in Naval Applications," by **H. Pleimling**, Deutz MWM; "Trump Noise Control," by **K. McKeever**, Pratt & Whitney Canada Inc.; and "Construction and Project Management of Icebreaker Oden," by **B-G Renbourg**, GVA Canada, and **J. Falkman** and **G. Lilijestrom**, GVA Sweden.

CSOE '89 will be located on the convention floor opposite the technical conference rooms. CSOE'89 will help bring together many sectors of the marine industry, including electronics, communications, navigation and electric equipment suppliers, shipbuilders and ship repairers, diesel engine and propulsion equipment manufacturers, and other marine systems, services and parts companies. Exhibition hours will be 2 p.m. to 6 p.m. on Monday, February 20, and 10 a.m. to 5 p.m., on Tuesday, February 21.

Mr. **Clarke** noted that the 1988 technical conference and exhibition attracted well over 900 persons from across Canada and around the world, including international media and government officials.

For further information about the conference and exhibition, as well as CMIA, contact: Mrs. **Joy MacPherson**, secretary/treasurer, Canadian Maritime Industries Association, P.O. Box 1429, Station B, Ottawa, Ontario, Canada K1P 5R4; telephone: (613) 232-7127; telex: 053-4848; fax: (613) 232-2490.

TECHNICAL PRESENTATIONS

Jolliet Room

"Integrated Logistic Support—A Canadian Approach," by **B. Hough**. AMTEK Management.

"Design Development and First Experience with the Bergen Diesel Type B Medium Speed Engine," by **L.M. Nerheim**, Bergen Diesel A.S.

"Diesel Engines in Naval Applications," **H. Pleimling.** Deutz MWM.

"The Pressurized Light Water Reactor—A Well Optimized Marine Propulsion Power Source," by **P. Gumley, F.N. McDonnell** and **R. Humphries**, Atomic Energy of Canada Ltd.

"Trump 1000-KW Diesel Generator," by **G. Munro**, Pratt & Whitney Canada Inc.

"Trump Noise Control," by **K. McKeever**, Pratt & Whitney Canada Inc.

"Practical Applications in CADD for 3-D Machinery Space Design and Modular Outfitting," by **D.J. Fong** and **P. Eng**, RDS Engineering.

"Pump Application to Ships," by **C. McNeil**, Energy, Mines & Resources.

Marquette Room

"The Hatchcoverless Containership—A New Concept," by **T.R. Fisher**, Advance Ship Design Pty., Ltd.

"Fracture Control for Steel Marine Structures," by **W.R. Tyson, M. Braid** and **V. Scepanovic**. Energy, Mines & Resources.

"Construction and Project Management of Icebreaker Oden," by **B-G Renbourg**, GVA Canada, and **J. Falkman** and **G. Lilijestrom**, GVA Sweden.

"Investigation of the Seakeeping Qualities of a Canadian Forces Research Vessel," by **A.F. Aboulazm**, Marine Institute.

"Ship Resistance in Pack Ice," by **A.F. Aboulazm**, Marine Institute, and **D. Muggeridge**, Memorial University.

"Propulsion Tests on the Class 4 Icebreaker M.V. Kalvik," by **P.L. Semery**, Transport Development Center.

"Why Welding Certification," by **D.E.H. Reynolds** and **P. Eng**, Canadian Welding Bureau.

"Electric Propulsion Systems—The Way of the Future," by **D. Peters**. General Electric Canada Inc.

CSOE '89 Exhibitors

Alfa Laval
Amtek Group
British Consulate General
British High Commission
CAE Electronics
Canadian Shipbuilding & Engineering
Canadian Submarine Consortium
Canadian Welding Bureau
CANMET-MTL
Charland Thermojet
Contro Valve Equipment
CSE Submarine Group
Delmare
Deutsch Metal Components
Devtek
Direction des Construction Navales
Dominis Engineering
ECS Electrical Cable Supply
Envirovac
GE Canada
GVA Canada
Hamworthy Canada
Hermont/B. Fortin
Hewitt Equipment
Hurum Marine
IMO Delaval
Indal Technologies
Institute for Marine Dynamics
International Paints (Canada)
Jastram
John Crane Canada
JSC
Key Marine Industries
Krupp MaK Diesel
Leroy Somer Canada
Litton Systems Canada
MAG Agencies
Marine Institute
Marine Sales & Service
Martech Equipment
McCann Equuipment
Merlin Gerin (Canada)
MIL Group
Montreal Valve Reseating
Mount Royal/Walsh Inc.
Paramax Electronics
Patlon Industries
Peacock
Quebec Ministry of Industry, Commerce & Technology
Quebec Ministry of Regional Industrial Expansion
RDS Engineering
Saint John Shipbuilding
Securiplex Systems
Siemens Electric
SNA Canada
Sulzer Canada
Swagelok Canada
Thomson CSF Systems
Thomson-Gordon Ltd.
Trafalgar Consortium
Wartsila Marine
Westinghouse Canada
Wilson Machine

Call For Papers For Symposium On National Shipbuilding Research

The National Shipbuilding Research Program Ship Production Symposium, which will be held September 13-15, 1989, at the Sheraton National Hotel in Crystal City, Washington, D.C., is soliciting unclassified abstracts and papers on a wide range of topics related to advanced shipbuilding procedures.

The symposium provides a forum for technologists, potential users (commercial, industrial and military), and concerned others to exchange and discuss new ideas in the field of advanced shipbuilding procedures. The theme of this symposium is "Advancing the Integration of Ship Design, Production and Repair."

Papers are being solicited which present the results of research or practices that advance the art/science of ship design, production and repair processes. Topical areas may include: New Build Strategies for Ship Production, Innovative Design Methodologies, Ship Production Operations and Economics, Application of Emerging Technologies, Shipyard Management Innovations, and any other areas that result in increased quality,improved productivity or reduced cost.

Twenty-four papers are planned to be presented during the three-day symposium, which is being sponsored by the Ship Production Committee and hosted by the Chesapeake Section of The Society of Naval Architects and Marine Engineers (SNAME).

The deadline for submitting abstracts, which should be no more than 500 words, is February 28, 1989. Abstracts should include paper title, principal author, organization, address and telephone number. Notice of acceptance will be issued on March 31, 1989, with final manuscript due June 15, 1989.

Abstracts should be sent to **Robert W. Schaffran**, Head, Manufacturing Systems Division (Code 185), David Taylor Research Center, Bethesda, Md. 20084-5000.

Shieldings To Buy Versatile Pacific

B.C. Pacific Capital Corporation recently signed an agreement to sell its wholly owned subsidiary Versatile Pacific Shipyards Inc. to Shieldings Incorporated, a private, Canadian-owned company headquartered in Toronto and Vancouver which has a number of major investments in manufacturing and other business sectors throughout Canada.

Versatile Pacific, which is one of the largest shipbuilders and ship repairers in western Canada, operates two yards, one in Vancouver and one in Victoria. The shipbuilder has an order backlog of about C$50 million, including a C$16.4-million contract to build a hydrographic survey vessel and a C$35.1-million order for the construction of two Type 500 search and rescue vessels, and is expected to shortly sign a contract with the Canadian Government worth C$347 million to build a Polar Class 8 icebreaker.

Shieldings is purchasing the shipbuilder with the intention of arranging significant industrial diversification to enhance and strengthen the future operations of Versatile Pacific Shipyards.

The closing of the sale and transfer of ownership is expected in early 1989.

For free literature detailing the shipbuilding services of Versatile Pacific,

Circle 12 on Reader Service Card

SPD Technologies Marks First Full Year And 100th Anniversary In Ceremonies

SPD Technologies recently marked its first full year as an independent operating company and also commemorated the 100th anniversary of its predecessor company and the birth of its principal product, the circuit breaker. Ceremonies marking the first and 100th anniversaries were held at the company's headquarters in Philadelphia.

A bound book, tracing the 100-year evolution of the company, will be given to all employees to commemorate the occasion.

The company now called SPD Technologies was originally founded in Philadelphia in 1888 as Cutter Electrical Manufacturing Co. Soon thereafter, founder Henry Cutter and associates developed an improved circuit breaker on what was called the "inverse time element" principle.

The inverse time element (ITE) principle was to set the standard in circuit breaker design, and lead to the renaming of Cutter as I-T-E Circuit Breaker Co. I-T-E later merged with Imperial Eastman and became I-T-E Imperial, then was acquired by Gould Inc., and finally became SPD Technologies when Gould spun it off to its management group in 1987.

The company is the nation's largest producer of military circuit breakers, and a prominent supplier of other electronic controls for electrical systems protection in the U.S. and abroad.

For more information and free literature from SPD Technologies,

Circle 75 on Reader Service Card

American Durweld Sales Offers Free Literature On Cold Welding Kits

American Durweld Sales, Scituate, Mass., is offering literature detailing its Velodur® and Durmetal® Cold Welding System Kits.

Engine oil or water leaks, piping system fractures, eroded pump casings, holded transformers—these problems and many others can now be repaired on the job and without costly shutdowns.

The latest in modern cold welding technology is now available in kit form from American Durweld Sales as a cost-effective addition to any tool kit.

Erosion and cavitation damage can be repaired on-the-spot without hot work and long downtime delays.

These cold welding kits are now available in various sizes to fit any need.

For free literature detailing Velodur and Durmetal Cold Welding System Kits,

Circle 101 on Reader Service Card

U.S. Extends Limit Of Territorial Waters To 12 Miles Off Coast

The U.S. became the 105th nation to formally extend its territorial waters to 12 miles off its coast from the former 3-mile limit after a recent proclamation was issued by President **Reagan**.

The extension of U.S. territorial waters will not affect fishing or mineral rights, and no major changes are foreseen for ship operations.

The 12-mile limit, which went into effect immediately, will apply to the waters off the coastal U.S., Puerto Rico, U.S. Virgin Islands, Guam, American Samoa, Northern Mariana Islands and other U.S. territories and possessions.

3. Maj Wins Order For Four Cargo Ships

The Rijeka, Yugoslavia, shipyard of 3. Maj was recently awarded a contract by the Chinese-Polish Joint Stock Shipping Co., Shanghai, China, to build four 22,000-dwt containerships.

The 1,000-TEU-capacity vessels, yard Hull No.s 657, 658, 659 and 660, will each have an overall length of 557 feet, breadth of 90.2 feet and draft of 30.5 feet. Each will be powered by a single Sulzer-3. Maj 5RTA62 diesel engine with a maximum continuous rating of 9,500 kw at 109 rpm.

The ships will be classed by Lloyd's Register of Shipping, + 100 A1, Ice Class 1C + LMC, UMS notation "Strengthened for Heavy Cargoes," and Polish Register or Chinese Register of Shipping for equivalent class.

The total hold and 'tweendeck capacity of each vessel will be 32,000 m^3. Each vessel will be fitted with two 245-ton-capacity Hagglunds-3. Maj single deck cranes and one twin crane.

Accommodations will be provided for between 31 and 36 persons.

For free literature detailing the shipbuilding services of 3. Maj,

Circle 100 on Reader Service Card

New US-China Pact Offers Opportunities To Shipping Lines

U.S.-flag shipping and U.S. trade interests will benefit as a result of a new four-year maritime agreement between the U.S. and China recently signed in Washington, D.C., by Secretary of Transportation **Jim Burnley** and **Qian Yongchang**, China's Minister of Communications.

"This agreement, which caps a five-year effort to improve U.S.-China maritime relations, will provide new opportunities for U.S. carriers serving China," Secretary **Burnley** said.

Negotiations were completed late last year during the U.S. delegation's visit to Beijing.

Two key provisions of the maritime agreement are contained in exchanges of letters on cargo sharing and port access that are an integral part of the agreement.

The cargo-sharing provisions pledge the intention of each party to provide for parity in bilateral liner cargo carriage and to ensure vessels of each nation at least one-third of such cargoes. Flexible formulas are provided for annual verification.

Bulk cargo is not covered by the cargo-sharing provisions, but the two countries agreed to further consultations towards facilitating substantial participation of U.S.-flag bulk vessels in the bilateral bulk trade.

Under the agreement, U.S.-flag vessels may enter 40 listed Chinese ports upon 24 hours advance notice. Chinese vessels, on the other hand, will be able to enter all U.S. ports, except 12 that have been designated national security risks, upon 24 hours notice.

The agreement also deals with a number of technical matters, including vessel documentation, crew identity documents, crew shore leave, handling of maritime accidents, convertibility of payments, technical exchanges, and most favored nation treatment with respect to the payment of tonnage duties, as well as future consultations.

Moran Towing Names Donald J. Peck VP And General Manager

Donald J. Peck, who recently transferred to Moran Towing of Florida, Inc. from an affiliated company, has been appointed vice president and general manager, according to **Thomas E. Moran,** chairman and chief executive officer.

ABB Industrial Announces New Standard Drives Division In Connecticut

ABB Industrial Systems Inc. of New Berlin, Wisc., a subsidiary of Asea Brown Boveri, one of the world's largest manufacturers of electric drives, has announced the formation of a Standard Drives Division in Orange, Conn. This new unit combines the resources of Parametrics of Orange, a wholly owned subsidiary of Asea, with RMC of Broomfield, Colo., a wholly owned subsidiary of Brown Boveri Corporation. The Standard Drives Division will market a broad line of AC and DC drives ranging from fractional to 600 hp, and servo-drives up to 75 hp. Earlier this year, Asea merged with Brown Boveri Corporation creating ABB, now one of the world's largest electrotechnical companies with 180,000 employees and 800 operations in over 140 countries.

For more information and free literature on Standard Drives Division of ABB Industrial Systems,

Circle 71 on Reader Service Card

SPD Technologies Completes Acquisition Of Dyncorp Unit

SPD Technologies, a leading manufacturer of advanced electronically controlled electrical systems protection equipment, has completed its previously announced acquisition of the ship repair division of Pac Ord, Inc., a wholly owned subsidiary of Dyncorp.

SPD president **George M. Gordon** said the addition of Pac Ord's five service and repair facilities will make SPD one of the leading independent repair specialists of shipboard equipment in the nation.

Pac Ord has facilities in Seattle, Wash., San Diego, Calif., Portland, Ore., Jacksonville, Fla., and Norfolk, Va. The unit provides repair and overhaul services for shipboard communications systems, weapons systems, air traffic control systems, sonar, radar and antenna systems, electronic warfare hardware and electrical equipment.

With the acquisition, SPD will now provide on-site repair and overhaul facilities at all primary U.S. Navy home ports.

For more information and free literature on SPD Technologies,

Circle 51 on Reader Service Card

Marine coatings & corrosion control

Last year, the U.S. Senate passed the "Organotin Antifouling Paint Control Act of 1988" which controls the application of tributyltin (TBT) antifoulings in the U.S. In response to this new legislation, several major marine coatings suppliers have introduced new TBT-free antifoulings. Additionally, a number of coatings suppliers have also expanded their marine lines with the addition of new, high technology products.

The following is a brief overview of the latest products and services introduced by the major suppliers of marine coatings and corrosion-control systems. This review is based upon their responses received as of press time.

FOR MORE INFORMATION

If you wish to receive additional information on any of the products or services described in this review, circle the appropriate reader service number(s) on the postage-paid reader service cards near the back of this issue.

AMERICAN ABRASIVE METALS

Circle 85 on Reader Service Card

American Abrasive Metals Company, Irvington, N.J., is offering free literature on its multipurpose, resin-based safety coating which can be applied to floors, stairs, ramps, and decks aboard commercial boats.

Known as Epoxo, the improved safety coating is particularly useful to marina operators and commercial fishing boat owners to reduce hazardous slippery conditions.

The company reports that maintenance personnel will find cleanup fast and easy since Epoxo is unaffected by harsh detergents. Depending on location, Epoxo can be applied by roller or trowel over properly prepared concrete and steel to protect these surfaces against spills such as water, oil, solvent, grease or hydraulic fluid, while providing sure footing to personnel.

Epoxo acts as a barrier against surface penetration by spills and can withstand cracking or disintegrating under heavy vehicular and foot traffic.

AMERON MARINE

Circle 86 on Reader Service Card

Increasing concern over the use of tributyltin (TBT) antifoulings and their release of tin into the marine environment, has resulted in UBEM NV of Antwerp, Belgium, specifying the application of an Ameron Marine tin-free antifouling for its 170,000-dwt bulk carrier Belval.

As part of the vessel's scheduled underwater hull maintenance and repair work, its previous Ameron organotin A/F system was overcoated with Amercoat® 70 ESP, a tin-free self-polishing antifouling.

The generally good and clean condition of the boottop, vertical bottom and bottom flats meant that only a limited amount of abrasive blasting was required, particularly to prepare areas which had suffered mechanical damage.

Bare metal areas were treated with a touch coat of Amerlock® 400 Aluminum, and then a touch-up coat of ATMC 540 High Solids Vinyl Tar, to provide the vitally important anticorrosion protection.

This treatment provided the base for two touch-up coats of Amercoat 70 ESP antifouling, at 80 microns each, followed by a full coat at 100 microns.

Chlor-rubber primer and finish coatings for the topsides were also supplied by Ameron Marine Coatings.

Amercoat 70 ESP is a high-performance, tin-free antifouling, marketed and sold by Ameron to market segments and customers who need and want this product as an alternative to organotin copolymer antifoulings.

According to a spokesman for Ameron Marine Coatings, its product research and development has not stopped with tin-free antifoulings. It is highly conscious of the growing worldwide concern with problems related to ecology and the environment, and is continuing to work on low toxicity and non-toxin alternatives to both tin and copper-based antifouling products.

CTI COATINGS

Circle 87 on Reader Service Card

CTI Industries, Inc., Fairfield, Conn., recently formed a new coatings division, CTI Coatings, which will specialize in the formulation and application of high-performance coatings for high value and critical items.

Staffed by a unique group of engineers, estimators and applicators, CTI Coatings offers extensive experience in marine, power generation and chemical processing engineering. **Jeff Longmore**, the newly appointed division manager, has more than 20 years of technical and plant management experience in the marine and industrial coatings industry.

CTI Specialty Coatings are formulated to provide superior anticorrosion protection and repair for all exposed surfaces. Heat exchanger interiors, steel and concrete tanks, hulls, rudders, pumps and housings, exhaust ducts, piping, and FRP structural repair are but a few of the uses for CTI's high performance coatings.

CTI specializes in quality controlled on-site application. Recent investments in new application and test equipment and the introduction of new structural repair processes, further strengthen the firm's commitment to providing high quality, turnkey coating systems. The firm also recently expanded its Stratford, Conn., plant with the addition of an extensive blasting and coating facility. The facility is equipped to handle abrasive blasting and coating of objects up to 10,000 pounds.

CTI Industries is a full service organization providing restoration and preventive maintenance service and products for heat exchangers, condensers and associated equipment.

Operating worldwide, CTI serves major utilities, refineries, chemical processing plants, the merchant marine and the U.S. Navy.

DEVOE COATINGS

Circle 88 on Reader Service Card

A world leader in high quality technologically advanced protective coatings, Devoe Coatings Company, with a history dating back to 1754, is one of the oldest corporations in the U.S.

Devoe Coatings offers a complete line of proven performance VOC compliant coatings extending from alkyds to urethanes.

Catha-Coat 318 is a solvent base inorganic zinc primer. Its 3.19 pounds/gallon VOC meets solvent emission requirements. The company claims it can be recoated in less than two hours, and it is virtually impossible to make this coating mud crack or produce top coat bubbling.

Bar-Rust is Devoe Coatings' trademark for a series of unique, advanced technology epoxies. These products can be utilized above and below the waterline. Most have low temperature cure and recoat times of less than four hours. VOC for this advanced technology line are 2.4 pounds/gallon for Bar-Rust 235, 1.41 pounds/gallon for Bar-Rust 236, and 2.72 pounds/gallon for Bar-Rust 239.

Devoe has developed a group of 100 percent solids epoxy coatings that are mixed and applied with standard painting practices and equipment. There is no expensive plural equipment required to obtain epoxy materials with a VOC of "0". These materials can be applied up to 1/2-inch thick and provide excellent abrasion and water immersion resistance. Devran 184 is a 100 percent solids epoxy tank coating. Devran 188 is a 100 percent solids epoxy hull coating, particularly effective on icebreakers. All of Devoe's 100 percent solid epoxies have a "0" VOC and yet a working pot life of two hours.

Devran 646 and 648 are Devoe's water-base epoxies. These unique coatings have a VOC of less than .5 pounds/gallon. They can be used as not only exterior coatings, but as tank linings for water, ballast and fuels. Both of these materials are not only water-based, but water-thinned, producing not only extremely low VOC, but also, no flash point.

Devoe is also recognized for its leadership in antifouling coatings. A full range of antifouling materials with release rate guidelines to Devoe's ABC #3 Tin-Free Ablative.

DREW AMEROID MARINE

Circle 89 on Reader Service Card

Drew Ameroid® Marine now offers a specially designed air-powered spray system to apply Magnakote® rust preventive coating. The equipment operates with ship's service air, at a pressure of 20-100 psi, and enables the user to get a uniform, adherent coating, quickly and easily.

The complete system consists of a filter/regulator, pump, hose, suction tube and a unique spray gun with turret nozzle. The multijet nozzle has four, easy-to-set detented spray settings allowing optimum Magnakote coating coverage over a range of spraying distances, minimizing the need for staging, and reducing overall labor costs. One customer reports an 80 percent reduction in staging when using the equipment for spraying Magnakote coating. The spray gun assembly is designed to provide reliability and safety without placing physical strain on the operator. The system may also be used for a variety of other shipboard chemical applications and to facilitate cleaning and maintenance jobs.

Magnakote rust preventive coating is a patented compound of organic and inorganic chemicals in a matrix of gelling and drying oils. It is an inexpensive and durable alternative to traditional ballast tank coatings, sacrificial anode systems and older technology, non-drying, float coatings. Magnakote coating requires minimal surface preparation and can be applied in port, in a shipyard, or in transit by the ship's own personnel. Magnakote dries in 48 hours and can be applied to a damp or dry surface. Because of its unique properties, it can also be applied over rusted or new steel.

As part of Drew's Magnakote "Life Preserver Program," (service available at selected ports) ships' ballast tanks are inspected by qualified Drew representatives, who evaluate and advise on preventive maintenance and recoating requirements. After application, the shipping company is periodically reminded of the recoating needs of the tank, thereby assuring maximum corrosion protection.

(continued)

REPAIR & CONVERT

Why you should repair (or convert) your ships at a Astilleros

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.
12 dry docks and 2 floating docks, with capacities up to 400.000 d.w.t.

Our conversion experience Ask for the facts. Astilleros has successfully converted all kinds of vessels (our recent contracts include the conversion of a 21.000 dwt Bulkcarrrier into a molten Sulphur carrier for Navimin). And Astilleros is a well known leader in FPSO and FSU and in Internal Blasting and Coating.

A spread of specialized yards.
Along the long coastline of Spain, and covering all tonnages.

And the Spanish weather...
Last but no least: an excellent climate means that work is rarely heald up by adverse weather.

As Astilleros offers, also, the best price and surprising financial packages, don't you think it's high time to check on us?

ASTILLEROS ESPAÑOLES

For further information: Astilleros Espanoles, S.A.
Padilla, 17
28006 Madrid
Tel. (341) 435 78 40
Telex 27648 ASTIL-E
Fax. (341) 276 29 56

The Shipbuilders of Spain

(continued)

ELECTROCATALYTIC

Circle 90 on Reader Service Card

Electrocatalytic, Inc., Union, N.J., offers the Capac® impressed current protection system and the Chloropac® system for commercial and military marine applications.

Capac impressed current protection system is a leading tool selected by ship management to extend drydock intervals.

Capac systems employ hull potential control which, the company claims, is superior to conventional non-controlled sacrificial anode protection. The Capac large ship anodes employ clad platinum metal on niobium and tantalum. The clad anode gives life and quality higher than either electroplated, or thermal type coated anodes.

The potential control of all Capac systems is guided by robust guarded, silver-silver chloride electrodes giving stable long life performance.

Used to eliminate microbiological-induced corrosion, the Chloropac system has been selected by over 1,000 shipowners and offshore operators to control marine fouling in seawater, firefighting, cooling and general service piping.

The Chloropac system is environmentally acceptable because it does not add any heavy metal or biocidal chemicals to the water nor does it require acid cleaning.

The Chloropac system is very efficient. Water is split in the electrochemical cell. Oxygen is added to the halogen in seawater forming hypobromite and hypochlorite. The halogens, especially hypobromite, are very effective biocides in extremely low concentrations, typically 200 parts-per-billion. Any organism that attempts to attach itself to marine metals is subject to sterilization after several days of treatment. Once the bacteria, which destroy the metal's corrosive resistant film, are eliminated, the low level hypobromide and hypochloride enhance the metal's film forming.

Electrocatalytic manufactures all the components of its Capac systems. Each Capac system is tailored for the individual user's requirements. For military applications with 7 to 10 year drydock intervals, specified capacity exceeds 100mA/m^2. Commercial applications for a five-year drydock interval typically employ an 80 mA/m^2 design standard.

Shipboard Chloropac models are stocked in sizes from 0.01 pounds/hour to 11 pounds/hour capable of treating all flow rates up to 70,000 gpm. The units are backed by a worldwide network of service engineers with spare parts in stock.

HEMPEL'S

Circle 91 on Reader Service Card

Hempel's Marine Paints has introduced a powerful, computer-based data storage and retrieval system, Shipdata, designed to extend the effectiveness of the firm's popular "tailor-making" approach to coatings selection.

In addition, Hempel's has also introduced a range of tin-free antifoulings for the commercial shipping market.

Based on data Hempel's has accumulated on ships coated with its products over the past decade, the Shipdata system already contains some 25 million individual items of information (registrations) on about 13,000 ships, covering newbuildings and drydockings.

Shipdata is used for performance analysis, feedback to research and development, case histories and customized reference lists.

The registrations are used for calculations for a particular ship or selected number of vessels, the condition both before and after drydocking, and to establish the basis for analysis of a particular coating system's performance, lifetime, etc.

Shipdata provides the information necessary for the preparation of truly tailored specifications giving, for example, reduced dry film thickness per coat or number of coats, or an evaluation of the safety margin or performance factor of each individual specification.

As for the coatings themselves, Hempel's new tin-free range, which covers both non-polishing and ablative antifoulings, involves new tech-

nology and the use of a novel antifoulant.

The company's popular, non-polishing coating, Classic, is now available in a tin-free version.

Hempel's new ablative antifoulings for the commercial shipping market function in a similar manner to copolymer types in that the applied film gradually diminishes through physical erosion during time in service. As with copolymer types, this provides for exposure of a fresh active layer of antifoulant.

The difference lies in their mode of action/control which (not being on the molecular level) may be condensed as a mainly physical, as opposed to chemical, process. In this sense, the ablatives can be considered as polishers rather than self-polishers.

INORGANIC COATINGS

Circle 92 on Reader Service Card

Inorganic Coatings, Inc., Malvern, Pa., manufactures and markets IC 531, a high-ratio, water-based, silicate/zinc coating.

Developed by NASA, IC 531 is based on breakthrough silicate technology which the company claims offers virtually permanent protection for steel. It is a no-cure inorganic zinc which dries in 30 minutes and can be topcoated in two hours or less. Because it is water-based, it has zero volatile organic compounds, thins with water and does not generate hazardous waste.

IC 531 is NAVSEA approved under Chapter 631, paragraph 631-7.97 of the Naval Ships Technical Manual and is currently being used in marine and offshore industries on a variety of equipment and applications.

Inorganic Coatings has taken the corrosion protection of IC 531 silicate/zinc and coupled it with high performance, water-based and high solids coatings to offer premium systems for nearly every application and environment. Inorganic Coatings representatives offer assistance with proper coating selection and specifications.

Inorganic Coatings has become a leader in informing the marketplace on the performance of water-based coatings and low VOC products. The company sponsors seminars on water-based coatings several times a year across the U.S., and is currently publishing a new catalog which not only addresses systems and products, but includes historical performance information and technical articles on corrosion, the economics of coating systems and coating selection.

INTERNATIONAL PAINT

Circle 93 on Reader Service Card

Tanker operators are now able to carry a much broader spectrum of "aggressive cargoes" with the use of International Paint Marine Coatings' Interchem TC 900, a tank coating series offering maximum flexibility of cargo carriage.

The Interchem TC 900 system utilizes innovative modified epoxy technology allowing a greater degree of chemical curing at ambient temperatures and, thus, a greater cargo resistance range compared to conventional epoxy and epoxy-phenolic systems. This is made possible by the reaction of a high molecular weight epoxy resin by way of its active hydrogen groups maximizing cross-link density within the film. The system offers the widest spectrum of chemical resistance currently available from organic tank coatings. It is the result of three years of concentrated research and development into marine tank coatings by UK-headquartered International Paint Marine Coatings.

Interchem TC 900 series offers tanker operators the opportunity to carry such diverse cargoes as unrestricted vegetable oils, ketones, caustic soda and methanol, without the need for the post heat curing procedures normally associated with tank coatings of similar in-service performance capabilities.

A key factor in this new tank coating's flexibility is its resistance to softening, even in low molecular weight solvent cargoes. This is due to the coating's optimized chemical and physical properties which result in a tough, resilient film which has

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Preview Article—The
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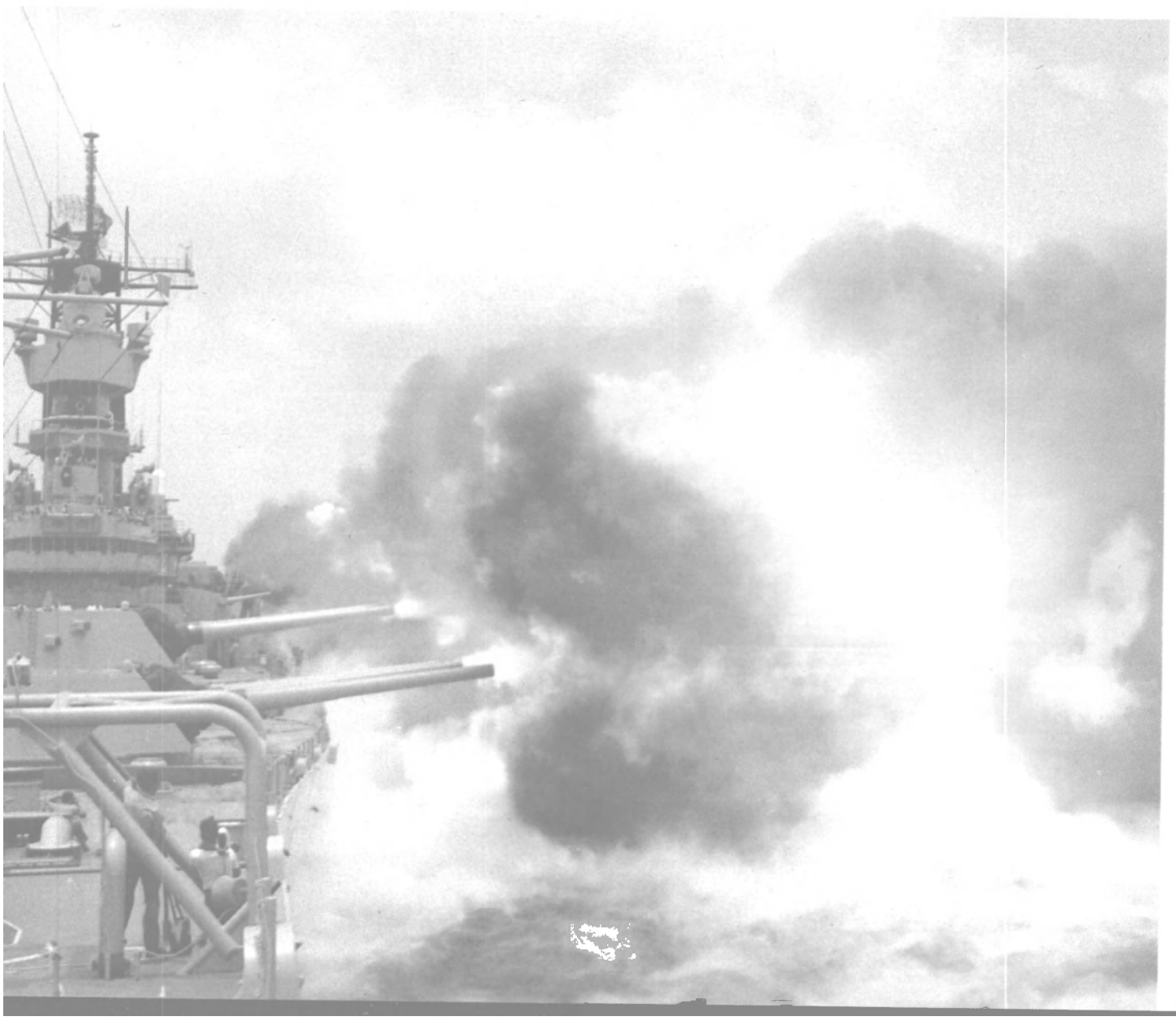

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Coatings Review

(continued)

less tendency to absorb cargo compared to conventional epoxy-based systems. For tanker operators, this may lead to faster turn-around times between cargoes as a result of easier tank cleaning.

Offering a broad spectrum of cargo resistance, Interchem TC 900 series is the premier product in the International Paint tank coating range, which includes the pure epoxy Intergard TH 700 series and Interzinc QHA zinc silicate as well as Intergard THB series pure epoxy.

Introduced to the marine market in 1987, Intergard TH 700 series has been successfully specified and applied to over 200,000 m² of cargo tanks.

Interzinc QHA series, an ethyl silicate, offers excellent performance against a wide range of neutral chemicals and solvents and has been applied to more than 200 vessels over the last 10 years.

This product range is supported worldwide by an experienced dedicated sales and technical team.

JOTUN VALSPAR

Circle 94 on Reader Service Card

Jotun Valspar is the Marine Coatings Division of the Valspar Corporation. Valspar is among the largest manufacturers of coatings in the U.S., having acquired within the past four years, Mobil's North American Coatings Division, Farboil Marine Coatings and Jotun A/S North American Marine Coatings.

As a result of these acquisitions, Jotun Valspar is among the leading suppliers of marine coatings. Of particular note is Jotun Valspar's supply of Sovapon Tank Coating to the marine industry, including the U.S. Navy. Sovapon Tank Coating Systems are formulated with epoxy resins that are cured or converted by a reaction catalyst at atmospheric temperatures.

The company reports Sovapon has been applied to liquid cargo tanks, and deep tanks on hundreds of vessels, with an outstanding record of success.

Sovapon tank coatings are applied as a two-coat system, and provide efficiencies by eliminating the need for steel renewals, preventing commodity contamination between cargoes, faster drainage of cargoes, and quicker tank washing and gas freeing.

The Sovapons are extremely durable, tough, and smooth with excellent adhesion, resistance to undercutting, peeling, and blistering. Additionally, Sovapon complies with FDA requirements, is accepted by regulatory agencies as a potable water tank lining, and also meets DOD requirements as a lining for fuel/ballast water tanks.

Included among Jotun Valspar's line of coatings are a variety of products based on various generic resin systems, as for example, organic zinc coatings, manufactured with chlorinated rubbers or epoxy resins. Inorganic zinc coatings are also provided with solvent or water using silicate resin systems. Of significant interest to the marine industry is a one-package inorganic zinc silicate coating that is used as a pre-construction ship primer. This product is applied automatically after abrasive blasting at a dry film thickness of approximately 0.75 mils, and will provide corrosion resistance without topcoating for about one year. Jotun Valspar zinc coatings have had extensive marine service, with applications on exterior or hull topsides, deck and cargo tanks of vessels.

Recent innovations include the introduction of Vepok, a unique group of protective coatings that can be applied over oily, wet, rusty surfaces and a high-ratio water-based inorganic zinc rich coating (MZ-6) that offers unique dry and topcoat applications.

Jotun Valspar is a complete supplier of coatings to the marine industry, and therefore in addition to the above mentioned coatings, also manufactures and provides anti-fouling paints and specification coatings that are used by government agencies including the U.S. Navy.

NALFLEET, BULL AND ROBERTS

Circle 95 on Reader Service Card

Ballast tanks can be protected from rust through the use of Maxi-Cote corrosion inhibitor from Nalfleet, Bull and Roberts Inc., Springfield, N.J. When the product is applied, it produces a stable film on the metal surface, above and below the waterline.

The protective film remains soft and flexible, repels water and forms a chemical bond with the base metal, producing a strong durable surface adhesion. It penetrates existing rust, cutting down considerably the usual preparation time required with some alternative corrosion control methods.

This low viscosity liquid is easily applied by flotation, spray or brush, over existing coatings and rusted surfaces, in wet or dry conditions. Maxi-Cote applications are simple to inspect because they remain visible on the tank surface. With its high flash point and neutral pH, it is non-toxic and safe to use.

When properly applied, Nalfleet, Bull and Roberts claims that with normal ballast tank operations, Maxi-Cote will provide effective corrosion protection for over two years.

PRC

Circle 96 on Reader Service Card

More than one million square feet of Proreco® deck coating systems have been applied to exterior decks of small boats, large commercial ships, towboats, offshore rigs and military ships. Manufactured by Products, Research & Chemical Corporation (PRC) of Glendale, Calif., the interior and exterior Proreco coating systems are fire-retardant, and resistant to acids, caustic chemicals and petroleum products.

Proreco III exterior coating systems are used to virtually eliminate costly maintenance and down-time for working ships. The PRC Proreco III coating systems are specified by many naval architects and specified by the military due to its known track record for corrosion control, dependability and long wear.

Proven to be most effective, the Proreco III coating systems have an inherent flexibility to withstand normal stress caused by deck movement. The fire-retardant systems provide excellent corrosion control and are resistant to abrasion and impact. According to PRC, one of the advantages of Proreco III systems over rigid coatings is that the Proreco elastomeric base is not brittle and subject to cracking, chipping or spralling.

The Proreco I coating system is specified for habitability areas such as heads, galleys and mess decks. Proreco I is a low-cost, minimal maintenance system for living spaces. The Proreco I polyurethane coatings provide an attractive high gloss appearance coupled with the long-wearing capability and flexibility to withstand structural movement, impact and abrasion, with extended corrosion control. The Proreco I coating system has both U.S. Navy military specification and SOLAS approvals.

PRC supplies to the marine market a full line of both one-part and two-part polyurethane and polysulfide sealants, caulking compounds, hull coatings and compounds. ■

Walker Boat Yard Appoints Dahl Manager, Diesel Engine Division

Walker Boat Yard, Paducah, Ky., recently announced that **Joseph Dahl** has joined their operation as manager, Walker Diesel Engine Division. Mr. **Dahl** is a 1971 graduate of the U.S. Merchant Marine Academy and formerly was with Signet Marine in Houston, Texas. He has extensive experience with diesel repair and shipyard operations.

In his new position, Mr. **Dahl** will be responsible for directing the Walker Marine Diesel overhaul facility, one of the largest in the inland waterways system. Walker services all makes of marine diesels as well as serving as a service center for Caterpillar, Detroit and Cummins engines.

Leevac Awarded Conversion Contracts —Literature Available

Leevac Shipyards, Inc., Jennings, La., was recently awarded two separate conversion contracts.

The first contract calls for the design, fabrication and installation of a new stern section for a 110-foot landing craft for U.S. naval operations in the South Atlantic Ocean.

The second contract was awarded to both Leevac Shipyards and Fredeman Shipyard, Inc., Sulphur, La., for the conversion of the supply vessel Northern Surveyor to a seismic exploration vessel for the Bureau of Marine Geological Survey of the People's Republic of China.

The Geophysical Service Inc. is the prime contractor and will furnish all seismic equipment. The work is expected to be completed at the end of March 1989.

The new stern section of the naval landing craft will consist of a steel hull stern containing the engine room and steering compartment. Two levels above the main deck will consist of a steel poop deck and aluminum pilothouse.

Leevac Shipyards is charged with designing the new stern section incorporating the latest marine equipment and systems, improved use of the deck area for crew quarters and a more spacious pilothouse with improved visibility. This is to be done without negatively affecting the stability, draft or load carrying capabilities of the vessel.

Located on the Mermentau River, Leevac Shipyards has been in the business of building, converting and repairing of supply, geophysical, fishing and excursion vessels, as well as inland and offshore tank and cargo barges since 1913.

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

Circle 11 on Reader Service Card

Drydock Training Program Offered In California By Marine Design Services

A training program for dockmasters and related drydock personnel will be offered by California-based Marine Design Services, Inc. from February 26 through March 3, 1989, at the Radisson Hotel in Mission Valley, San Diego, Calif.

The course curriculum is structured to cover all technical aspects of drydocking both commercial and U.S. Navy ships in certified drydock facilities, and will be directed by **John W. McGruer**, who is well known in the drydock community and who has presented NavSea sanctioned training programs in the past.

The program is offered for $375 for each participant, which includes registration and course materials.

Block rooms have been set aside at the Radisson Hotel at special rates.

Those interested in attending this program may obtain details of the curriculum, and hotel reservation package by writing to Marine Design Services, Inc., P.O. Box 928, Bonita, Calif., 92002-0830, or by calling (619) 427-4219.

Furuno To Open New Distribution Center

Furuno president **William P. Dupre** recently broke ground for a new 11-acre East Coast Distribution Center to be located in Denton, Md. This facility will include a 30,000-square-foot office and warehouse complex designed to expand Furuno's operating capabilities in the East.

The new facility will be fully operational by early May 1989, and will be staffed with more personnel than presently in the New Jersey plant. This will give dealers additional access to finished marine electronics goods, spare parts and technical assistance.

According to Mr. **Dupre**, this move is just another step in Furuno's commitment to improve support to the dealer organization so important to the company's continued growth.

For more information and free literature from Furuno,

Circle 41 on Reader Service Card

McDermott Signs Letter Of Intent To Acquire Avondale Offshore Division Assets

Avondale Industries, Inc. and McDermott Incorporated recently announced that they have entered into a Letter of Intent for the sale of certain of the assets of Avondale's Offshore Division, located in Terrebonne Parish, La., that are used by Avondale in its offshore fabrication business. Consummation of the sale is subject to Avondale and McDermott entering into a satisfactory definitive agreement. The sale is expected to be completed within 60 days.

Avondale Industries, Inc., headquartered in New Orleans, La., is one of the nation's leading marine fabricators.

McDermott Incorporated is a subsidiary of McDermott International, Inc., a leading worldwide energy services company. The company and its subsidiaries manufacture steam-generating equipment, defense products, tubular products, and process control systems. They also provide engineering and construction services for industrial and utility facilities onshore, and to the oil and gas industry offshore.

For more information and free literature,

Circle 68 on Reader Service Card

Neles And Jamesbury, Two Leading Valve Companies, Combine

Neles, the high-technology valve manufacturer of Finland, recently announced that negotiations have been completed with Combustion Engineering, Inc. of the U.S., on the sale of C-E's valve manufacturing subsidiary, Jamesbury Corp., to Neles. Based on the acquisition, Jamesbury of Worcester, Mass., joins Neles as a subsidiary of Rauma-Repola, a major Finnish public corporation.

Both Neles and Jamesbury, each with the annual net sales in the range of $120 million and each employing 1,100 persons, concentrate heavily on quarter-turn or rotary valves, a particularly demanding and growing segment of the valve industry. While the market position of Neles is strongest in Europe, the majority of Jamesbury's activities are in North America.

For further information and free literature,

Circle 107 on Reader Service Card

Carrier Transicold Offers Free Marine Refrigeration Sales & Service Directory

Carrier Transicold, a division of United Technologies, is offering a free 20-page worldwide directory detailing its marine refrigeration and air conditioning sales and services centers.

Entitled "Ports of Call Worldwide," the publication provides the addresses, telephone numbers, facsimile numbers and telex numbers of Carrier Transicold sales and service centers located around the world. The directory categorizes centers by global location (North America, Europe, Middle East, Pacific/Far East), region in the case of North America (Atlantic, Gulf, Pacific, Great Lakes, Canada) or country in the cases of Europe (Denmark, Finland, Germany, Ireland, Italy, Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom), Middle East (Israel, Saudi Arabia) and Pacific/Far East (Australia, Japan). A service center is also located in the British Crown Colony of Hong Kong.

The latter part of the pocket-sized directory contains black-and-white photographs of various marine products offered by Carrier Transicold. Compressors, Seahorse condensing units, single-package marine cooling units and packaged marine units are included.

The directory will be particularly useful to shipowners, ship operators or port engineers who need refrigeration/air conditioning parts or service in a hurry.

For a free copy of "Ports of Call Worldwide,"

Circle 102 on Reader Service Card

Textron Marine Wins LCAC Program Contracts Worth $225 Million

Textron Marine Systems (TMS), Division of Textron Inc., has been awarded major U.S. Navy contracts for the Landing Craft, Air Cushion (LCAC) Program totaling more than $225 million.

One contract valued at $216 million calls for the construction of 12 LCAC and major equipment items. This contract with options could reach a total value of between $400 million to $500 million. The contract with its options provides for the continuation of the LCAC production activities through mid-1994.

A second contract worth $9.1 million was awarded to TMS for a full range of engineering support and logistics management services for the LCAC program. The contract covers a four-year period through 1992 and contains options which, when exercised, could result in a total contract value of $60 million.

The LCAC is an air cushion landing craft designed to carry troops, weapons and equipment at high speeds from support ships to the shore.

Under prior contracts, TMS has delivered 14 LCACs to the Navy and is currently manufacturing another 10 at its shipyard operations in New Orleans, La.

Textron Marine Systems is a U.S. leader in design and construction of advanced technology air cushion vehicles and surface effect ships and other advanced marine craft for both military and commercial customers.

For free literature detailing the full line of air cushion vehicles and SES offered by Textron Marine Systems,

Circle 28 on Reader Service Card

ITT Antarctic Seeks Bids For Charter/Purchase Of Icebreaker For NSF

ITT Antarctic Services, Inc., under contract to the National Science Foundation, Division of Polar Programs, is seeking the charter/purchase of an icebreaking research vessel to operate in the Antarctic and southern ocean waters in support of the U.S. Antarctic Program.

The general purpose, multidisciplinary oceanographic research vessel, which should have an overall length from 250 to 300 feet, must be capable of steaming continuously at 3 knots or better through level ice with a thickness of three feet or more.

The procurement includes a "Buy American" provision. The provision calls for the vessel to be built in a U.S. shipyard, unless the lowest U.S. bid is more than 50 percent above the lowest foreign bid. In determining the cost of the vessel, the provision requires that the cost of the vessel will be "increased by the amount of any subsidies or financing provided by a foreign government (or instrumentally thereof) to such vessel's construction."

The Shipbuilders Council of America, an organization whose members include the major shipbuilders and ship repairers in the U.S., fought hard for the inclusion of the "Buy American" provision.

Port Of Portland Names Robeson Director, Maritime Operations And Services

Bruce J. Robeson has been named director, maritime operations and services for the Port of Portland.

In this newly created position, Mr. **Robeson** has overall management responsibility for marketing and operations associated with the port's five marine terminals and the Portland Ship Repair Yard.

He joins the port with over 25 years' experience in the maritime industry. He has served as president with Foss Launch and Tug Company, Seattle. Foss operates a fleet of tugs and barges and a repair facility

Other positions previously held by Robeson include vice president and general manager of Foss Alaska Line; director of Traffic Services for American President Lines in San Francisco; and president of Berwind Lines of San Juan, Puerto Rico.

NAVAL TECHNOLOGY

& SHIPBUILDING

a special supplement to

MARITIME REPORTER AND ENGINEERING NEWS

February

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Circle 241 on Reader Service Card

LONG TERM OUTLOOK FOR U.S. NAVY SHIPBUILDING

NAVY PROJECTS SPENDING $11 BILLION PER YEAR

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

Editor's Note: This article only forecasts business opportunities in the shipbuilding sector. For a projection of business opportunities in the ship repair and maintenance sector over the next 10 years, see Mr. **McCaul's** *article, "U.S. Ship Maintenance & Repair—A $50 Billion to $60 Billion 10-Year Market," in the Naval Technology & Shipbuilding Supplement in the December 1988 issue of Maritime Reporter and Engineering News.*

The U.S. Navy ship construction program has been a major source of business for shipyards and manufacturers in the U.S. Over the past five years, the Navy has spent an average of $9.5 billion per year on ship procurement. While this spending is expected to continue, the Navy will be required to make difficult decisions on the size and composition of its shipbuilding program over the next several years. These decisions will have important implications for many firms.

Photo: The aircraft carrier, USS America (CV-66), underway. U.S. Navy photo.

Overall Situation

The Navy views a future shipbuilding program of about $11 billion per year as necessary to maintain the current force structure. This figure would support a building rate of 18 to 20 ships per year.

However, the U.S. Navy has entered a period of unsettling change. Defense objectives are being reexamined, the federal budget is under heavy pressure and technical problems and cost overruns are hurting the Navy's image.

Navy Options

The Navy is faced with making long-term strategic decisions. Options include:

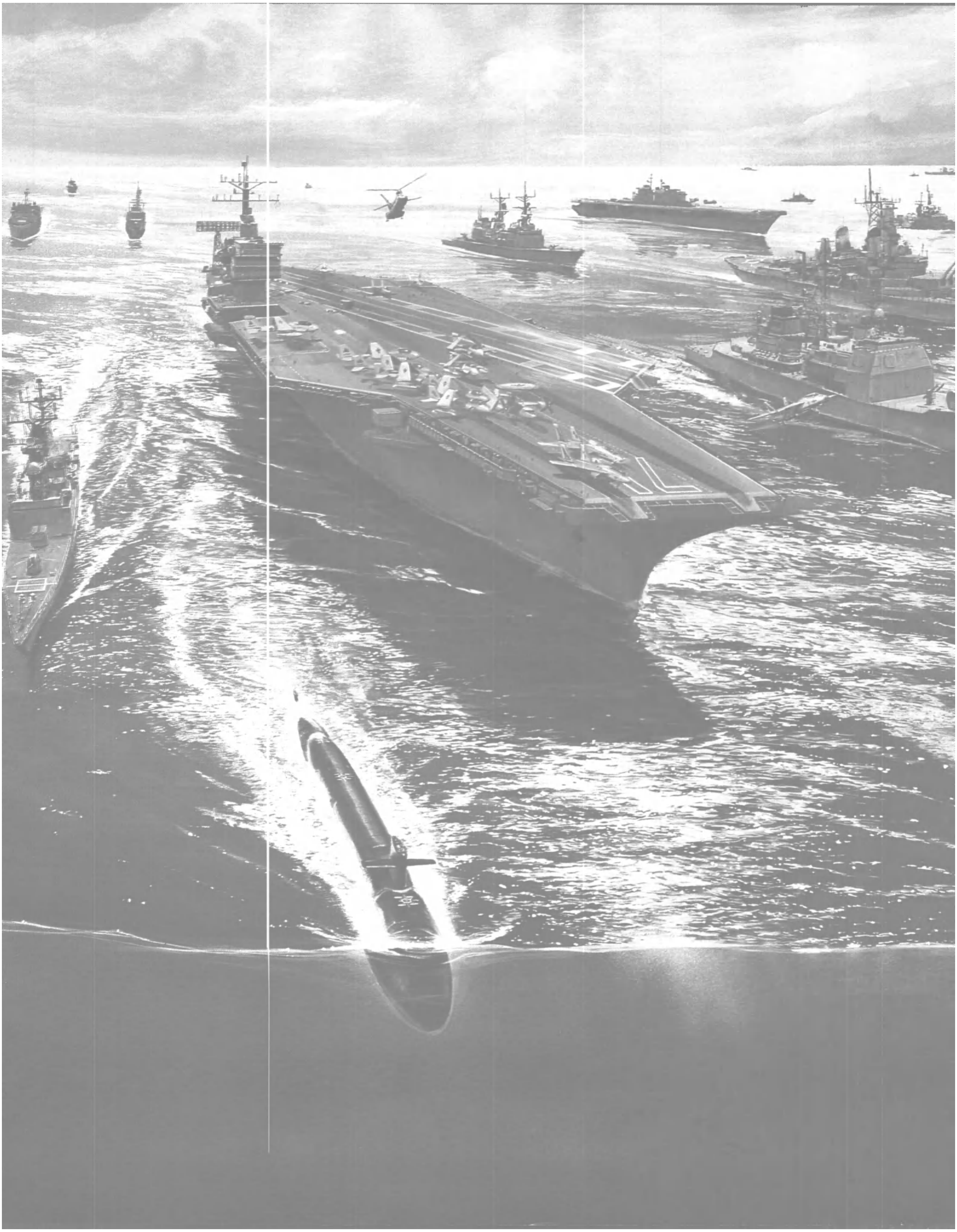
- maintain current fleet size by permitting an aging process which produces the average ages shown in Exhibit 1.
- retire older ships—and accept a lower force structure.
- continue to build ships at a rate necessary to replace those facing obsolescence.
- compromise by accepting (1) a somewhat lower force structure, (2) a gradually increasing average age and (3) a somewhat stretched out building program.

Exhibit 2 summarizes how IMA views the direction and composition of Navy shipbuilding over the next 10 years. The remainder of this article describes the most likely course of action in each of the major programs.

SUBMARINES

The number of missile submarines will decline and the attack submarine force increase slightly over the next 10 years.

Tridents—The ballistic missile submarine fleet will shrink to 17-23 ships as new Trident submarines replace older SSBNs. Each Trident has 24 missile tubes vs. 16 tubes in Polaris/Poseidon submarines. Fewer submarines are needed to provide the same missile launching capabili-



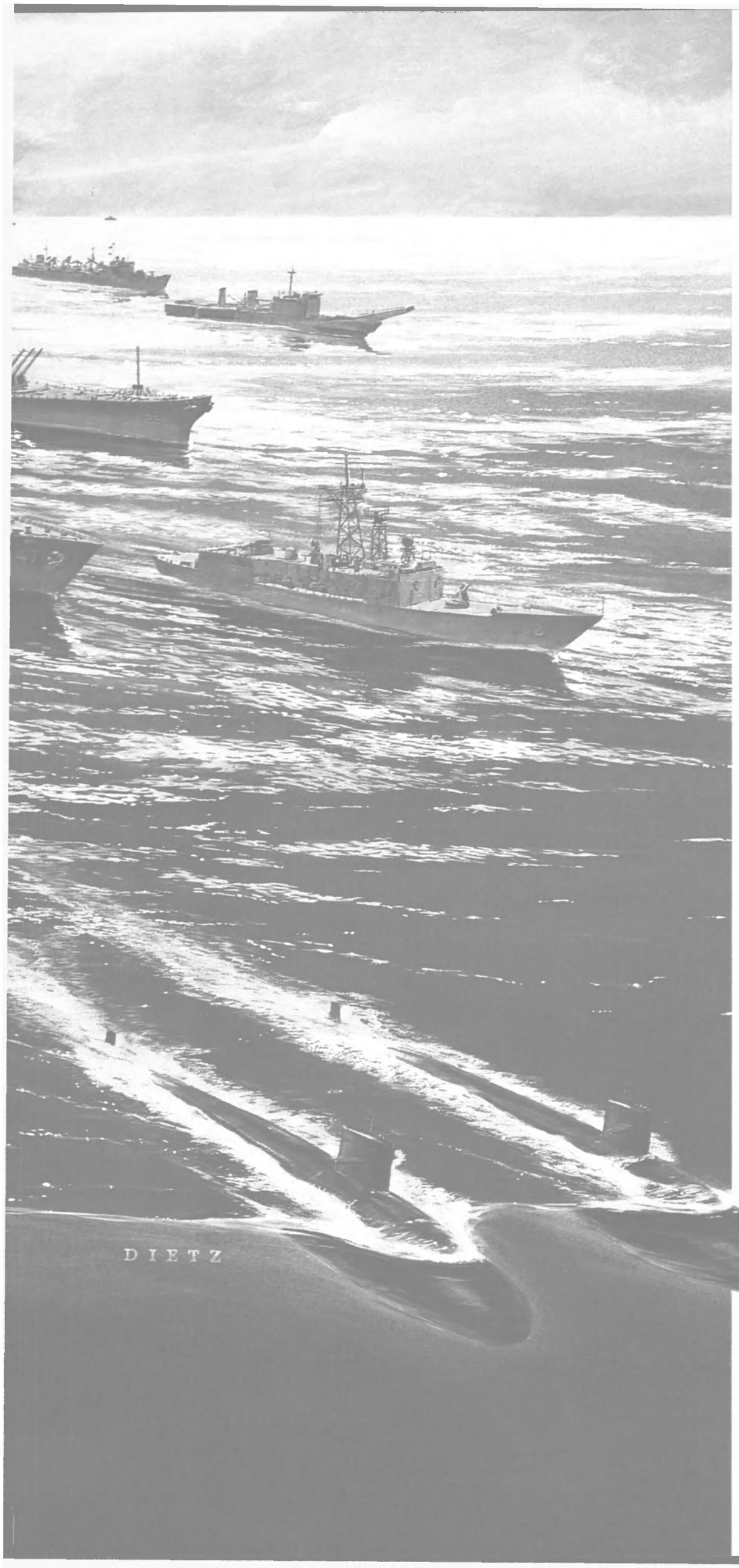


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EXHIBIT 1—AVERAGE AGE OF SHIPS IN THE U.S. NAVY FLEET OVER THE NEXT TEN YEARS

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Battleships	46	47	48	49	50	51	52	53	54	55
Cruisers	21	16	16	15	15	16	17	18	19	20
Destroyers	19	19	18	16	17	17	18	19	20	21
Frigates	12	13	14	15	16	17	18	19	20	21
Carriers	27	26	27	28	28	27	28	28	29	30
Submarines	16	16	17	17	18	18	19	20	21	22
Tenders	27	28	29	30	31	32	33	34	35	36
Logistics Ships	25	24	25	25	25	26	27	27	28	29
Amphibious Ships	19	18	19	20	20	21	22	23	24	25
Mine Warfare Ships	33	28	23	22	23	24	25	26	27	28
Patrol Combatants	8	9	10	11	12	13	12	13	9	10
Survey Ships	18	18	17	17	18	19	20	21	22	23
Sealift Ships	15	16	17	18	19	20	21	22	23	24
Misc	20	21	22	23	24	25	26	27	28	29

Note: Ships already contracted or currently in service are included in the averages. Excluded are ships known to be earmarked for decommissioning over the next several years. The forecast assumes no further orders are placed and Navy maintains its current level of fleet inventory. In effect, the data represent the aging process which will occur if the Navy orders no further ships.

Source: International Maritime Associates, Inc., *U.S. Navy Shipbuilding in a Period of Uncertainty*, February 1989.

EXHIBIT 2—ASSESSMENT OF FUTURE U.S. NAVY SHIP CONSTRUCTION REQUIREMENTS

CURRENT SITUATION
- ten year build-up completed—480 to 580 ships
- big impact on industry—addictive, many companies now Navy dependent
- problems have accumulated—technical shortfalls, cost overruns, procurement scandal
- stalemate exists—major decisions on program direction awaiting next administration

FUTURE PROGRAM DRIVERS
- goals for fleet size and composition depend on Navy's perception of its defense role
- aging ships, technology advances create basic replacement needs
- DOD's priorities for allocating financial resources sets Navy's funding limit
- future international developments impact Navy requirements—foreign base closures, conventional arms reduction agreements
- current problems could erode political support for key Navy programs—particualry DDG 51, SSN 21
- shift in congressional positions may impact support for Navy programs in Congress

SUBMARINES
- SSN 688 funding may end earlier than planned—now overlaps with SSN 21 start-up
- SSN 21 continues to be controversial—expensive, slow
- Trident building goal depends on missile treaty negotiations
- new roles proposed for submarines—anti-air, battle surveillance
- DARPA/Navy submarine R&D could produce major changes in sub design
- AN/BSY 2 combat system problems could be big issue

SURFACE COMBATANTS
- DDG 51 program could be expanded beyond 29 ships
- Aegis system shortfalls,ship cost overruns casting shadow over DDG 51 program
- major effort initiated to develop revolutionary designs for surface ships
- frigate modernization program being considered
- electric drive designated as propulsion system for future ships

CARRIERS
- 12, 13 or 15 carrier groups—big issue affecting future surface force requirements
- new carrier orders and CV modernizations in 1990's depend on carrier force objectives

TENDERS
- very old inventory
- possible AR program to enhance forward repair capability

AMPHIBIOUS SHIPS
- next several years include LSD 49 and LHD orders
- LPH and/or LPD replacement program to begin mid-1990's
- LCAC orders to reach 90 units

COMBAT LOGISTICS SHIPS
- fleet capability gap said to exist—despite AOE, TAO procurements
- AE building program—technical issues still to be resolved

PATROL COMBATANTS
- PXM program planned for early 1990's

MINE WARFARE
- MHC, MCM programs continue to have technical problems
- new designs under review—including air cushion vehicle for minehunting

OCEAN SURVEY AND SURVEILLANCE
- more TAGOS surveillance ships to be ordered
- SWATH "A" bigger than TAGOS 19
- oceanographic ships—some SWATH designs

SEALIFT SHIPS
- Army wants more sealift capability
- Navy studying procurement of new fast sealift ship
- additional crane ships—must be funded by DOT
- replenishment tankers—build/charter program to replace Sealift tankers

SERVICE CRAFT
- Inventory approaching block obsolescence
- creative procurement methods likely

IMPLICATIONS FOR INDUSTRY
- technolgoy push developments getting greater attention in Navy
- fewer ships, increasingly expensive, complex—business will support fewer players
- technology changes will open new opportunities—fibre optics, composite armor, stealth concepts, ship survivability, etc.
- ships will be designed for minimizing M&R toll

DEVELOPMENTS TO WATCH
- fewer dollars, rapidly growing unit costs will produce internal clash for available funds
- overruns/claims to cause procurement shake-up, contracting rules to change
- sustained attack of Aegis technology threatens pace of DDG 51 program
- Navy under pressure to study and introduce new concepts—not simply buy more of the same

Source: International Maritime Associates, Inc., U.S. Navy Shipbuilding in a Period of Uncertainty, February 1989

(continued)

ty. Trident construction will likely end at 20 units. Sixteen are now in service or under contract. Future construction will probably continue at the rate of one per year through 1992.

Attack submarines—Construction of six to eight additional SSN-688s and 20 to 25 SSN-21s has been planned over the next 10 years. However, budget pressures are likely to cause cancellation of some of the remaining SSN-688s.

The SSN-21 program could prove very controversial due to program cost. The Navy projects SSN-21 follow ships will be about 20 percent more costly than the SSN-688. This seems very optimistic—considering the SSN-21 is far more complicated and one third larger than the SSN-688. The SSN-21 cost estimate is going to be a major target for criticism over the next few years.

The Navy is now studying new roles for attack submarines—including antiair capability—which may lead to major changes in submarine design. The Defense Advanced Research Projects Agency (DARPA) has been assigned responsibility for assessing promising concepts which could lead to major breakthroughs in submarine technology. Funding of $95 million has been provided this year for the DARPA program. The Navy and DARPA work in this area could provide many new business opportunities.

CARRIERS

The goal of 15 operational carriers is very controversial. Aircraft carriers are enormously expensive to build, deploy and maintain. The four CVNs now under contract are to offset retirements of three older CVs. But five instead of three CVs—and possibly the USS Enterprise (CVN-65)—may be retired in the 1990s for budget-cutting reasons.

It's possible that the next administration could stretch spending on CVN-75—maybe even CVN-74. However, the contract for both ships has been awarded and a major cancellation cost would be incurred should there be a change of plans. Cancellation would be unlikely.

CRUISERS/DESTROYERS

The Navy's goal to build 29 DDG-51s may be pushed higher. There is again talk of a 60-ship force requirement—which would provide a five to six per year construction program through the 1990s. The higher figure is in line with the number of DDGs originally planned in the early 1980s.

However, future requirements for DDGs largely depend on the number of carriers and battleships in service. Each carrier group and surface action group roughly requires three missile destroyers for protection. Any cut in major ships in service (carriers or battleships) will reduce DDG force requirements.

Budget constraints will also play a major role in limiting expansion of the DDG building program. These ships must compete with attack

submarines and other high priority programs for a share of the SCN budget.

At $1 billion each, a larger force objective for DDG-51 surface combatants will meet resistance.

FRIGATES

DOD's decision to retire P-fired boiler frigates has taken or will take 16 ships from the fleet over the next year. Several other older frigates will likely be retired by the early 1990s. SWATH-type hulls are being studied for future frigate design. However, no frigate building program is in the five-year ship construction plan.

The Navy plans a major modification program for FF-1052 Class frigates—intended to add five years of useful life to existing ships. An improved ASW system, anti-ship missile protection, and better command and control capability is to be added. This is a major program which should keenly interest shipyards and ship systems manufacturers.

AMPHIBIOUS SHIPS

Four LSD-41 (CV)s are planned under an option package to Avondale. Two LHDs are to be ordered from Ingalls. Completion of the LHD and LSD-41/49 programs will add eight to 10 amphibious ships to the fleet in the 1990s.

While no other amphibious shipbuilding program is planned at this time, the Marine Corps will likely press for at least one amphibious ship of some type to be funded annually. Candidates include a program to replace several LPHs or LPDs which will reach 30 years of age in the early 1990s.

PATROL COMBATANTS

The Navy has plans to build six high-speed patrol boats in the early 1990s. A proven hull design—hydrofoil or high-speed displacement hulls—is to be chosen. However, this program is very tentative. Patrol craft don't generate much interest in the Navy and funding will not likely receive high priority.

MINE WARFARE

The remaining MCMs will be contracted to Peterson and Marinette Marine—completing the objective of building 14 new MCM ships. An additional 16 MHCs are to be ordered. A second source is to be chosen for the MHC program—to provide competition to Intermarine, the current builder. No other major program is planned. Old MSOs will be retired as MCMs and MHCs are delivered.

COMBAT LOGISTICS SHIPS

According to the Congressional Budget Office, the Navy may be understating its force requirements in this area. An April 1988 CBO study says the Navy's force goal for combat logistics ships (AOE, AOR, AO, AE, AFS) may be too low. The Navy says it needs 65 ships. CBO thinks a figure of 93 ships is more realistic.

TENDERS

Some of the older tenders may be retired over the next 10 years. Three submarine tenders (AS) and three destroyer tenders (AD) date from World War II. The two repair ships (AR) now in service were built in the early 1940s. However, there are no plans to replace these ships in the foreseeable future.

STRATEGIC SEALIFT

This program has essentially been completed. There are now 39 strate-

(continued)

U.S. NAVY

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

(As of December 1988)

SHIPYARD Navy Designation	NAME	APPROX. CONTRACT $	EST. DELIVERY
Alabama Maritime Corporation			
YON (3) & YOS (2)	unnamed	6,955,046	4/90
YCV (3)	unnamed	4,700,000	10/89
Avondale Shipyards			
T-AO-194	John Ericsson	97,500,000	2/90
T-AO-196	Kanawha	95,025,000	11/90
T-AO-195	Leroy Grumman	101,000,000	5/89
T-AO-197	Pecos	100,633,789	3/90
T-AO-198	unnamed	109,600,000	9/91[8]
T-AO-200	unnamed		7/92
T-AO-202	unnamed	242,600,000	3/93
T-AO-204	unnamed		12/93
LSD-44	Gunston Hall	166,000,000	1/89
LSD-45	Comstock	153,400,000	6/89
LSD-46	Tortuga	153,400,000	11/89
LSD-47	Rushmore	150,000,000	4/90
LSD-48	Ashland	150,000,000	8/90
LSD-49	unnamed	157,400,000	11/93
Avondale—Gulfport Marine Division			
LCAC (7)	unnamed	115,586,281	—
LCAC	—	31,759,154[6]	90
Bath Iron Works			
CG-58	Philippine Sea	252,800,000	1/89
CG-60	Normandy	191,800,000	10/89
CG-61	Monterrey	191,800,000	3/90
CG-63	Cowpens	193,300,000	7/90
CG-64	Gettysburg	193,300,000	11/90
CG-67	Shiloh	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-54, -56, -58	unnamed	610,109,000	94
DDG-51 Class	—	22,600,000[1]	5/92
DDG-51 Class	—	23,100,000[1]	5/89
Bethlehem-Sparrows Point			
T-AGS-40	Tanner	66,000,000	2/89
Bollinger Shipyard			
WPB (16)	unnamed	99,306,516	2/90
General Dynamics-Electric Boat			
SSN-752	Pasadena	280,100,000	12/88
SSN-754	Topeka	324,500,000	4/89
SSN-755	Miami	324,500,000	10/89
SSN-757	Alexandria	283,000,000	4/90
SSN-760	Annapolis	258,166,750	10/90
SSN-761	Springfield	258,166,750	3/91
SSN-762	Columbus	258,166,750	7/91
SSN-763	Santa Fe	258,166,750	11/91
SSN-768	unnamed	347,400,000	4/93
SSN-21 Class	—	17,699,000	9/89
SSN-688 Class	unnamed	399,970,000	11/93
SSBN-734	Tennessee	523,700,000	12/88
SSBN-735	Pennsylvania	531,600,000	8/89
SSBN-736	West Virginia	500,870,000	4/90
SSBN-737	Kentucky	616,400,000	12/90
SSBN-738	Maryland	674,100,000	12/91
SSBN-739	Nebraska	615,000,000	12/92
SSBN-740	unnamed	644,000,000	7/94
SSBN-741 Class	unnamed	617,400,000	10/94
Halter Marine			
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
T-AGOR-23	unnamed	20,900,000	12/89

SHIPYARD Navy Designation	NAME	APPROX. CONTRACT $	EST. DELIVERY
Ingalls Shipbuilding			
CG-59	Princeton	325,500,000	12/88
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]	—
CG-47 Class	—	3,608,809[6]	10/89
CG-47 Class	—	28,364,184[1]	6/89
CG-47 Class	—	10,000,000[5]	9/89
DDG-52	John Barry	162,149,000	9/91
DDG-55, -57	unnamed	466,500,000	95
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
LHD-4	unnamed	341,400,000	4/94
DD-963 & DDG-993 Class	—	14,100,000[1]	3/93
Intermarine USA			
MHC-51	Osprey	20,926,936	4/91
Marinette Marine			
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
SWATH T-AGOS (3)	unnamed	61,700,000	10/91
YTT 9 & 10	unnamed	21,700,000	10-11/89
YTT 11	unnamed	10,913,817	5/90
YTT Class	unnamed	10,000,000	2/91
NASSCO			
AOE-6	Supply	290,097,944	4/91
AOE-7	unnamed	242,785,351	6/92
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	John C. Stennis	3,700,000,000	96
CVN-75	unnamed		98
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	Jefferson City	259,833,333	6/90
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-769	unnamed	612,000,000	4/93
SSN-770	unnamed		8/93
SSN-688 Class	unnamed	338,520,000	2/94
SSN-688 Class	—	22,000,000[5]	10/89
SSN-21 Class	—	325,000,000[7]	2/94
North American Shipbuilding			
Tractor tugs (MSC-4)	unnamed	16,148,689[2]	10/89-5/90
Oregon Iron Works			
50-foot workboats (17)	unnamed	4,400,000	8/90
50-foot workboats (19)	unnamed	5,000,000	6/91
Pennsylvania Shipbuilding			
T-AO-191	Benjamin Isherwood	111,000,000	8/89
T-AO-192	Henry Eckford	111,000,000	7/90
Peterson Builders			
MCM-5	Guardian	57,900,000	6/89
MCM-6	Devastator	48,287,461	8/89
MCM-8	Scout	48,287,461	6/90

Footnotes: 1. Lead yard services contract; 2. Includes 17-month charter of tugs from parent company Edison Chouest Offshore, with options; 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. Contains options for one T-AO in FYs 89, 90 & 91; 9. Former Lockheed Shipbuilding yard in in Savannah, Ga., purchased by Trinity Marine Group.

Complied by Maritime Reporter Staff

KEY TO NAVY DESIGNATIONS

AOE	Fast Combat Support Ship	LCU	Landing Craft, Utility	SSN	Submarine, Nuclear	WPB	Patrol Boat†
CG	Guided Missile Cruiser	LHD	Amphibious Transport Dock	T-AGOS	Ocean Surveillance Ship*	YCV	Aircraft Transportation Lighter
CVN	Aircraft Carrier, Nuclear	LSD	Dock Landing Ship	T-AGS	Surveying Ship*	YON	Fuel Oil Barge
DDG	Guided Missile Destroyer	MCM	Mine Countermeasures Ship	T-AO	Oiler*	YOS	Oil Storage Barge
FFG	Guided Missile Frigate	MHC	Mine Hunter, Coastal	TB	Tugboat	YTT	Torpedo Test Craft
LCAC	Landing Craft, Air Cushion	SSBN	Ballistic Missile Sub, Nuclear	WMEC	Medium Endurance Cutter†		

*Assigned to Military Sealift Command
†Coast Guard

SHIPYARD Navy Designation	NAME	APPROX. CONTRACT $	EST. DELIVERY
Robert E. Derecktor Shipyard			
WMEC-912	Legare	30,160,000	5/89
WMEC-913	Mohawk	30,160,000	5/89
TB 130A	unnamed	16,500,000	7/89
TB 130B	unnamed		10/89
TB 130C	unnamed	14,460,174	1/90
TB 130D	unnamed		2/90
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
LCAC (12)	unnamed	216,000,000	94
Thunderbolt Shipbuilding & Repair[9]			
LCUs (Army-23) (opt. 12)	unnamed	—	—
Todd Pacific-San Pedro			
FFG-61	Ingraham	96,100,000	6/89

Long Term Outlook

(continued)

gic sealift ships in varying operational status. Four crane ship conversions still remain to be performed. Two have been funded and will soon be under contract. MarAd has requested funding for TACS-11 and -12 in the FY 1990 budget. This request must be approved by OMB. There is talk about additional TACS conversions.

The nine Sealift class tankers will be 20 years old in 1995. There probably will be a replacement requirement—which could generate a build/charter tanker program within the next several years. This would obviously interest yards such as Avondale, NASSCO, Bethlehem Steel-Sparrows Point and Tampa Shipyards.

SURVEY & SURVEILLANCE SHIPS

The Navy plans to build a fleet of 27 T-AGOS ocean surveillance ships. Nine will be SWATH design. Five ships still remain to be contracted.

The Navy also plans to build six to nine survey ships—some of which are to be SWATH design. Funding for the first SWATH oceanographic ship had been planned for FY 1989. The Navy retracted its request after submitting the proposed budget—saying the design needs more work. ■

MAJOR NAVY CONTRACTS

The following special section highlights the latest U.S. Navy contract awards for shipbuilding, ship repair and maintenance, shipboard communications, weapons, etc.

October 3

Bath Iron Works, Bath, Maine, was awarded a **$27.3-million** modification to a contract for repair services for USS Samuel B. Roberts (FFG-58). The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-R-8520).

Ingalls Shipbuilding Inc., Pascagoula, Miss., was awarded a **$341.4-million** modification to a contract for the design an construction of LHD-4, a Wasp Class amphibious assault ship. Work is to be completed by April 1994. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-86-C-2005).

October 4

General Dynamics Corp., Groton, Conn., was awarded an **$8-million** contract for electrically suspended gyro navigator spares for SSN-637 and SSN-688 Class submarines. Work is to be completed by May 1992. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-G-2060).

Avondale Industries, Avondale, La., was awarded a **$45-million** modification to a contract for the conversion of two AO-177 Class fleet oilers to the AO-177 (Jumbo)

U.S. NAVY

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

(AS OF DECEMBER 1988)

SHIPYARD	SHIP	WORK	$VALUE	COMP.
Alabama Dry Dock	USS Lexington (AVT-16)	PM	10,131,466	8/90
Atlantic Dry Dock	USS Samuel Eliot Morison (FFG-13)	DD & SRA	8,700,000	5/89
	USS Tattnall (DDG-19)	REP	5,171,135	5/89
Avondale Shipyards	USS Radford (DD-968)	ROH	20,700,000	5/89
	USS Merrimack (AO-179) & USS Willamette (AO-180)	CONV	52,100,000	5/93
	USNS Monongahela (AO-178) & USNS Cimarron (AO-177)	CONV	45,100,000	10/92
	USS Caron (DD-970)	ROH	18,000,000	10/89
Bath Iron Works	4 USCG cutters	ROH	117,452,000	6/91
	USS Samuel B. Roberts (FFG-58)	REP	27,300,000 3,998,653	11/89
Bay Shipbuilding	Mormactide (MarAd)	CONV	19,847,786	10/89
Bender Shipbuilding	Cape Farewell & Cape Flattery (MarAd)	REP	600,000	—
	HLT-1	ROH & DD	400,000	—
	USCG Salvia	ROH	278,546	1/89
Bethlehem Steel—Sparrows Point	USS Barney (DDG-6)	DSRA	3,305,013	1/89
Charleston Naval Yard	USS Andrew Jackson (SSBN-619)	OH	112,058,684	3/90
	USS Woodrow Wilson (SSBN-624)	OH	120,928,007	3/89
	USS Henry L Stimson (SSBN-655) & USS Mariano J. Vallejo (SSBN-658)	REF	19,673,812	8/89
	USS Von Steuben (SSBN-632)	ERP	9,370,334	3/90
Colonna's Shipyard	USS Beary (FF-1085)	DSRA	3,000,000	2/89
Continental Maritime	USS Rentz (FFG-46)	DSRA	4,400,000	12/88
	USS Enterprise (CVN-65)	SRA	6,855,930	3/89
	USS Merrill (DD-976)	DSRA	5,800,000	3/89
	USS Sides (FFG-14)	SRA	3,145,701	4/89
	USS Long Beach (CGN-9)	SRA	3,856,412	3/89
	USS Samuel Gompers (AD-37)	DPMA	6,800,000	7/89
Detyens Shipyards	Los Alamos (AFDB-7)	ROH	5,699,765	4/89
General Ship Repair	USS Glover (FF-1098)	DD & PM	7,400,000	4/89
Ingalls Shipbuilding	USS Luce (DDG-38)	MAINT	3,900,000	6/89
Jacksonville Shipyards	USNS Marshfield (T-AK-282) (MSC)	UPG	7,028,147	12/89
	USS Forrestal (CV-59)	SRA	3,744,662	3/89
Jonathan Shipyard	USS Saginaw (LST-1188)	PM	9,900,000	6/90
Long Beach Naval Yard	LPH Class Ships	PM	8,096,132	10/90
Metal Trades	USS Sierra (AD-18)	ROH	3,000,000	6/89
Metro Machine	Atlantic Fleet LPDs	PM	5,334,400	8/91
	USS Bowen (FF-1079)	OH	6,900,000	—
	USS Yorktown (CG-48)	DSRA	3,449,654	12/88
	USS Vreeland (FF-1068)	ROH	6,500,000	9/89
NASSCO	4 LSTs	PM	3,500,000	90
	3 LSTs	MAINT	5,858,543	—
	USS Bristol County (LST-1198)	PMA	5,800,000	2/89
	USS Barbour County (LST-1195)	MAINT	6,800,000	1/89
Newport News Shipbuilding	USS Newport News (SSN-750)	PSA	3,400,000	1/89
	Support Barge	REP	48,095,123	7/89
	USS Key West (SSN-722)	PSA	38,000,000	12/88
	USS Abraham Lincoln (CVN-72)	PSA	3,000,000	4/90
	USS Enterprise (CVN-65)	OH	9,800,000	9/91
	USS Oklahoma City (SSN-723)	PSA	27,000,000	6/89
	USS Enterprise (CVN-65) & USS Long Beach (CGN-9)	MAINT	3,325,930	9/89
Norfolk Naval Yard	USS Hyman G. Rickover (SSN-709)	SRA	9,055,518	3/90
	USS Cincinnati (SSN-693)	SRA	9,400,000	10/89
Norfolk Shipbuilding	AO-178, 179 & 186	PM	38,900,000	—
	USS Lawrence (DDG-4)	REP	4,966,666	—
	Mormacsea & Mormacsaga (RRF)	UPG	7,973,482	—
	USNS Pawcatuck (T-AO-108)	DD & REP	3,033,211	4/89
	USS Emory S. Land (AS-39)	SRA	11,400,000	5/89
North Florida Shipyards	USS Paul (FF-1080)	REP	3,632,240	12/88
Northwest Marine Iron Works	USNS Kawashiwi (T-AO-146)	DD & OH	4,775,510	—
	USS Okinawa (LPH-3)	ROH	14,091,106	1/89
Pacific Ship Repair	USS Independence (CV-62)	REP	3,400,000	3/89
Pennsylvania Shipbuilding	USS Patterson (FF-1061)	PM	5-10mil/yr	91
	USS Butte (AE-27), USS Nitro (AE-23) & USS Suribachi (AE-21)	PMA	69,000,000	93
Philadelphia Navy Yard	USS Kidd (DDG-993)	OH	35,000,000	9/89
Puget Sound Naval Yard	USS Nimitz (CVN-68)	REP & OH	—	89
	USS Alexander Hamilton (SSBN-617)	ROH	110,713,798	11/89
Robert E. Derecktor	USS Connole (FF-1056)	ROH	2,500,000	—
	USS Capodanno (FF-1093)	OH & REP	3,761,792	1/89
Service Engineering	USNS Spica (T-AFS-9)	OH	10,700,000	—
	AE-29, 32-34	PM	4,154,000	89
	USS Mauna Kea (AE-22)	PMA	4,000,000	1/89
	USS Enterprise (CVN-65)	SRA	4,858,686	3/89
Southwest Marine	USS Dubuque (LPD-8)	OH	10,000,000	—
	USS O'Brien (DD-975)	REP & UPG	2,300,000	11/89
	USS Jarrett (FFG-33)	EDSRA	12,900,000	10/89
	USS George Philip (FFG-12)	ESDRA	10,758,483	4/89
	USS Wichita (AOR-1) & USS Kansas (AOR-3)	REP	41,600,000	—
	LST-1185, -1186 & -1191)	OH	35,000,000	87-89
	USS Knox (FF-1052)	ROH	8,092,380	2/89
	USS Thach (FFG-43) & USS McClusky (FFG-41)	DSRA	9,920,280	3/89
	USS Juneau (LPD-10)	PMA	4,000,000	3/89
	USS O'Brien (DD-975)	OH	19,600,000	11/89
Tacoma Boatbuilding	USNS Hayes (T-AG-195)	CONV	33,878,232	3/90
Tampa Shipyards	T-ACS-7 & -8	CONV	43,158,333	2/89
Todd-Seattle	8 WHECs	OH	234,903,000	4/92
	USS Mount Vernon (LSD-39)	REP	6,300,000	2/89
Triple A Machine Shop	SS Petersburg (MarAd)	REP	346,769	12/88
USCG-Curtis Bay	14 buoy tenders	SLEP	8,500,000	—
	16 WMECs	MAINT	—	—

Legend: CONV-Conversion; DEACT-Deactivation; DPMA-Drydocking Phased Maintenance Availability; DSRA-Docking Selected Restricted Availability; EDSTRA-Extended Docking Selected Restricted Availability; MAINT-Maintenance; PMA-Phased Maintenance Availability; PSA-Post-Shakedown Availability; REF-Refit; REP-Repair; ROH-Regular Overhaul; SER-Service; SLEP-Service Life Extension Program; SRA-Selected Restricted Availability; UPG-Upgrade.

Major Navy Contracts

(continued)

configuration. Work is to be completed by October 1992. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-2221).

October 5

Newport News Shipbuilding and Dry Dock Company, Newport News, Va., was awarded a **$27,000,000** cost-plus-fixed-fee contract for the post shakedown availability of USS Oklahoma City (SSN-723). Work is expected to be completed June 19, 1989. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-86-H-8002).

General Dynamics Corporation, Groton, Conn., was awarded a **$617,353,600** fixed-price-incentive contract for the construction of one Ohio class submarine (SSBN-741). Work will be performed in Groton, Conn. (75 percent), and Quonset Point, R.I. (25 percent), and is expected to be completed in October 1994. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-88-C-2000).

Continental Maritime of San Diego, San Diego, Calif., was awarded a **$3,856,412** firm-fixed-price contract for the selected restricted availability for USS Long Beach (CGN-9). Work is expected to be completed March 10, 1989. The Supervisor of Shipbuilding, Conversion and Repair, San Diego, Calif., is the contracting activity (N00024-85-H-8212).

October 6

Avondale Industries, Avondale, La., was awarded a **$292.6-million** modification to a contract for the construction of three T-AO 187 Class ships. Work is to be completed by April 1993. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-2050).

Alabama Maritime Corp., Mobile, Ala., was awarded a **$4.7-million** contract for three Aircraft Transportation Lighters. Work is to be completed by October 1989. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-2040).

Norfolk Naval Shipyard, Portsmouth, Va., was awarded a **$9.4-million** contract for the selected restricted availability for USS Cincinnati (SSN-693). Work is to be completed by October 1989. The contract was awarded by the Naval Sea Systems Command, Washington, D.C.

October 7

Pacific Ship Repair and Fabrication, San Diego, Calif., was awarded a **$3.4-million** contract for repair services for USS Independence (CV-62). Work is to be completed by March 1989. The contract was awarded by the Supervisor of Shipbuilding, Conversion and Repair, San Diego, Calif. (N00024-85-H-8107).

McDermott Inc., Amelia, La., was awarded a **$61.7-million** modification to a contract for construction of three SWATH T-AGOS ships. Work is to be completed by October 1991. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-87-C-2087).

October 12

Jacksonville Shipyards Inc., Jacksonville, Fla., was awarded a **$3,744,662** firm-fixed-price contract for Selected Restricted Availabilities (SRA) on USS Forrestal (CV-59). Work is expected to be completed March 3, 1989. The Supervisor of Shipbuilding, Conversion and Repair, Jacksonville, Fla., is the contracting activity (N00024-85-H-8171).

Robert E. Derecktor of Rhode Island Inc., Middletown, R.I., was awarded a **$3,761,792** firm-fixed-price contract for overhaul and repair services for USS Capodanno (FF-1093). The Supervisor of Shipbuilding, Conversion and Repair, Boston, Mass., is the contracting activity (N62665-85-H-8209).

October 14

Ingalls Shipbuilding Inc., Pascagoula, Miss., was awarded a **$29.8-million** modifi-

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Length \ Diameter	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
1/2	*	*							
5/8	*	*	*						
3/4	*	*	*	*	*				
7/8	*	*	*		*				
1	*	*	*	*	*	*	*		
1 1/4	*	*	*	*	*	*	*		
1 1/2	*	*	*	*	*	*	*		
1 3/4	*	*	*	*	*	*	*		
2	*	*	*	*	*	*	*	*	
2 1/4	*	*	*	*	*	*	*	*	*
2 1/2	*	*	*	*	*	*	*	*	*
2 3/4		*	*		*	*	*	*	*
3	*	*	*	*	*	*	*	*	*
3 1/4						*	*	*	
3 1/2			*	*	*	*	*	*	*
3 3/4						*	*	*	
4			*	*	*	*	*	*	*
4 1/2						*	*		
5						*	*	*	*
5 1/2						*	*		
6						*	*	*	*

FINISH NUTS	*	*	*	*	*	*	*	*	*
THREADED ROD	*	*	*	*	*	*	*	*	*
FLAT WASHERS	*	*	*	*	*	*	*	*	*
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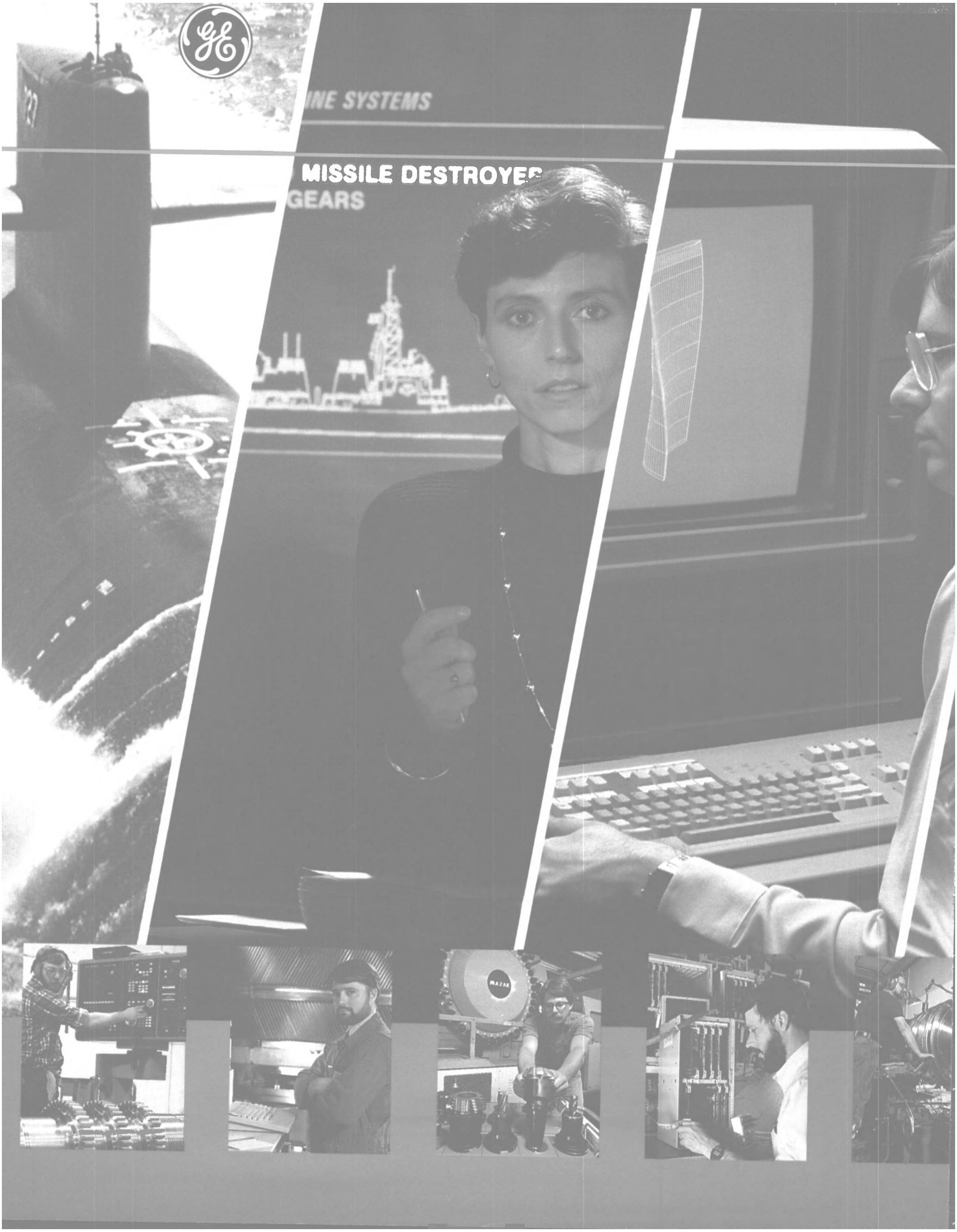
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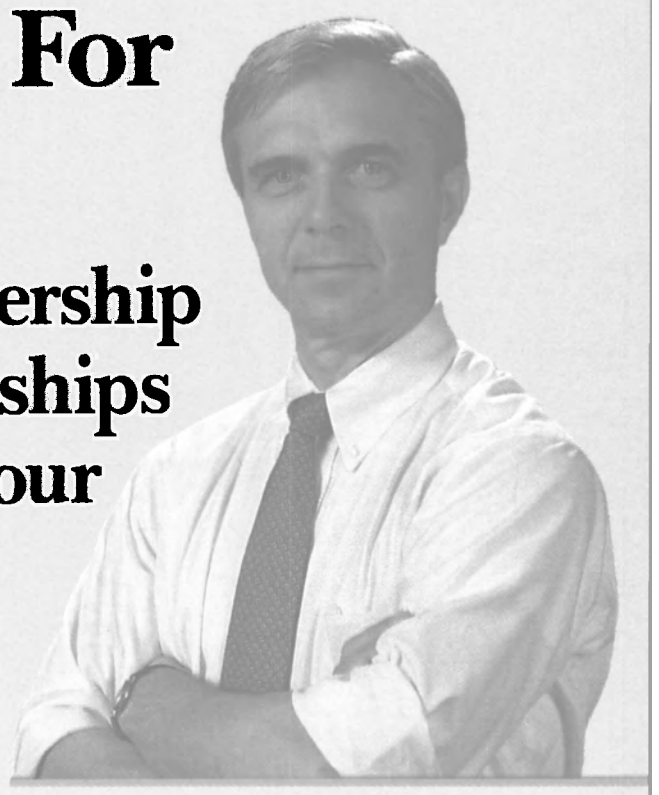

L.A. Carlstrom
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Recently, the CNO announced an intention to power future Navy surface combatants with electric drive propulsion systems. We were pleased to learn last November that Naval & Drive Turbine Systems was awarded an 89.5 million dollar contract to develop electric drive. On this program, we bring together the capabilities and resources of GE Corporate Research & Development, Drive Systems, Ordnance Systems, and Aircraft Engine Business Group, along with our people in Fitchburg and Lynn, Massachusetts; Bangor, Maine; and Schenectady, New York. Within these organizations, Navy experts will apply their experience, and use some of the world's most modern equipment, to create a state-of-the-art propulsion system that is versatile, quiet and highly efficient. We wish to thank the Navy for entrusting this vital program to GE.

A Proud Tradition

The heritage Edison began with the first shipboard power generation system continues at Naval & Drive Turbine Systems. Today, GE powers the Navy fleet from large aircraft carriers and submarines to small auxiliary ships. Tomorrow, electric drive will broaden the Navy's capability in the Twenty-first Century and enable us to carry-on our primary mission ... to maintain leadership in propulsion and ships service systems for the U.S. Navy.

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Major Navy Contracts

(continued)

cation to a contract for planning yard services for DD-963 and DDG-993 class destroyers. Work is to be completed by Sept. 30, 1989. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-2081).

Todd Pacific Shipyards Corp., San Pedro, Calif., was awarded a **$6.3-million** modification to a contract for repairs on the USS Mount Vernon (LSD-39). Work is to be completed by Feb. 24, 1989. The contract was awarded by the Supervisor of Shipbuilding, Conversion and Repair, Long Beach, Calif. (N00024-85-H-8237).

Raytheon Co., Wayland, Mass., was awarded a **$7.3-million** contract for long lead materials for the Aegis SPY-1D transmitter and MK 99 fire control system. Work is to be completed by June 30, 1991. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-5715).

Southwest Marine Inc., San Diego, was awarded a **$19.6-million** modification to a contract for the overhaul of USS O'Brien (DD-975). Work is to be completed by Nov. 1, 1989. The contract was awarded by the Supervisor of Shipbuilding, Conversion and Repair, San Diego, Calif. (N00024-85-H-8221 EH-45).

October 17

General Electric Company, Schenectady, N.Y., was awarded a **$89,829,000** modification to a previously awarded cost-plus-fixed-fee contract for naval nuclear propulsion components. Work is expected to be completed in September 1996. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-88-C-4035).

October 18

Detyens Shipyards Inc., Mt. Pleasant, S.C., was awarded a **$5,699,765** modification to a previously awarded firm-fixed-price contract for the Regular Overhaul (ROH) of Los Alamos (AFDB-7), a large auxiliary floating dry dock. Work is expected to be completed in April 1989. The Supervisor of Shipbuilding, Conversion and Repair, Charleston, S.C., is the contracting activity (N00024-85-H-8139).

October 20

Avondale Industries Inc., Avondale Shipyards Division, New Orleans, was awarded an **$18-million** contract for the regular overhaul of USS Caron (DD-970). Work is to be completed by Oct. 16, 1989. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-85-H-8113).

General Dynamics Corp., Electric Boat Division, Groton, Conn., was awarded a **$6.3-million** modification to a contract for reactor plant yard services for nuclear-powered guided missile cruisers. Work is to be completed by Sept. 30, 1989. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-4019).

Westinghouse Electric Corp., Wilkins Township, Pa., was awarded a **$58.2-million** modification to a contract for naval nuclear propulsion components. Work is to be completed by September 1993. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-4030).

General Electric Co., Knolls Atomic Power Laboratory, Schenectady, N.Y., was awarded a **$102.4-million** contract for naval nuclear propulsion research. Work is to be completed by September 1989. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-4002).

October 24

Colonna's Shipyard Inc., Norfolk, Va., was awarded a **$3-million** modification to a contract for Drydocking Selected Restricted Availability for USS Beary (FF-1085). Work is to be completed by Feb. 21. The contract was awarded by the Supervisor of Shipbuilding, Conversion and Repair, Portsmouth, VA. (N00024-85-H-8134).

General Electric, RCA Electronics Systems Dept., Moorestown, N.J., was awarded a **$92.5-million** contract for MK 7 Aegis weapon systems for DDG-2313, a Japanese destroyer. Work is to be completed by August 1991. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-5194).

Westinghouse Electric Corp., West Mifflin Borough, Pa., was awarded a **$221-million** contract for naval nuclear propulsion research. Work is to be completed by Sept. 30, 1989. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-4003).

General Electric, Schenectady, N.Y., was awarded an **$14-million** modification to a contract for naval nuclear propulsion components. Work is to be completed by September 1996. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-4033).

Cincinnati Gear Co., Cincinnati, was awarded a **$12.5-million** contract for eight Landing Craft Air Cushion transmissions. Work is to be completed by December 1990. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-2022).

October 25

Continental Maritime, San Diego, Calif., was awarded a **$5.8-million** modification to a contract for Drydocking Selected Restricted Availability for USS Merrill (DD-976). Work is to be completed by March 31, 1989. The contract was awarded by the Supervisor of Shipbuilding, Conversion and Repair, San Diego, Calif. (N00024-85-H-8212).

Ingalls Shipbuilding Inc., Pascagoula, Miss., was awarded a **$10-million** modification to a contract for planning yard services

in support of CG-47 class cruisers. Work is to be completed by Sept. 30, 1989. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-87-C-2031).

General Electric, Schenectady, N.Y., was awarded a **$116-million** modification to a contract for naval nuclear propulsion components. Work is to be completed by September 1992. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-87-C-4001).

General Electric, Pittsfield, Mass., was awarded a **$26.7-million** contract for engineering for the Fleet Ballistic Missile Program. Work is to be completed by Sept. 30, 1989. The contract was awarded by the Strategic Systems Program Office, Washington, D.C. (N00030-89-C-0027).

General Dynamics Corp., Groton, Conn., was awarded a **$77-million** modification to a contract for Seawolf (SSN-21) steam and electric plant development. Work is to be completed by Nov. 30, 1994. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-87-C-4086).

October 26

Westinghouse Electric Corporation, Plant Apparatus Division, Wilkins Township, Pa., was awarded an **$8,969,000** modification to a previously awarded cost-plus-fixed-fee contract for naval nuclear propulsion components. Work is to be completed in September 1993. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-88-C-4032).

October 27

Metro Machine Corp., Norfolk, Va., was awarded a **$6.5-million** contract for the regular overhaul for USS Vreeland (FF-1068). Work is to be completed by Sept. 14, 1989. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-85-H-8187).

Oregon Iron Works Inc., Clackamas, Ore., was awarded a **$4.4-million** contract for seventeen 50-foot work boats. Work is to be completed by August 1990. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-2075).

October 28

General Dynamics Corp., Groton, Conn., was awarded an **$8.7-million** modification to a contract for reactor plant yard services for nuclear-powered guided missile cruisers. Work is to be completed by Sept. 30, 1989. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-85-C-4021).

October 31

IBM Corp., Manassa, Va., was awarded an **$176-million** contract for three AN/BSY-1(V) combat control acoustic sets plus ancillary equipment for SSN-688 class submarines. Work is to be completed by January 1992. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-6008).

Metal Trades Inc., Hollywood, S.C., was awarded a **$3-million** modification to a contract for the regular overhaul for USS Sierra (AD-18). Work is to be completed by June 23, 1989. The contract was awarded by the Supervisor of Shipbuilding, Conversion and Repair, Charleston, S.C. (N00024-85-H-8186).

November 3

AT&T Technologies Inc., Greensboro, N.C., was awarded a **$10,236,325** modification to a previously awarded cost-plus-award-fee contract for oceanographic equipment and services. Work is expected to be completed June 30, 1989. The Space and Naval Warfare Systems Command, Washington, D.C., is the contracting activity (N00039-88-C-0115).

National Steel and Shipbuilding Company, San Diego, Calif., was awarded a **$242,785,351** modification to a previously awarded fixed-price-incentive contract for the construction of one AOE-6 class fast combat support ship (AOE-7). Work is expected to be completed in June 1992. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-2002).

Newport News Shipbuilding and Dry Dock Company, Newport News, Va., was awarded a **$7,193,018** modification to a previously awarded cost-plus-fixed-fee contract for reactor plant planning yard services for nuclear-powered submarines. Work is expected to be completed September 30, 1989. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-85-C-4020).

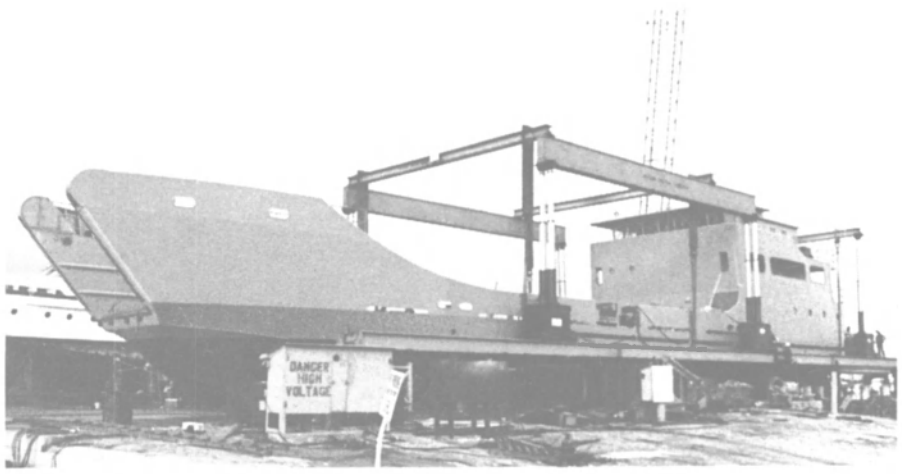
Newport News Shipbuilding and Dry Dock Company, Newport News, Va., was awarded a **$3,325,930** modification to a previously awarded cost-plus-fixed-fee contract for reactor plant planning yard services for USS Enterprise (CVN-65) and USS Long Beach (CGN-9). Work is expected to be completed by September 30, 1989. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-85-C-4014).

November 9

General Electric Company, Fitchburg, Mass., was awarded an **$89,515,562** fixed-price-incentive contract for design, construction, and test of a full scale electric drive system for surface combatants. The work is expected to be completed in June 1994. The Naval Sea Systems Command, is the contracting activity (N00024-89-C-4018).

November 10

Edison Chouest Offshore, Inc., Galliano, La., was recently awarded a firm-fixed-price contract worth **$16,148,689** for the charter of four tractor tugs. The new tugs will provide service for the Navy's Trident subma-



The three Twin-Path Extra lifting slings in place around the 419-ton U.S. Navy ship at Lantana Boatyard, Lantana, Fla.

Lightweight Lifting Slings From Slingmax Rigging Products Used In Navy Ship Launching

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Twin-Path Extra lifting slings are made of Dupont Kevlar, an uncommonly strong, lightweight material that is both flame and chemical resistant. Kevlar is what allows Twin-Path Extra lifting slings long-term wear performance, as well as the reason the units are both flexible enough to store and light enough for one person to carry. Slingmax Rigging Products claims that an equal wire rope sling would weigh as much as 1,400 pounds.

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Ingalls To Drydock Navy Destroyer Under $3.9-Million Contract

The U.S. Navy has awarded Ingalls Shipbuilding division of Litton Industries, Pascagoula, Miss., a $3.9-million contract to conduct drydocking and maintenance work on the guided missile destroyer USS Luce (DDG-38).

Ingalls will place the ship in drydock for work on the hull, including refurbishing valves, propulsion shafting, propellers and repainting. Also included in the contract is maintenance work on the ship's main propulsion boilers. During the peak work period, as many as 300 employees from Ingalls' existing work force will be involved in the project.

The 512-foot, 6,150-ton USS Luce, which was commissioned in May 1961, is scheduled to be at Ingalls from February through June 1989.

For free literature on the shipbuilding services of Ingalls,

Circle 30 on Reader Service Card

Major Navy Contracts

(continued)

rines at the Naval Submarine Base, Kings Bay, Ga. The tugs will be constructed by North American Shipbuilding, Inc., a subsidiary of Edison Chouest Offshore, Inc. The performance period is 17 months with two 17-month options. The boats will begin service between October 1989 and May 1990. The Military Sealift Command is the contracting activity (N00033-89-C-1201).

November 14

Continental Maritime of San Diego, San Diego, Calif., was awarded a **$3,145,701** firm-fixed-price contract for Selected Restricted Availability for USS Sides (FFG-14). Work is expected to be completed April 21, 1989. The Supervisor of Shipbuilding, Conversion and Repair, Long Beach Calif., is the contracting activity (N00024-85-H-8212).

General Dynamics Corporation, Convair Division, San Diego, Calif., was awarded a **$190,972,372** firm-fixed-price contract for Tomahawk sea-launched cruise missile all-up-rounds. This contract includes 99 new all-up-rounds, the conversion of 67 previously procured ground-launched cruise missiles to sea-launched configuration, and spares. Work is expected to be completed in March 1991. The Cruise Missiles Project Office, Washington, D.C., is the contracting activity (N00019-88-C-3137).

Crow Construction Company, N.Y., was awarded a **$5,747,000** firm-fixed-prepriced option to a previously awarded contract for the construction of a Fleet Operations/Ship Maintenance Facility at the Naval Station, Staten Island, N.Y. Work is expected to be completed in June 1990. The Naval Facilities Engineering Command, Northern Division, Philadelphia, Pa., is the contracting activity (N62472-85-C-0018).

November 15

Swiftships Inc., Morgan City, La., was awarded a **$3.5-million** contract for Craft of Opportunity equipment and services for the Arab Republic of Egypt. Work is to be completed by August 1989. The contract was awarded by the Naval Sea Systems Command,Washington, D.C. (N00024-89-C-2076).

November 16

National Steel and Shipbuilding Co., San Diego, Calif., was awarded a **$5.8-million** modification to a contract for a phased maintenance program for the USS Bristol County (LST-1198). Work was to be completed by Feb. 10, 1989. The contract was awarded by the Supervisor of Shipbuilding,

Conversion and Repair, San Diego, Calif. (N00024-86-C-8521).

National Steel and Shipbuilding Co., San Diego, Calif., was awarded a **$6.8-million** modification to a contract for the USS Barbour County (LST-1195). Work was to be completed by Jan. 27, 1989. The contract was awarded by the Supervisor of Shipbuilding, Conversion and Repair, San Diego, Calif. (N00024-86-C-8521).

November 17

General Dynamics Corporation, Electric Boat Division, Groton, Conn., was awarded a **$17,699,000** modification to a previously awarded cost-plus-fixed-fee contract for design services for the SSN-21 Seawolf class submarine. Work is expected to be completed September 30, 1989. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-2011).

November 18

General Electric Co., Moorestown, N.J., was awarded a **$4.2-million** modification to a contract for shipyard test and integration support for CG-60, CG-61, and CG-62. Work was to be completed by Feb. 28, 1989. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-87-C-5600).

November 21

Southwest Marine Inc., San Diego, Calif., was awarded a **$4-million** modification to a contract for a Phased Maintenance Availability for USS Juneau (LPD-10). Work is to be completed March 17, 1989. The contract was awarded by the Supervisor of Shipbuilding, Conversion and Repair, San Diego, Calif. (N00024-87-C-8518).

November 29

Newport News Shipbuilding and Drydock Co., Newport News, Va., was awarded a **$22-million** contract for planning yard services for SSN-688 class submarines. Work is to be completed by Sept. 30, 1989. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-2089).

December 1

Norfolk Shipbuilding and Drydock Corp., Norfolk, Va., was awarded an **$11.4-million** contract for Drydocking Selected Restricted Availability (DSRA) for USS Emory S. Land (AS-39). Work is to be completed by May 4, 1989. The contract was awarded by the Supervisor of Shipbuilding, Conversion and Repair, Portsmouth, Va. (N00024-85-H-8195).

General Electric, Moorestown, N.J., was awarded a **$9.6-million** modification to a contract to integrate the Aegis combat system into a Japanese destroyer. Work is to be completed by November 1993. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-86-C-5545).

December 2

Magnetek ALS, Anaheim, Calif., was awarded a **$4.7-million** contract for the production of the power supply and split bus controller of the Japanese Aegis weapon system. Work is to be completed by December 1991. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-5198).

Norfolk Shipbuilding & Drydock Corp., Norfolk, Va., was awarded a **$3-million** contract for the drydocking and repair of USNS Pawcatuck (T-AO-108), a Military Sealift Command (MSC) fleet oiler. Work is to be completed by April 11, 1989. The contract was awarded by the Military Sealift Command, Atlantic (N62381-89-C-0204).

December 7

General Electric Co., Syracuse, N.Y., was awarded a **$225-million** modification to a contract for AN/BSY-2 submarine combat systems. Work is to be completed by November 1993. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-6150).

General Dynamics Corp., Groton, Conn., was awarded a **$77.8-million** modification to a contract for engineering and technical services in support of Ohio (SSBN-726) class submarines. Work is to be completed by Sept. 30, 1990. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-2219).

McDermott Inc., Amelia, La., was awarded a **$10-million** modification to a contract for one Torpedo Test Craft. Work is to be completed by February 1991. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-2093).

Atlantic Dry Dock Corp., Jacksonville, Fla, was awarded a **$5.2-million** contract for USS Tattnall (DDG-19). Work is to be completed by May 14, 1989. The contract was awarded by the Supervisor of Shipbuilding, Conversion and Repair, Jacksonville, Fla. (N00024-85-H-8111).

December 9

Continental Maritime, San Francisco, Calif., was awarded a **$6.8-million** contract for Drydocking Phased Maintenance Availability of USS Samuel Gompers (AD-37). Work is to be completed by July 24, 1989. The contract was awarded by the Supervisor of Shipbuilding, Conversion and Repair, San Francisco, Calif. (N00024-85-H-8218).

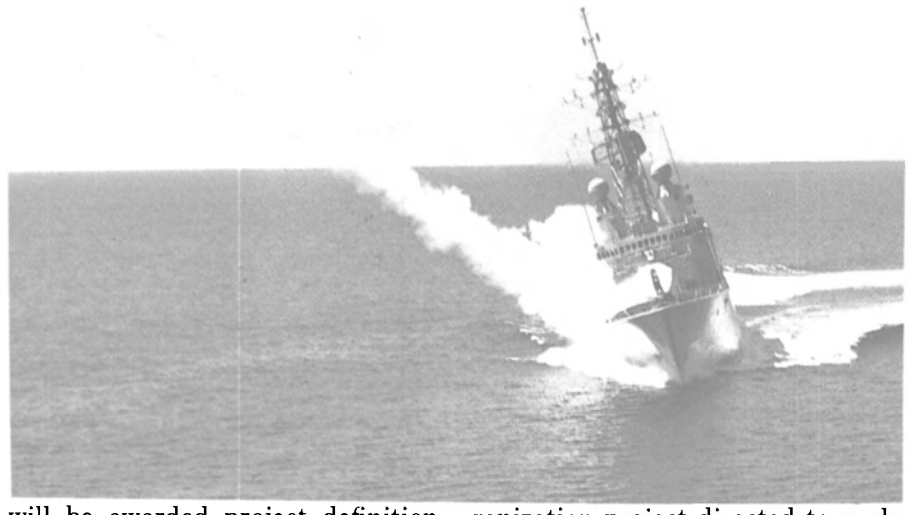
December 12

Newport News Shipbuilding, Newport News, Va., was awarded a **$20-million** modification to a contract for naval architectural and engineering support for advanced nuclear attack submarines. Work is to be completed by September 1989. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-87-C-2012).

PROMISING FUTURE FOR CANADIAN NAVAL SHIPBUILDING

Navy Programs Could Bring C$16 Billion In Work To Shipbuilding & Allied Industries Over Next 15 Years

Maritime Reporter Staff



Based on a speech by **J.W. Serge Poirier**, Director-Procurement & Supply Maritime, Canadian Department of National Defense (DND), at the Canadian Maritime Industries Association (CMIA) and Allied Industries Outlook Conference late last year, the future of Canadian shipbuilding and its allied equipment and support industries appears to be promising. Acquisition of more than 65 percent of total Canadian Forces requirements over the next 15 years can be purchased in Canada. The Navy program over the 15-year period has approximately 40 projects primarily associated with the shipbuilding industry and is valued at approximately C$16 billion. While the majority of the work relates to the shipbuilding sector, large amounts of work will be assigned to the nuclear, electronics, communications, ADP and aerospace industries. It is expected that Canadian shipyards on both coasts, the Great Lakes and St. Lawrence River will participate in the Navy's rebuilding programs.

Mr. **Poirier** outlined the status of the major maritime projects contained within the Defense White Paper and others that are ongoing within the DND. All of the proposed projects will be competing for the Defense procurement dollars over the next few years. Some of the projects have not yet received departmental or governmental approval. Each project will be subject to intensive examination to determine need and affordability. This article provides a brief review of the status of these programs.

PROPOSED PROJECTS

Nuclear-Powered Submarines

The French Rubis/Amethyste Class (SNA-72) and U.K. Trafalgar Class nuclear-powered attack submarine designs are currently under evaluation by Canada. Once the country-of-origin evaluation process has been completed, a technical data package and a technology transfer contract will be purchased. It is anticipated that once the Request For Proposal (RFP) is issued and replies evaluated, the top two will be awarded project definition studies contracts. The implementation contract is scheduled to be let for late 1991 with the acquisition phase expected to extend until the year 2014. The government plans to spend $6 billion or more to acquire a fleet of 10 to 12 nuclear-powered attack submarines.

The French Rubis Class attack submarine is 236.5 feet long and displaces 2,670 tons (submerged). Her propulsion equipment consists of a 48-MW nuclear reactor, two turbo-alternators and one main motor.

The larger, faster Trafalgar Class has a displacement of 5,208 tons, with an overall length of 280.1 feet. Her propulsion machinery consists of a single pressurized-water-cooled nuclear reactor, General Electric geared steam turbines and two Paxman auxiliary diesels.

NATO Frigate Replacement

NATO Frigate Replacement for the 1990s (NFR90) is an eight-nation North Atlantic Treaty Organization project directed towards the cooperative development and construction of a standard NATO antisubmarine warfare (ASW) frigate replacement for the 1990s. Canada is participating on all international working groups preparing the necessary documentation required for project definition. A Canadian lead company has been designated to represent Canada in an international ship design company for the project definition phase of the project. In October 1987, the Treasury Board approved Canadian participation and Canada signed the international MOU for the project definition phase of this project. Negotiations are underway and it is expected that the definition phase will commence shortly at a cost of C$15 million-C$20 million per nation.

Should the project be implemented, the lead ship of the new ASW frigate class would be delivered in the mid-90s. Construction by the participating nations would follow.

Naval Reserve MCM Project

The government has given preliminary approval to the Naval Reserve Mine Countermeasures (MCM) Project and RFPs for project definition have been issued to interested Canadian prime contractors. After a bid evaluation period, two Canadian prime contractors will be selected to design a Maritime Coastal Defense Vessel (MCDV) for the Naval Reserve that will provide a ship capable of performing both patrol and MCM tasks in Canadian coastal waters. If the current schedule is maintained, the DND will award two project definition contracts in July 1989.

Following an evaluation of the two designs, one contractor will be selected to build 12 coastal defense vessels for delivery between 1993-1998.

MCM Auxiliaries

This project was initiated to provide MCM training to reserves. Two offshore commercial vessels have been acquired and will be fitted

(continued)

Exhibit 1—Canadian Coast Guard Capital Projects Completed/Underway
(C$ in millions)

Vessel (Type)	Build Modernization	Shipyard(s)	Contract Value	Delivery
Sir Wilfred Grenfell (Offshore SAR Vessel)	ACQ & RECOG	Marystown	29.3	DEC 87
Alert (Offshore SAR Vessel)	MOD	Marystown	5.4	MAY 88
Henry Larsen (Icebreaker)	BUILD	Versatile Pacific-Vancouver	96.8	JUL 88
Bartlett (Navaids tender)	MOD I	Port Weller	3.0	JUL 88
Eckaloo (Navaids tender)	BUILD	Vancouver	6.5	AUG 88
Simcoe (Navaids tender)	MOD	Marystown	9.5	DEC 88
Type 310 SAR (ARUN design-GRP)	BUILD	Halmatic, U.K. & AMT Marine	2.4	JUN 89
Tracy (Navaids tender)	MOD	Pictou Industries	7.8	JUN 89
Type 500 SAR (2) (Medium Endurance)	BUILD	Versatile Pacific-Victoria	35.2	MAY 90
Louis S. St. Laurent (Icebreaker)	MOD	Halifax-Dartmouth Industries Ltd.	82.3	NOV 90

Photo: The HMCS Iroquois is one of two Canadian destroyers undergoing modernization at MIL Davie, Lauzon, Quebec.

Mechanical limit switches are still preferable to electronic proximity switches in most Navy applications. Here, a Namco Snap-Lock® switch controls a davit gearbox. Rugged Snap-Lock switches have reliably stood up to harsh environments like this tor years.

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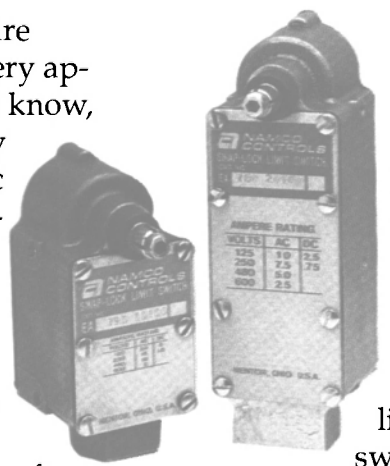

Additionally, our switches meet MIL-C-2212...just try to find a proximity switch that can.

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All in all, knowing what mechanical and electronic switches can and can't do, we recommend mechanical limit switches for most Navy and marine uses. Call us, we'll be happy to show you more!

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Promising Future For Canadian Shipbuilding

(continued)

with Hyperfix Precise Navigation Systems, side scan sonar, the PINS 9000 Precise Integrated Navigation Systems and with mechanical minesweeping equipment.

The two vessels will require docking, equipment installation and shipwork to bring them to Canadian Coast Guard pollution standards.

The DND will contract engineer support to private industry within the next six months.

Auxiliary Vessel Replacement Project

This project is presently in the planning stages. When developed, it will entail the progressive modification and replacement during the 1990s of tugs, cranes and auxiliary barges. This project should generate a great deal of work for Canadian yards.

General Purpose Auxiliary Vessel

The urgency of the Canadian Patrol Frigate requirement for a trials support vessel has made it necessary for the DND to bring forward the procurement of one of the vessels in the Auxiliary Fleet Replacement Project, the General Purpose Auxiliary Vessel. This vessel is needed much the same as the MCM Auxiliary, and Supply and Services Canada has sent letters to all companies who responded to the MCMA request.

Under-Ice Fixed Sonar Systems

This project involves the installation of a modern, fixed under-ice surveillance system in the Arctic to aid in the detection of incursion of Canadian Arctic waters by submarines. Departmental officials are in the process of preparing the necessary option analysis and documentation to obtain approval for this project. It is expected that a competitive contract for project definition will be issued in 1989.

Sonar Array Towing Vessels

The DND has determined the need for mobile-subsurface long range surveillance systems consisting of towed arrays and up to three towing vessels. This project depends on the development of a suitable sensor to meet the performance requirements.

ONGOING PROJECTS

ASW Patrol Frigates

The government has approved the second phase of the ship replacement program in the form of six more Canadian patrol frigates to be delivered between 1992-1996. The design remains essentially the same as that of the first six ships and Saint John Shipbuilding, Ltd., New Brunswick, and Paramax are in the process of placing purchase orders for material for the second batch.

At a total cost of C$10 billion, the CPF is the largest single defense project with annual expenditures now approaching C$1 billion.

Saint John Shipbuilding, the prime contractor for the first six frigates, has christened the first ASW frigate, the HMCS Halifax, and will construct two others.

Marine Industrie Limitee (MIL) of Quebec is building the other three frigates in the first batch.

Tribal Class Update & Modernization Project (TRUMP)

The C$1.2-billion TRUMP program was begun in June 1986 when Litton Systems Canada Ltd. was selected as prime contractor with responsibility for project management and combat systems design and integration.

Under the project, the four Tribal Class destroyers, the Iroquois, Algonquin, Huron and Athabaskan, are being modernized and equipped with new combat systems, gas turbine propulsion engines, diesel generator engines, vertical missile launcher modules and electronics to fulfill the role of air defense, as well as antisubmarine warfare. Each conversion takes approximately 18 months.

At present, the HMCS Iroquois and the HMCS Algonquin are being converted at the MIL Davie Shipyard in Lauzon, Quebec.

Contracts for the second two destroyers will be let by Litton on a competitive basis. The RFP was issued by Litton in 1987 and proposals have been submitted. The evaluation and approval process is proceeding and it is expected that the subcontract will be awarded early this year.

CF Maritime Experimental & Test Range Support Vessels

West Coast Manly, a division of Rivtow Straits Ltd., was awarded a contract in September 1988 to build four Canadian Forces Experimental and Test Range Support vessels. The vessels will be 98.4 feet long and displace about 220 tons.

Research & Development

This year, the Research and Development Branch of the DND has been allocated C$149 million for R&D contracts and equipment, plus the support needed for research facilities. These funds will be supplemented by additional monies identified to support international cooperative development as recently stipulated by the U.S. "Nunn Amendment."

Coast Guard Projects

A number of Canadian Coast Guard major capital projects have been completed, are underway or proposed. See Exhibit 1 for details. More information will be provided next issue. ■

Bender Awarded USCG Buoy Tender Repair Contract

Bender Shipbuilding & Repair Co., Inc., Mobile, Ala., was recently awarded a $278,546 contract for the regular overhaul of the U.S. Coast Guard buoy tender Salvia.

Contingent work on the 180-foot tender, which is based at the Coast Guard station in Mobile, could add $100,000 to the contract.

The USS Tortuga at the Shipyards Division of Avondale Industries, Inc., Avondale, La. She is the third in a series of five Landing Ship Docks (LSDs) being built for the U.S. Navy. The Tortuga is powered by four medium-speed Colt-Pielstick diesel engines.

Avondale Shipyards Christens USS Tortuga (LSD-46) For Navy

Third In Series Built By Yard

Avondale Shipyards Division, Avondale Industries, Inc., Avondale, La., recently christened the Landing Ship Dock vessel USS Tortuga (LSD-46) for the U.S. Navy. She is the third in a series of LSDs being built for the U.S. Navy by the yard.

The principal speaker at the christening ceremonies was U.S. Senator **J. Bennett Johnston** (D-La.). The ship's sponsor was Mrs. **Rosemary Parker Schoultz**, wife of retired Vice Adm. **Robert F. Schoultz**, U.S. Navy. Other dignitaries at the ceremonies included **Albert L. Bossier Jr.**, chairman and chief operating officer, Avondale Industries, Inc., and the Honorable **Everett Pyatt**, Assistant Secretary of the Navy, Shipbuilding and Logistics.

The USS Tortuga, like her sister ships, is 610 feet long, has a beam of 84 feet, maximum draft of 19 feet 7 inches, and displaces 15,623 long tons.

Powered by four Colt-Pielstick medium-speed diesel engines for a total of 33,000 shp, the Tortuga is capable of service speeds in excess of 20 knots.

LSDs are multi-functional ships capable of a wide range of amphibious assault operations for the U.S. Navy and Marine Corps. Their primary mission is to carry, launch and dock up to four Landing Craft, Air Cushion (LCAC) vessels. In combination with the LCACs, the LSD ships will allow Marines to make beach landings.

The LCACs which will be carried by the Tortuga and her sister LSDs are also being built by Avondale at its recently acquired Gulport marine facility.

The Tortuga, which is being built by Avondale with the use of modular construction techniques, is expected to be delivered in July 1989.

For free literature detailing the shipbuilding services offered by Avondale Shipyards,

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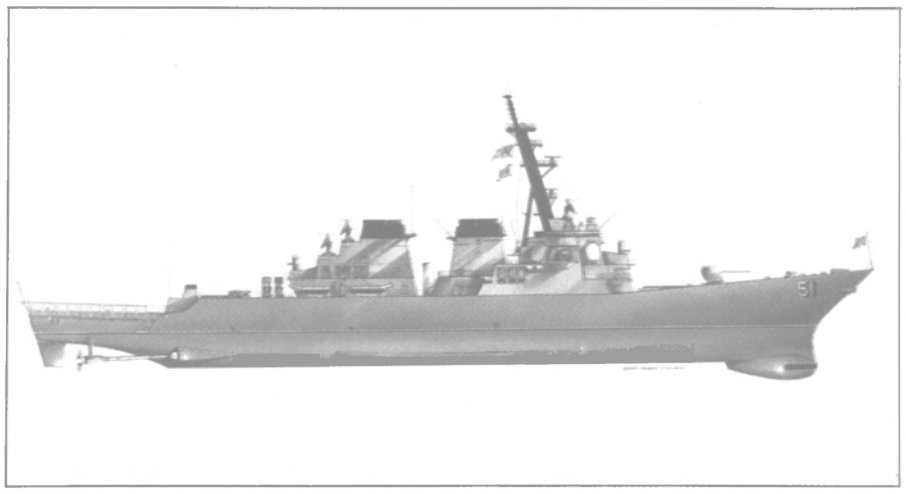
TORTUGA
Equipment List

Main engines	Colt-Pielstick
Reduction gears	Philadelphia Gear
Shafting	Avondale
Ship service generator	Colt-FM
Lineshaft bearings	Waukeshaw
Exhaust silencers	Burgess Manning
Main switchboards	International Switchboard
Motor controllers	Cutler-Hammer
CP propellers	Bird-Johnson
Steering gear	Paul-Munroe
Propulsion control, ballast control & bridge consoles	Rexnord
Damage control console	Henschel
F/O & L/O purifiers	Alfa-Laval
Rotary pumps	Transamerica Delaval Blackmer
Centrifugal pumps	Carver
Deballast air compressor	Dresser-Roots
HP air compressor	Worthington
LP air compressor	RIX
Distiller	Aqua Chem
Auxiliary boiler	Combustion Engineering
Oil/water separator	Quantec
Filter separator	Gill
Valve actuator	Limitorque Morgan
A/C plant	York
Reefer plant	Carrier
Halon system	Hiller
Cargo & ammo elevators	Unidynamics
Package conveyor & turntable operating gear	Transco
Stern gate operating gear & ballast valve hydr. pwr. units	Paul-Munroe
Motors	GE Tech Systems
Frequency changer	Teledyne
Switchboard	Taplin
Degaussing system	EMS Development
Brominating system	Everpure
Vent fans	Buffalo Forge
Pedistal cranes, anchor windlass & capstans	Lakeshore
Bridge crane	P&H
Joiner work	American Joiner

Bath Iron Works Awarded $610.1-Million Contract To Build Three Destroyers...

The U.S. Navy recently awarded Bath Iron Works (BIW), Bath, Maine, a contract worth $610,109,000 to build three Arleigh Burke Class (DDG-51) Aegis guided missile destroyers.

The three destroyers, DDG-54, -56, and -58, will each have a length of 504 feet, beam of 59 feet and displace 8,300 tons. The vessels will each be powered by four gas turbine engines.



Artist's conception of the Arleigh Burke Class (DDG-51) guided missile destroyer. Bath Iron Works is building the lead ship of this class. BIW drawing

While Ingalls Receives $466.5-Million Navy Pact To Build Two Others

The U.S. Navy recently awarded the Ingalls Shipbuilding Division of Litton Industries, Pascagoula, Miss., a $466.5-million contract to build two Arleigh Burke (DDG-51) Class Aegis guided missile destroyers.

The ships will each have an overall length of 504 feet, beam of 59 feet and displace 8,300 tons. Each will be powered by four gas turbine engines to speeds in excess of 30 knots.

Construction of the ships, designated DDG-55 and -57, is scheduled to get underway in September 1990 and May 1991, respectively.

Anadac, Inc. Awarded $27.7-Million Contract

Anadac, Inc., an Arlington, Va., professional services firm was recently awarded a multiyear $27.7-million contract to provide engineering and technical services to the U.S. Navy's Aegis Shipbuilding Program.

MSI Offers Naval And Commercial Training At Simulator Complex

MarineSafety International (MSI), a professional training organization, operates a shiphandling simulator training complex in Newport, R.I. The complex houses four interactive ship simulators. Unique features of the complex are a "true" bridge wing simulator, a wheelhouse simulator with a 250-degree visual including a view over the stern and multi-media learning feedback centers.

In addition to training up to 1,200 Naval officers per year, the MSI complex is used to train merchant marine officers and harbor pilots. Courses have been conducted for Chevron, American President Lines and many other U.S. and Canadian companies.

The bridge wing simulator is an excellent tool for training pilots in the techniques of close-in maneuvering and docking. Courses have been conducted for the San Francisco Pilots, the State of California, and many Canadian pilot groups. Training for Panama Canal Pilots at the Newport complex will begin in April.

For a free brochure detailing the courses available from MSI,

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Tracor Marine Awarded $3.6-Million Navy Contract

Tracor Marine, Inc., a subsidiary of Tracor, Inc., has been awarded a $3.6-million contract by the Naval Surface Warfare Center (NSWC) for engineering and technical support services.

Bender Awarded Contract To Overhaul Navy Research Vessel

Bender Shipbuilding & Repair Co., Inc., Mobile, Ala., was recently awarded a $438,070 contract for the regular overhaul of the USNS Bartlett (T-AGOR-13), an oceanographic research vessel based at Port Everglades, Fla.

Bender is a full-service shipyard that builds, converts and repairs vessels for the commercial and government sectors.

For free literature detailing the shipbuilding and ship-repairing services of Bender,

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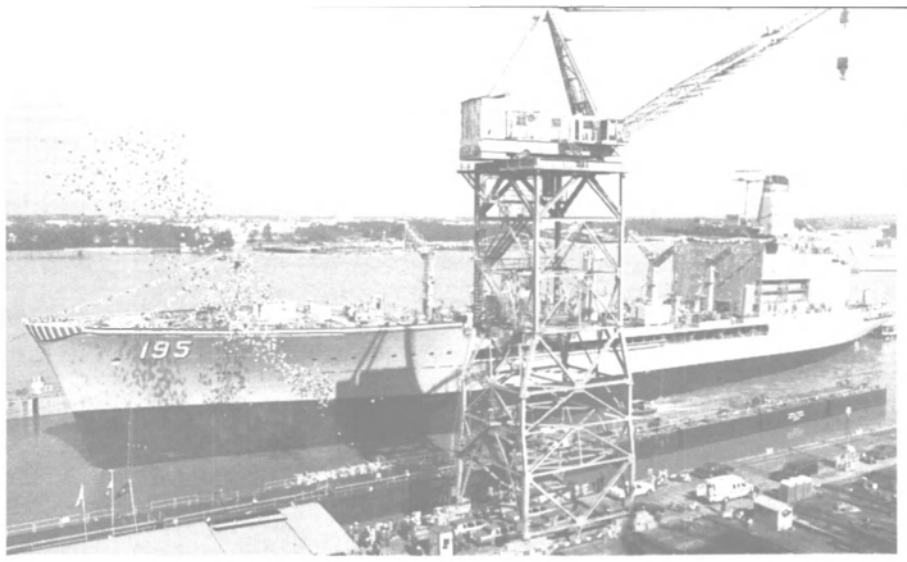

The recently christened USNS Leroy Grumman (T-AO-195) at Avondale Shipyards Division, Avondale, La. Powered by a pair of Colt-Pielstick 10-cylinder diesel engines, she has a service speed of 20 knots.

Avondale Christens U.S. Navy Fleet Oiler, USNS Leroy Grumman (T-AO-195)

The Shipyards Division of Avondale Industries, Inc., Avondale, La., recently christened the U.S. Navy's newest fleet oiler, the USNS Leroy Grumman (T-AO-195).

The USNS Leroy Grumman, like her sister ships in the T-AO-187 Class, is 677-1/2 feet long, has a beam of 97-1/2 feet, draft of 36 feet and displaces 40,700 tons. She is powered by two 10-cylinder PC4.2 Colt-Pielstick diesel engines manufactured by the Fairbanks Morse Division of Colt Industries, Inc.

Sponsoring the ship were the three daughters of the late Leroy Grumman, one of our nation's greatest industrialists and aircraft designers, and the man whom T-AO 195 honors. The sponsors were **Marion Grumman Phillips, Florence Grumman Hold** and **Grace Grumman Nelson.** Officially representing Grumman Aircraft Engineering Corporation was Dr. **Renso Caporali,** vice chairman, corporate technology.

The principal speaker at the event was Representative **Lindy Boggs,** D-La., a longtime supporter of maritime interests.

Other christening participants were: **Albert L. Bossier Jr.,** chairman and CEO, Avondale Industries, Inc., Capt. **E. L. Gibson,** USN, Commander, Fast Sealift Squadron One; Vice Adm. **Peter M. Hekman,** USN, Commander, Naval Sea Systems Command, Capt. **Paul D. Hurst,** USN Supervisor of Shipbuilding, Conversion and Repair, New Orleans, and **Michael P. Garvey,** Chaplain Corp, United States Naval Reserve.

The mission of the Grumman will be to transport bulk petroleum products from shore depots to Navy ships at sea. Designed to carry 180,000 barrels of fuel and 534 pallets of dry cargo stores, the Grumman's at-sea delivery capability will enable Navy ships to operate for longer periods without returning to port for fuel and supplies.

For further information on the shipbuilding services of Avondale Shipyards,

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Principals at the fleet oiler Leroy Grumman christening ceremony included (seated, L to R): **Grace Grumman Nelson**, sponsor; **Lauren Catherine Kitchen**, flower girl; **Marion Grumman Phillips**, sponsor; **Nikki Lynn Berthelot**, flower girl; **Florence Grumman Hold**, sponsor; and **Arienne Dore Arnold**, flower girl. Standing (L to R): **Albert L. Bossier Jr.**, chairman and CEO, Avondale Industries, Inc.; Dr. **Renso Caporali**, vice chairman, corporate technology, Grumman Aircraft Engineering Corporation; the Honorable **Lindy Boggs**, U.S. Representative, D-La.; Vice Adm. **Peter M. Hekman Jr.**, USN, Commander, Naval Sea Systems Command; Capt. **Paul D. Hurst**, USN, Supervisor of Shipbuilding, Conversion and Repair, New Orleans; and Capt. **E.L. Gibson, USN,** Commander, Fast Sealift Squadron One.

Trinity Marine Group Acquires Lockheed Shipbuilding Yard

Deal Includes Transfer Of LCU Building Contract

Trinity Industries, Inc., recently announced that its wholly owned subsidiary Halter Marine, Inc., has signed an agreement to purchase the shipbuilding business and certain assets of the Lockheed Shipbuilding Company in Thunderbolt, Ga., near Savannah.

The transaction includes transfer of a contract with the U.S. Army Troop Support Command for the construction of twenty-three 174-foot Landing Craft Utility (LCU) ships. The Army holds options for 12 additional LCUs which could bring the total contract value to approximately $144 million. The Army has approved the transfer.

The announcement was made by **John Dane III**, president of the Trinity Marine Group which operates Trinity Industries shipyards. Mr. **Dane** said that, while no final decision has been made on transfer of work, some of the work would be done at Moss Point Marine, Escatawpa, Miss., because of facility constraints at the Thunderbolt shipyard.

"This will have positive effects in Mississippi and Louisiana, " said Mr. **Dane**. "It will maintain employment levels at Moss Point and stabilize employment at our Halter-Lockport, La., shipyard. Three 175-foot, 100-ton Army crane barges valued at a total of approximately $16 million, which were slated for Moss Point, will now be built at Lockport.

The Georgia facility will be renamed Thunderbolt Shipbuilding and Repair, Inc. **Dan Sentilles** has been named the manager of the yard.

"As the new name indicates, we are expanding the service and product mix of Thunderbolt. The shipyard will continue to build components for the LCUs and we are already bidding on overhaul and repair work for the facility," said Mr. **Dane**.

The purchase of the Thunderbolt facility is the second major acquisition the Trinity Marine Group has made in recent months. Late last year, the group purchased the Crown Point, La., yard of Aluminum Boats, Inc.

In addition to the new Thunderbolt yard and Aluminum Boats, Inc., facility, the Trinity Marine Group includes four other shipbuilding companies and six other shipyards in Louisiana and Mississippi.

For free literature detailing the shipbuilding, ship-repairing and conversion services of the Trinity Marine Group,

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Corps Of Engineers To Repower Aluminum Surface Effect Ship

The U.S. Army Corps of Engineers, acting as contracting authority for the U.S. Navy, intends to repower the David Taylor Research Center's SES-200, an existing 160-foot aluminum surface effect ship using a government-furnished propulsion system. As part of this effort, the vessel's conventional fixed-pitch propulsion system will be replaced with a waterjet propulsion system.

Because of machinery system configuration and weight growth, the vessel's hull lines will be modified and a large blister integrated into the side hulls. The acquisition is identified as M DC Project 2211. The Request For Proposal, including detailed plans and specifications will be available after March 1, 1989, by contacting U.S. Army Corps of Engineers, Philadelphia District, Custom House, 2nd and Chestnut Streets, Philadelphia, Pa. 19106, Attn: CENAP-CT.

Colonna's Begins Repair Of U.S. Navy Frigate Under $3-Million Contract

Colonna's Shipyard, Norfolk, Va., has begun work on a $3.05-million Navy contract for repairs to the frigate USS Donald B. Beary (FF-1085).

The USS Donald B. Beary was docked in early December, and the work is scheduled to be completed at the end of this month. She is the first frigate to be docked in Colonna's floating drydock.

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

Colonna's Shipyard, founded in 1875, is a family-owned, full-service shipyard with facilities to provide ship repairs for government and commercial vessels up to 800 feet. Plant facilities include a 17,200-ton-steel floating drydock, three marine railways and complete shop and pier facilities.

For free literature detailing the ship-repairing facilities and services of Colonna's,

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Recent Ship Repair Work At Colonna's Shipyard

Vessel	Work
USS Donald B. Beary (FF-1085)	DSRA
USCG Durable (WMEC-628)	MMA
USCG Courageous (WMEC-622)	MMA
USS Papago (ATF-160)	DSRA
USNS Marshfield (T-AK-282)	DD

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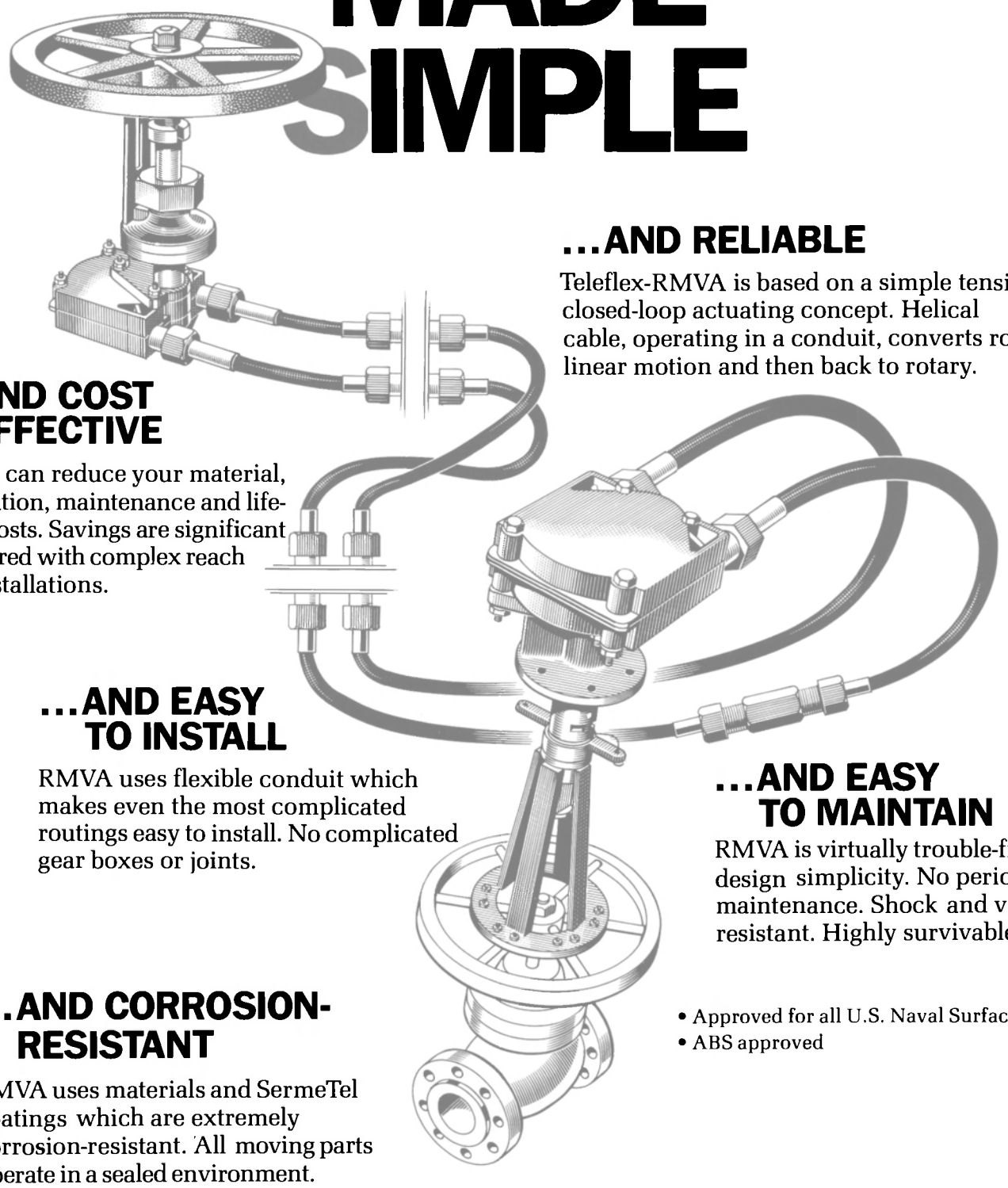

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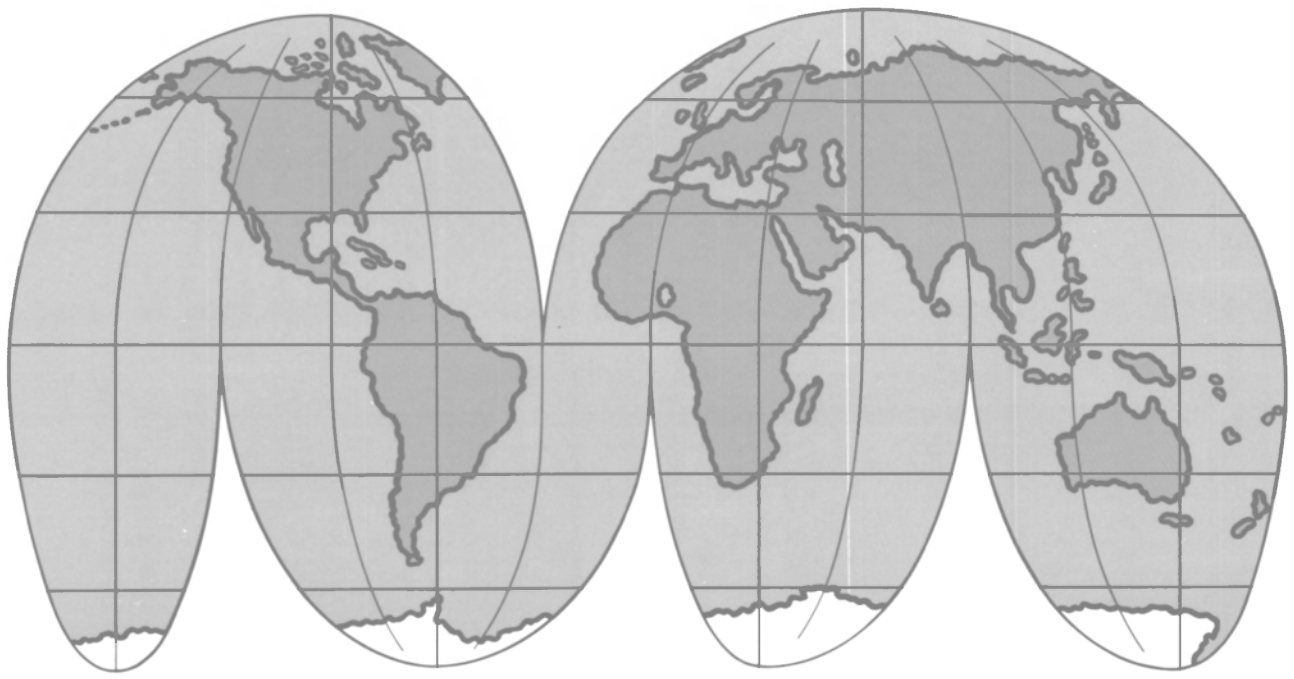

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Write to Allison Gas Turbine, General Motors Corporation, P.O. Box 420, U-6, Indianapolis, Indiana 46206 USA. Telex 6876054.

Allison

Versatile Pacific Shipyards Inc. delivered the Arctic Class 4 icebreaker Henry Larsen to the Canadian Coast Guard. Powered by an AC marine propulsion system that includes Wartsila Vasa diesel engines and General Electric Canada synchronous generators, the Henry Larsen can reach speeds of 13.5 knots in the open sea.

Versatile Pacific Delivers Arctic Icebreaker 'Henry Larsen' To Canadian Coast Guard

The Northern Vancouver yard of Versatile Pacific Shipyards, Inc. (VPSI) has delivered the Type 1200 Arctic Class 4 icebreaker Henry Larsen to the Canadian Coast Guard. She is now in operation providing large vessel escort service in the Gulf of St. Lawrence during the winter months and in the Eastern Arctic in the summer months.

Commenting on the delivery of the Henry Larsen, **David Alsop**, president and chief executive officer of VPSI, said the ship performed well during her sea trials and "we are confident the Government of Canada and the Coast Guard are taking delivery of a first class vessel that will meet all expectations."

As reported in the September issue of MARITIME REPORTER, the Henry Larsen is 327.5 feet long, has a beam of 64.6 feet and displacement of 8,290 tons at a draft of 23.7 feet. She is powered by an AC marine propulsion plant consisting of three main generator sets, cycloconverters and synchronous motors. Three Wartsila Vasa type 16V32 diesel engines each rated at 5,250 kw at 720 rpm, drive General Electric Canada AT1 synchronous generators with brushless exciters. Each generator is rated at 5,000 kw, 4,160 v, 6,250 kva at 720 rpm. Cullen Canada Inc., Vancouver, B.C., Canada, supplied the main propulsion generator sets.

Auxiliary power is supplied by a 625-kw Stromberg HSPTL 10/653 generator driven by a Wartsila Vasa 6R22 rated at 960 kw at 1,200 rpm. She is also fitted with a Caterpillar emergency generator set.

The Henry Larsen can accommodate a crew of 72, has a cruising range of about 15,000 nautical miles, a cruising speed of about 13.5 knots and a total shaft horsepower of 12,000 kw through two Lips propellers.

One special feature of the Henry Larsen is her advanced Asea Brown Boveri (ABB) Integrated Automation System. The system provides true integration of control and instrumentation functions, integrating prime mover control with electronic governors, start permissives and safety systems; alarm and monitoring; fan, valve, pump and compressor control; power management; fuel consumption calculation and presentation; and tank gauging.

Completed under a C$96.8-million contract as one of several newbuildings and modernizations planned or underway in the Canadian Coast Guard's Capital Projects, the Henry Larsen is one of Canada's largest icebreakers. To enhance her icebreaking capabilities and increase her maneuverability, she is fitted with a Wartsila Air Bubbling System, which reduces friction between the hull and the surrounding ice. Additionally, she is fitted with a heeling/stabilizing system by Intering of Germany through Jastram Canada.

The icebreaker is named in honor of Supt. Henry Larsen of the Royal Canadian Mounted Police who was in command of the RCMP ship St. Roch when it made its historic 28-month voyage through the Northwest Passage in the early 1940s.

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

Circle 104 on Reader Service Card

HENRY LARSEN
Equipment List

Main engines (3)	Wartsila Vasa
Main generators (3)	General Electric Canada
Propellers	Lips
Auxiliary generator engine	Wartsila Vasa
Auxiliary generator	Stromberg
Emergency genset	Caterpillar
Steering gear	Wagner Engineering
Integrated automation system	Asea Brown Boveri
Radar	Racal-Decca
Gyrocompass	Canada Marconi
Air compressors	Hamworthy
Evaporator	Alfa-Laval
Deck machinery	Hytac Equipment
Heeling & stabilization system	Intering
Vacuum toilet system	Envirovac
Sewage plant	Red Fox
Paints & coatings	International Paints (Canada)

Dutch Yard To Build Six Multipurpose Ships

The Dutch shipyard Van der Giessen-de Noord was recently awarded a contract by Van Nievelt, Goudriaan to build six multipurpose carriers. The 6,000-dwt ships will be built to carry containers, oil products and bulk cargo.

The Detroit Diesel-powered catamaran ferry Jelang K was recently delivered to the U.S Army for use at a missile test range in the Marshall Islands.

Nichols Brothers Delivers High-Speed Army Catamaran For Use In Marshall Islands

Nichols Brothers Boat Builders, Inc., Whidbey Island, Wash., recently christened the second of two catamaran passenger ferries it has built for the U.S. Army for use in the Marshall Islands.

Built under a $1.8-million contract, the 72-foot FB-817 Jelang K will join the FB-816 Jera at the Army's missile range in the Marshall Islands. The 31-knot Jelang K will be barged to the Marshall Islands for use as a ferryboat for technical personnel working at the U.S. Army Kwajalein Atoll test range.

With a beam of 28 feet 6 inches and a draft of 5 feet 11 inches, the vessel will carry 1,100 gallons of fuel oil, 250 gallons of water, and 232 passengers at full load. She is powered by a pair of Detroit Diesel 16V92 TA 960-hp main engines supplied by Pacific Diesel Power of Portland, Ore. The engines are coupled to ZF model BW250 reduction gears with a ratio of 2.03:1, and 37-inch by 36.5-inch, five-bladed bronze propellers from Osborne Propellers.

The two 50-kw Northern Lights auxiliary generators are driven by John Deere 4276 engines. Systems Engineering provided propulsion controls and Hough Marine, the steering system. The vessel's air conditioning was engineered by Celcius Marine, Inc., with duct work by Puget Sound Refrigeration.

The Jelang K is based on a design by International Catamaran Designs Pty. Ltd., of Australia. Nichols Brothers Boat Builders and Gladding-Hearn Shipbuilders, Somerset, Mass., are the only shipbuilders in the U.S. licensed to build this type of catamaran.

Electronics include a Data Marine LX201 fathometer, Standard Communications VHF radio, Furuno FCR 1411/6 radar, Furuno 8030D radar, and Data Marine LX50 speed log. The electronics package was provided by Northern Marine Electronics of Seattle.

Current contracts at the Whidbey Island, Wash., yard include an order for a 35-knot advanced technology "wave piercer" catamaran from California Cruisin', as well as an order for six passenger catamarans to be delivered to Puerto Rico over the next two years.

For free literature detailing the boatbuilding services of Nichols Brothers,

Circle 19 on Reader Service Card

JELANG K
Equipment List

Main engines (2)	Detroit Diesel
Reduction gears	ZF
Propellers	Osborne Propellers
Generators	Northern Lights
Generator engines	John Deere
Propulsion controls	Systems Engineering
Steering system	Hough Marine
Fathometer	Data Marine
VHF radio	Standard
Radar	Furuno
Speed log	Data Marine
Pumps	Paco Pumps
Starters	Klockner-Moeller
Coatings	Devoe Paint
Wiring & light fixtures	Hardware Specialties

Cunico Offers Free 60-Page Catalog On Fittings And Flanges

Cunico Corporation of Wilmington (Los Angeles), Calif., is offering a 60-page catalog of its standard piping components for shipbuilding, offshore and marine piping systems.

Featured in the catalog are fittings and flanges in both 90-10 and 70-30 copper-nickel alloys in 200-, 700-, 3,000- and 6,000-psi classes. Dimensions and specifications are provided for both buttweld and socketweld configurations.

Also emphasized are the company's capabilities to custom-fabricate difficult fitting designs and ability to work with a wide variety of seawater alloys, including monel, inconel, stainless steel and titanium.

Other Cunico-manufactured products described in the catalog are heat exchangers, freon condensers, lube oil coolers, cu/ni tanks and a full round port plug valve for marine sewage systems

For more information and a free copy of the catalog,

Circle 4 on Reader Service Card

SNAME Section Calls For Papers For Ice Tech Symposium

The Arctic Section of The Society of Naval Architects and Marine Engineers (SNAME) has issued a call for technical papers for the fourth International Ice Tech Symposium, which will be held in Calgary, Alberta, Canada, from March 20-23, 1990.

The symposium, which covers ships and marine systems in cold regions, will focus on the following interests: modeling of ship/ice interaction; model and full scale tests in ice; ice loads and pressures; structural design criteria; marine systems operations; design and construction of vessels; marine systems for transportation and resource development; future developments; marine engineering; and offshore structures.

The deadline for submitting an abstract, which should be approximately 400-500 words, is February 28, 1989. Notice of provisional acceptance will be issued April 15, 1989. After acceptance, a draft manuscript must be submitted by August 1, 1989. Notice of final acceptance will be issued September 1, 1989. The deadline for final manuscript submission is January 1, 1990, with submission of audio-visual material set for February 1, 1990.

Abstracts should be sent to **J. Wainwright**, c/o Arctic Transportation Ltd., Suite 800, Eau Claire 2, Calgary, Alberta, Canada T2P 3T3.

Renk Tacke Reports Over 100 RCF Gears Sold To Date

The West German firm of Renk Tacke recently reported that another six Renk Constant Frequency (RCF) gear installations have been ordered, bringing the total sold within three years to well over 100 installations representing a value of approximately 100 million Marks (about US$56 million).

The RCF system, developed jointly by Renk Tacke with MAN B&W, is used for economical current generation aboard ships. Via the RCF gear, a ship generator can be driven by a cheap, low-speed diesel engine running on low-price lube oil. The installations have been successfully tested in service, partly in conjunction with TCS-Turbo-Compound Systems which converts a part of the exhaust gas energy into power.

According to Renk, the combination of RCF and TCS represents the economical solution for on-board energy generation. The savings in operating costs lead to very short amortization costs. As a rule, the initial costs are recovered as early as after two to four years. Moreover, the RCF/TCS installations need very little maintenance and operate reliably at long (four years) service intervals.

For more information and free literature,

Circle 72 on Reader Service Card

← **Circle 286 on Reader Service Card**

Recent U.S. Navy Flag Officer Nominations

The Secretary of Defense recently announced the following Presidential flag officer appointments:

Rear Adm. **James F. Dorsey Jr.**, USN, for appointment to the grade of vice admiral and assignment as Commander Third Fleet.

Rear Adm. **Henry H. Mauz Jr.**, USN, for appointment to the grade of vice admiral and assignment as Commander Seventh Fleet.

Vice Adm. **William E. Ramsey**, USN, to be placed on the retired list in his current grade. He is scheduled to retire March 1, 1989.

Vice Adm. **Walter T. Piotti Jr.**, USN, was placed on the retired list at his last rank. He retired after 35 years of active service. His last appointment was as Commander Military Sealift Command.

Vice Adm. **Diego E. Hernandez**, USN, for reappointment to the grade of vice admiral and assignment as Deputy Commander in Chief, U.S. Space Command.

Vice Adm. **Paul D. Miller**, USN, for reappointment to the grade of vice admiral and assignment as Deputy Chief Naval Operations, Naval Warfare, OP-07, Office of the Chief of Naval Operations.

Vice Adm. **Clyde R. Bell**, USN, retired after 35 years of active service. His last appointment was as Vice Director, Joint Strategic Target Planning Staff.

Rear Adm. (Lower Half) **John E. Gordon**, JAGC, USN, for appointment as Deputy Judge Advocate General for the Navy with the rank of rear admiral.

Redline Marine Selects Northwest Marine Services As Distributor

Northwest Marine Services has recently been chosen by Redline Marine Engines, Inc. to distribute their cost-efficient engines in Canada and the states of Idaho, Oregon, Washington, Montana, Alaska, and California. According to **Kerry Kennedy**, manager of Redline, "We chose Northwest Marine Services because we feel that their new Hamilton Jet product line, together with our Ford 302, 351 and 460 engines, will provide boatbuilders with a comprehensive propulsion package."

All three Ford models are eight-cylinder gas engines which undergo a complete and rigorous "marinization" process by Redline. Redline designs and manufactures their own marinized engine components to make the engine easier to install, easier to maintain, and more efficient. The engines offer a horsepower range from 213 to 350 hp.

Northwest Marine Services, a marine sales, engineering and service corporation, also specializes in a variety of products related to the propulsion, maneuvering and control of ship and offshore structures. For more information,

Circle 69 on Reader Service Card

Schoellhorn-Albrecht Under New Leadership —Literature Offered

Schoellhorn-Albrecht Machine Co., a recognized manufacturer of marine equipment on inland waterways since 1887, has recently been acquired by two St. Louis men, **Robert Pavlisin** and **Norman Morgan.**

Under the new leadership of Mr. **Pavlisin** and Mr. **Morgan,** Schoellhorn-Albrecht is located at 5215 South 38th Street, St. Louis, Mo. The company, founded in 1887, will continue to manufacture quality capstans, winches and deck fittings, along with complete machine shop capabilities that include factory repair reconditioning and replacement parts for customers worldwide. Their operations include not only the inland waterways but also all coasts and overseas.

"The designs and reputation of our equipment has been proven for over 100 years," Mr. **Pavlisin** stated. "Our goal is to continue the quality and service the name Schoellhorn-Albrecht represents."

For free literature giving full information on products manufactured by Schoellhorn-Albrecht Machine Co.,

Circle 78 on Reader Service Card

ELECTRONICS UPDATE

Leslie Controls Introduces New SDM 5000 Flow Computer

—Literature Available—

The Commander SDM 5000 Flow Computer, a total energy management information center for calculating pressure and temperature-compensated flow, has been introduced by Leslie Controls, Inc., Tampa, Fla. The new unit is designed to be used as a stand-alone flow computer, or in communication with a host computer.

Leslie Controls is a leading manufacturer of steam control valves, regulators, water heaters, instrumentation, viscosity control systems, microcomputer flow measurement systems and other related products in the field of steam management.

The SDM 5000 represents the newest addition to the company's Commander series of flow measurement systems. It is designed to measure flow, pressure and temperature in a single pipe and can be programmed to measure saturated steam, superheated steam, natural gas, compressed air, liquids, kilowatts and BTUs.

Whether used as a stand-alone flow computer, or in communication with a host computer via RS232C, or modem, it permits the user to remotely access all important operating information. Bi-directional communication also allows the user to control the information needed, i.e., analysis of all inputs, calculated valves and calibrated data. Operators can change span, calibration data and alarm settings.

The SDM 5000 offers these additional features and benefits: use of approved ASME or AGA equations for mass flow calculations which prevent entry of inaccurate equations; built-in digital milliamp meter on each input for calibration and troubleshooting; parallel printer port, enabling the user to log all information for use in energy management or cost analysis; information advance feature, allowing the operator to advance through the display and view the current status of all transmitters; alarm indicators for flow, pressure and temperature can quickly isolate operating problems and reduce downtime for troubleshooting components.

The new Commander SDM 5000 Flow Computer from Leslie Controls, Inc. of Tampa, Fla., is designed to be used as a stand-alone flow computer, or in communication with a host computer.

As part of the overall Commander series turnkey program, Leslie Controls offers full installation of equipment, service contracts and continuous follow-up of all system operating components.

Founded in 1900 as The Leslie Company, Leslie Controls has its corporate offices and plant in Tampa, Fla., plus a network of sales representatives throughout the U.S. and the world.

For full information and particulars on the Commander SDM-5000 Mass Flow Computer or any Leslie Controls product or system,

Circle 21 on Reader Service Card

Furuno Introduces New Products; Is Now Distributor For Lokata EPIRBs

—Literature Available—

Furuno U.S.A., Inc., South San Francisco, Calif., recently introduced a new low-cost searchlight sonar to their line of professional fish finding equipment, and added the FCV-551 eight-color video sounder to its sounder family. In addition, the company was appointed exclusive distributor for the Lokata line of 406 MHz distress beacons in the U.S.

The CH-18 color searchlight sonar, for commercial and serious sport fishermen, is a compact system that provides an extremely bright eight-color non-fading picture on a high resolution 8-inch CRT with selectable background color. The system consists of only two units for easy installation. The display unit can be very conveniently mounted in even small pilothouses, while the transducer unit requires only a 6-inch I.D. hull pipe.

The CH-18 offers a powerful 800W (rms) transmitter operating at 180 kHz and has automatic or manual training in 6 degree steps around a full circle, or in any of eight operator selectable sectors.

Performance features include off-centering, target alarm, VRM and EBL, 6.5 degree high resolution conical beam, 11 ranges to 1,800 feet, audio monitor, noise limiter and interference rejector. Options include handheld remote control and electronic transducer stabilization.

The FCV-551 500W (rms), single-frequency, eight-color video sounder with high resolution 8-inch CRT has now been added to the sounder family that includes the dual-frequency FCV-552 introduced last year.

Both units can provide, with optional sensors, a historical temperature plot covering the range from 23 to 86 degree F on the lower third of the CRT. Or they can interface with onboard loran or sat nav receivers to function as video plotters complete with present position, track plot, event marks, present and past waypoints, range/bearing to waypoint, and current time, as well as position, depth, temperature and time data for past waypoints.

The FCV-551 is available in either 50 or 200 kHz operating frequencies. It has internal memory to store a full page of data in any mode, alarms for fish, bottom, midlayer, or temperature, it stores up to 16 events, and operates from a universal 11-40 VDC power supply drawing just 50 W.

Furuno's new FCV-551, and the entire FCV-550 series, has the performance features for complete fishing database management.

The Lokata line of 406 MHz distress beacons, for which Furuno was recently appointed exclusive distributor in the U.S., transmit on the worldwide frequency for satellite-aided search and rescue, and include information on ship identification and type of emergency. Signals are relayed via polar-orbiting COSPAS-SARSAT satellites to ground stations which then calculate vessel position to within 1-2 km.

Furuno offers three versions of the Lokata EPIRB, two Category 1 float-free units and one Category 2 unit. In Category 1, Models 406H and 406HH are available, the latter including a built-in heater to insure release in severe icing conditions. Once installed, these units are fully automatic, designed to float free and begin transmitting should the vessel sink or capsize.

While these new 406 MHz EPIRBs are now authorized for any vessel equipped with a VHF ship station, the U.S. Coast Guard has ruled that uninspected fishing vessels operating on the high seas must have an FCC Type Category 1 406 MHz EPIRB on board by August 17, 1989; if the vessel has an operable 121.5 MHZ Classs A EPIRB that was installed prior to October 3, 1988, it has until August 17, 1994 to fit the new style unit.

Furuno's CH-18 color searchlight sonar.

The FCV-551 8-inch color video sounder.

The Furuno/Lokata 406 MHz EPIRB.

For free literature detailing the Lokata line of 406 MHz distress beacons,

Circle 24 on Reader Service Card

For free full-color literature on Furuno's CH-18 color searchlight sonar,

Circle 25 on Reader Service Card

For further information and full-color literature on Furuno's expanded FCV-550 series color sounder line,

Circle 26 on Reader Service Card

Color Brochure Offered On New High-Tech Marine Repair Lift

Offshore Industries of Edmonds, Wash., is offering a free brochure on the patented Danish "Lemvig Lift," which can have a 300-ton vessel out of the water and onto the yard deck in 20 minutes or less and move it on a cushion of air to anywhere in the working area.

The brochure text explains that the Lemvig Lift can be as large or as small as needed, and the cost is as attractive as the product. The highly sophisticated system uses nothing but air to perform its task. Air lifts the vessel from the water, and air is used to float the vessel on land to

and from the repair area. The Lemvig Lift has no winches or tracks, and no pulley, cables or wheels to rust or wear out. Offshore Industries claims that it is virtually trouble-free, easy and economical to operate, simple in design, and beneficial to both yard operators and boat owners.

Equally as well suited to marinas as to commercial yards, the Lemvig Lift can be designed to accommodate any size vessel—from 30 tons to as large as required.

For further information and a free copy of the brochure, "Lift Your Profits," from Offshore Industries,

Circle 76 on Reader Service Card

GE Awarded Contract Worth $89.5 Million To Build Electric Drive

The General Electric Company, Fitchburg, Mass., was awarded a $89,515,562 fixed-price-incentive contract by the Naval Sea Systems Command for the design, construction, and testing of a full scale electric drive system for U.S. Navy surface combatants. The work will be performed in Fitchburg and Pittsfield, Mass., Salem, Va., and Schenectady, N.Y., and is expected to be completed June 1994. The contract is (N00024-89-C-4018).

Harris Wins $5.3-Million Contract For USCG Radio Receiver Program

The Harris Long-Range Radio Division has been awarded a $5.3-million contract from the U.S. Navy to provide new high-frequency radio receivers for the U.S. Coast Guard.

The contract calls for Harris to provide R-2368/URR-79(V) receivers to replace older equipment in Coast Guard ships and shore stations. The R-2368/URR is a general-purpose VLF/LF/MF/HF receiver operating in the 10 kHz to 30 MHz band. It provides enhanced remote control capability and other advanced features. The R-2368/URR is the receiver unit of the Navy AN/URR-79(V) radio. This receiver is the U.S. Navy-standard receiver and is the replacement for the AN/WRR-3 VLF, AN/SRR-19 LF, R-390 MF/HF and R-1051 HF receivers for shipboard and shore-based applications.

The R-2368 offers rapid tune time and internal scan capabilities for surveillance and other applications requiring flexibility and adaptability. Built-in test features diagnose and isolate malfunctions to the modular level with front-panel display, allowing rapid troubleshooting and modular replacement.

For more information and free literature from Harris Corporation,

Circle 38 on Reader Service Card

Circle 295 on Reader Service Card ➔

Cooper Bearing Offers Free Catalog, Booklet On Marine Roller Bearings

The Cooper Bearing Company, Virginia Beach, Va., which was one of the pioneers of split roller bearings with main components made in halves, is offering a free general catalog and marine applications booklet on their roller bearing products.

According to the company, the unique design of the Cooper Roller Bearing, with the main components made in halves, permits bearing changeover in a fraction of the time required for solid units. It also has one of the most effective seals of any roller bearing pillow block, thus preventing the entry of contaminants, which is one of the main causes of premature bearing failures.

Cooper Bearing reports that savings in maintenance and downtime can be substantial without sacrificing capacity or speed. And because of their strict quality standards, Cooper expects the roller bearings to have a long service life.

Prompt technical support is available on company products from Cooper Bearing's engineering department.

For a free copy of Cooper Bearing's general catalog and marine applications booklet,

Circle 15 on Reader Service Card

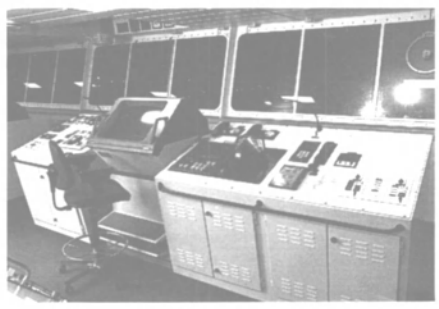
B&W Product Tanker 'Petrobulk Mars' Is First Ship Ever To Be Equipped With One-Man Operated Bridge

The Danish shipyard Burmeister & Wain recently delivered the 84,000-dwt product tanker Petrobulk Mars, the first ship in the world to be equipped with a one-man operated bridge.

The 84,000-dwt product tanker Petrobulk Mars is the 10th in the series of product tankers of this type built by B&W since 1985.

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

The class registration "W1-OC" means that the ship fulfills special requirements as far as instrumentation and surveyance are concerned. The bridge design enables the officer of the watch to operate all instruments unassisted at all times, have a clear view in all directions, be able to hear all signals, and by means of alarms be able to register any irregularities and errors no matter where they may occur onboard the ship. Furthermore, operational procedures are established which ensure that the bridge is manned at all times and that another qualified operator can attend the bridge within a specific response time in case of operator unfitness.



The M/T Petrobulk Mars can be operated safely by one person on the bridge day and night under normal operating conditions.

The classification rules have been prepared by Det norske Veritas in cooperation with Burmeister & Wain, who have helped in solving the technical problems.

The product tanker, type CPT 54E, is the 10th in the series of product tankers of this type built by the yard since 1985. The ship was contracted by Sonderjysk Erhvervsinvestering K/S-16 and chartered on a 15-year bareboat charter to Nordan Tankers 1 Inc. The owners behind the project are Naess, Jahre & Partners in cooperation with PetroBulk Carriers, consisting of Bulls Tankrederi A/S, Norway, Exmar N.V., Belgium, Mitsui O.S.K., Tokyo, and Shipping Development Company Limited (Erling D. Naess, Bermuda). The ship will be operated commercially by PetroBulk Carriers A/S and technically by Naess Shipping (Holland) B.V. on behalf of Nordan Tankers 1 Inc.

Besides this product tanker, Burmeister & Wain Shipyard has orders for four more product tankers of the same type for delivery in 1989 and 1990.

For free literature giving full details on the facilities and capabilities of Burmeister & Wain Shipyard,

Circle 22 on Reader Service Card

$7.1-Million Contract Received By Tracor

Tracor Applied Sciences, Inc., a subsidiary of Tracor, Inc., has received a contract from the Naval Sea Systems Command to provide engineering and technical services for the U.S. Navy's Strategic and Attack Submarine fleet support program. This contract includes two option years with a total value of $7,195,380.

CTI Industries Names Jeff Longmore Manager, Coatings Division

Jeff Longmore was recently appointed manager of CTI Industries' newly formed Specialty Coatings Division, Fairfield, Conn.

Mr. **Longmore** joins CTI with more than 20 years of technical and plant management experience in the marine and industrial coatings industry. He had been the technical director of International Paint, Hempels Marine Paint, and Underwater Technology Corp. before joining CTI.

Mr. **Longmore** will be responsible for directing the formulation, manufacturing and application of CTI's Specialty Coatings. He will also oversee the extensive blasting and coating facilities at CTI's Stratford, Conn., plant.

CTI Industries is a full service organization specializing in the restoration and preventive maintenance of heat exchangers, condensers and associated equipment. CTI's advanced coatings and FRP structural repair technology assures maximum life extension for high value or critical items.

Operating worldwide, CTI serves major utilities, refineries, chemical processing plants, the merchant marine and the U.S. Navy.

Astral Opens Shipping Office In Houston

Astral International Shipping Services, Inc., located in New Orleans, has added a new office in Houston, Texas, which will handle vessel agency business in all Texas ports.

The Texas office, located at 106 Keene Street, Galena Park, Houston, was created in response to the recent growth of worldwide shipping activities. Capt. **Gunnar H. Sanden** has joined the company as manager for the Houston office.

Electric Boat To Build First Seawolf Submarine Under $726-Million Pact

The Electric Boat Division of General Dynamics Corporation, Groton, Conn., was recently awarded a $725,951,700 fixed-price, incentive contract to build the lead submarine of the U.S. Navy's Seawolf Class (SSN-21).

According to reports, the Seawolf Class high-speed attack submarine will be well armed, and fitted with advanced sonar, sensors, computer attack systems and propulsion plant. She is designed to operate deeper, quieter and faster than the Navy's present attack submarine, the 360-foot, 6,900-ton-displacement Los Angeles Class (SSN-688).

The Electric Boat Division currently builds the Navy's Los Angeles Class submarines, as well as its 560-foot, 18,700-ton-displacement Ohio Class Trident ballistic missile submarines. Newport News Shipbuilding & Dry Dock Co., Newport News, Va., also builds SSN-688 Class subs.

The SSN-21 Class is designed to counter the rapidly increasing capabilities of the Soviet submarine force projected for the 1990s and beyond. Two notable Soviet submarine designs are the AKULA Class multipurpose attack submarine, which has the ability to run quietly and launch long-range cruise missile attacks, and the titanium-hulled ALFA Class, which, according to *Soviet Military Power 1988*, can dive deeper and run faster than current U.S. attack submarines.

Over the next 10 years, the Navy may build as many as 25 Seawolf Class submarines. Both Newport News and Electric Boat are expected to compete for these construction contracts.

The first Seawolf Class submarine is expected to be commissioned in 1995.

Nalfleet Offers Free 12-Page Color Brochure On Products And Services

Nalfleet, a world leader in marine chemical technology, has published a 12-page full-color brochure on the products and services offered by the company.

The brochure brings out the diversity of products and treatment programs developed by Nalfleet for task solving. These include corrosion inhibitors for diesel cooling systems, seawater antifoulants and anti-scalant liquid evaporator treatments, along with Nalfleet's comprehensive range of fuel treatment chemicals. These solutions are supplied as part of a problem solving program designed especially for the customer.

Actual case histories, emphasizing an individual approach to the various problems to be solved, are discussed and illustrated.

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

Circle 77 on Reader Service Card

Free 88-Page Catalog On Product Lines Offered By Crosby Group

A free 88-page catalog is available from The Crosby Group, Tulsa, Okla., a North American leader in forged fittings for wire rope and chain, and a subsidiary of Amhoist, which is comprised of Laughlin®, Lebus®, McKissick, National and Western. The companies manufacture every conceivable kind of fittings and accessories for deck machinery, cargo handling and other applications, including forged fittings, hooks, blocks, sheaves, pulleys, load binders, chain, etc. The catalog describes all of the products of all divisions in full detail with photos, detailed drawings, measurements, and full specification charts.

The Crosby Group has recently announced the opening of its newest distribution facility located in the Seattle area (Tukwila, Wash.). The facility will house over 600 Crosby line items providing improved delivery service to Crosby's Western U.S. distribution network. The Seattle warehouse will service the entire Northwest corner of the United States, including Alaska.

For further information and a free copy of the 88-page catalog from The Crosby Group,

Circle 63 on Reader Service Card

Voith Receives Orders For Four Water Tractors

The West German firm of J.M. Voith GmbH recently announced that British shipowners Tees Towing Co., Ltd. of Middlesborough ordered two Voith water tractors from the Richard Dunston (Hessle) Ltd. Shipyard.

The 98-foot-long by 32-foot-wide tractors will be propelled by two size 28 G 11/185 Voith-Schneider propellers connected through hydraulic couplings to one Ruston diesel engine each type 6 RK 270 developing 1,270 kw at 750 rev/min.

To be able to fully utilize the flexible ship-handling capability of the Voith water tractor, the new vessels will be fitted with towing winches. These are useful for rapidly varying the length of the towline and adapting it to suit the space conditions in open water or in a lock. Operation is designed so that no members of the crew need to stay on the aft working deck during the towing operation.

Also announced was an order for two Voith water tractors by the Chinese Petroleum Corporation (CPC). The 103-foot-long by 36-foot-wide vessels are currently under construction at the shipyard of the China Shipbuilding Corporation in Keelung, Taiwan.

Each tractor will be equipped with two size 28 G 11/185 Voith-Schneider propellers driven through hydraulic couplings by one Stork-Werkspoor diesel engine each with a MCR power of 1,250 kw at 1,000 rev/min.

The vessels will be fitted with powerful firefighting equipment, with the water pumps being driven through a PTO from the main engines. In addition, the tractors are designed so that they can also be used for small supply duties.

For free literature giving more information on Voith water tractors,

Circle 3 on Reader Service Card

Lindenau To Construct 3,500-Dwt Product Tanker For Ethiopian Shipping

The Lindenau GmbH, Schiffswerft & Maschinenfabrik, recently received an order for a 3,500-dwt clean oil tanker for Ethiopian Shipping Lines. The vessel is a new design, especially developed for shallow water and tropical conditions.

The 310-foot by 48-foot product/oil tanker, which will be equipped with 12 loading tanks, fits the newest international and national technical standard regarding economical ship operation and cargo handling, optimal maneuvering, safety of ship, environmental protection, etc. It will be powered by a MaK 6 H 453 main engine with a nominal output of 1,985 kw at 600 rpm. The navigation plant includes Krupp Atlas radar, Anschutz Gyrocompass and gyropilot and SAGEM speed log.

Delivery of the product tanker, the 38th special tanker Lindenau will be delivering, is scheduled for October 1989.

For free literature giving full details on the facilities and capabilities of Lindenau,

Circle 83 on Reader Service Card

Wisenbaker New GM, Spinner II Products Division Of T.F. Hudgins

W.C. (Bill) Wisenbaker Jr. has been named general manager 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 trucking, transit, industrial, marine, railroad, and oilfield markets.

In this new position, Mr. **Wisenbaker** will be responsible for the division's marketing programs, sales representation, distribution channels, and engineering support services for Spinner II products in the U.S., Canada and Mexico.

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

For more information and free literature on Spinner II products,

Circle 56 on Reader Service Card

MagneTek ALS Adds Pease, Rizzotti To Staff

MagneTek ALS, the flagship company of MagneTek Inc.'s recently announced MagneTek Defense Systems, has added **Jeff Pease** and **Ed Rizzotti** to its senior management staff. Serving in the positions of chief financial officer and vice president of government systems, respectively, both Mr.. **Pease** and Mr. **Rizzotti** will report to **Rob Brosius**, general manager.

As chief financial officer, Mr. **Pease** has the responsibility for both day-to-day operations as well as financial strategic planning. Prior to joining MagneTek Inc. in 1985, he held similar positions at Broan Manufacturing, Inc., and Harnischfeger Corporation.

In the new position of vice president of government systems, Mr. **Rizzotti** has reponsibility of integrating MagneTek ALS's marketing and program-management resources with those throughout MagneTek Inc. Before joining MagneTek Inc., he worked at Grumman Aerospace Corporation, Raytheon and Allied Signal Aerospace.

The new MagneTek Defense Systems, which incorporates MagneTek ALS, represents a focused commitment by MagneTek Inc. to the government and military markets. All of the company's extensive and long-standing expertise in military power solutions will now be concentrated in MagneTek Defense Systems, which includes complete manufacturing, support and marketing services. MagneTek ALS, the lead company of Defense Systems, designs and develops custom and standard power-conversion and conditioning equipment for government and military applications.

Among the company's most notable accomplishments are the pioneering and perfecting the use of transistors for high-power frequency conversion, and innovations in power distribution, such as the Split-Bus Controller and Fault Isolation Unit (FIU).

Dehumidification, Sealing, Monitoring System Installed On MSC Ship By L&C

L&C Associates, dehumidification specialists, recently announced the completion of the installation of an innovative dehumidification, sealing, and monitoring system for the prepositioned, general cargo ship M/V Advantage, chartered to the Military Sealift Command (MSC) to carry cargo.

The system, designed and installed by L&C to meet MSC specifications, consists of monitoring and dehumidification systems which service each of the vessel's four holds.

A major component of the system is a Cargo Environment Monitoring System (CEM), which includes air flow sensors, and humidity sensors. The area monitored by the CEM exceeds 1.2 million cubic feet.

Other features of the CEM include a computerized retrieval and recording system, required by MSC specs, designed by L&C. This unit compiles and computes functions and transmits data to a logger located in the deck office. Data can be downloaded via PC to floppy disks or nonvolatile EEPROM storage cartridges.

The computer and monitoring systems have been tested extensively for reliability in the marine environment and have been designed to retain all data despite a loss of power to the ship.

In order to maintain an acceptable environment within the holds, dehumidified air is ducted into the cargo areas and is controlled by humidistats. L&C, using their patented Protective Sealing System, sealed the hatch covers and the hold ventilation system. Sealing the control area is the only way to maintain the integrity of the dehumidified spaces, and L&C's Protective Sealing System (PSS) has proven to be an effective and economical method of protection from moisture damage.

L&C Associates, North Hampton, N.H., is an industry leader in the design and installation of dehumidifications, sealing and monitoring systems for the marine market.

For further information and free literature from L&C Associates,

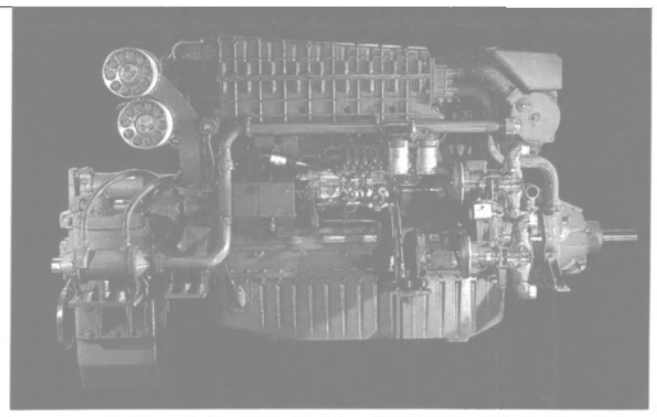
Circle 50 on Reader Service Card

PROFESSIONAL

PROPULSION UPDATE

Volvo Penta Enters New Market Segment For Workboat Engines With 16-Liter Marine Diesel

—Literature Offered—



Volvo Penta's new TAMD162, 16-liter marine diesel is designed for lowest fuel consumption in the 1,400-1,600 rpm speed range.

Volvo Penta recently introduced the new TAMD162, a 16-liter marine diesel, which marks an upgrading of the company's marine engine range and its entry into the market segment for workboats with engines of 400-600 hp.

The robust new engine has been developed primarily for powering fishing vessels and heavy-duty workboats or as auxiliary engines in large boats. It is available in three standard power output classes: HD, heavy duty (470 hp/345 kw at 1,800 rpm); MD, medium duty (490 hp/360 kw); and LD, light duty (550 hp/405 kw at 1,900 rpm). The engine is designed for lowest fuel consumption in the 1,400-1,600 rpm speed range.

Important design advancements, introduced in the new TAMD162, 16-liter, have also been incorporated into the company's new 12-liter and 10-liter engines. Features include new cylinder head and gaskets, new cylinder liners with flame barriers and improved sealing. The engine has a new injection pump with smoke limiter and new five-hole nozzles for better combustion and cleaner emissions.

In the 12-liter turbocharged and aftercooled category, a new designation TAMD122 replaces the previous generation 121 engine. The TAMD122 has between 4 and 7 percent higher power output than its predecessor. In the heavy-duty version, the engine now rates at 380 hp/279 kw, with 450 hp/331 kw for pleasure craft and light duty applications. The TAMD122 also features a new lightweight gearbox.

In the 10-liter category, the turbocharged 100 series of marine diesels has been replaced with a model designated TMD102, also reflecting an increase in power. Output in medium-duty operation has been increased by 5 percent to 272 hp/200 kw at 2,000 rpm.

The 16-liter TAMD162 is turbocharged, aftercooled and is fuel efficient, quiet and light. Special characteristics of the new engine include high-power output in combination with low fuel consumption, high reliability, long service life and low levels of noise and exhaust emissions.

Volvo Penta's first diesel engine with four valves per cylinder for engine efficiency, the six-cylinder TAMD162 has a variety of other special features designed to increase

(continued on page 64)

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Zodiac Hurricane RIBs Ideal For Use As Rescue Craft —Literature Offered

The RIB design approaches an optimum compromise between the standard rigid hull craft and the inflatable boat.

The Zodiac Hurricane Rigid-Hull Inflatable Boat (RIB) combines the wave cutting capability of a rigid hull with the safety features of an inflatable, creating an ideal rescue boat.

Based on a design by Admiral **Hoare**, former director of England's Royal National Lifeboat Institute, the RIB's standard deep "V" hull is made of fiberglass with an attached inflatable, heat-welded plastomer collar, which gives this hybrid the wave cutting qualities of a rigid hull boat and the safety of pontoon sides.

Rescue and enforcement agencies worldwide now recognize the many advantages of a RIB over both the inflatable and rigid-hulled vessels. A 24-foot RIB's ability to safely cut through 2-meter seas at 25 knots, carry up to 15 people, fender off of stricken vessels without damage, and transfer victims with a lower risk of injury make it popular with rescue and enforcement personnel.

Zodiac's 75 years of experience in marine and aeronautical fabric construction, and seam welding has resulted in near indestructible pontoons. The pontoons used on Zodiac Hurricane RIBs have met or surpassed the standards of marine safety organizations worldwide including Bureau Veritas of France, DIN standard of Germany, and the International Safety of Life at Sea.

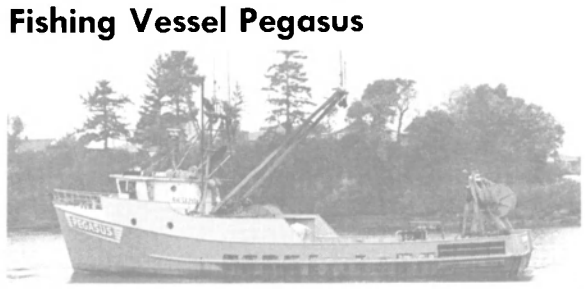
J.J. Marie, president of Zodiac Hurricane Marine Inc., believes the RIB is ideal for a very wide range of rescue, enforcement, military and commercial use. "The RIB's combination of a wave-cutting hull and safe, tough pontoon sides make it much more versatile than either a standard fiberglass hull or the soft bottomed inflatable," he said.

The Canadian Navy recently became the third Nato Navy to purchase $100,000 hydrajet-driven Zodiac Hurricane RIBs. The 24-foot RIB can avoid detection by radar, operate in shallow water, and be lifted by only one crane while the mother ship is in motion.

For further information and free literature on Zodiac Hurricane RIBs,

Circle 6 on Reader Service Card

Mid-Coast Marine Lengthens And Modifies Fishing Vessel Pegasus



The 90-foot by 27-foot fishing vessel Pegasus is powered by a new 940-hp Cummins main engine.

Mid-Coast Marine recently completed the lengthening and modification of the fishing vessel Pegasus.

Work included lengthening the 75-foot by 23-foot vessel to 90 feet by 27 feet, installing a new 940-hp Cummins main engine, new 6-inch shafting, bearings, shaft log, and four-blade stainless steel wheel.

The boat was cut in half near amidship, rolled apart, framed and plated to its original width. At the same time, the bow and stern sections were receiving the framing for the 24-inch sponsons that were added port and starboard and faired well forward. Mid-body sponson frames and plating were next, rounding out the vessel's new shell.

Inside, the old engine room bulkhead was cut out and a new bulkhead built, lengthening the engine room about 8 feet. Aligned along the new shaft line were the new stern tube, shaft alley, and engine rails. Saddle tanks were also built port and starboard outboard of the new main engine location.

Back on the main deck, the original bulwarks were reinstalled outboard, and the original rudder was converted to a contra-guide configuration with broad top and bottom plates added. This modification was done to assure that the boat, in its new configuration, would have sufficient rudder power.

For free literature detailing the boatbuilding services of Mid-Coast Marine,

Circle 8 on Reader Service Card

Kockums Receives $2.7 Million In Orders For Steerbear Systems

Kockums Computer Systems AB recently received orders totaling SEK16 million (about US$2.7 million) for the Steerbear CAD/CAM/CIM system from shipbuilding industry.

Howaldtswerke-Deutsche Werft AG in Kiel, West Germany has acquired Steerbear general design, pipe and structure to be able to handle both hull and outfitting in Steerbear. They have also acquired a VAX Server 3600 computer and seven graphic workstations. This is a breakthrough in the German market for Steerbear outfitting systems.

Eleusis Shipyards SA in Greece has acquired all Steerbear Systems for hull and outfitting applications, running on a Vax computer and 10 graphic workstations.

Lexicon Marine in Sweden has acquired Steerbear hull, a Vax computer and two graphic workstations.

Ludvigsen & Hermann in Denmark, a plant design company, has acquired Steerbear general design, pipe and cable, running on a Vax computer and two graphic workstations.

For more information and free literature from Kockums Computer Systems,

Circle 54 on Reader Service Card

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ON
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Volvo Penta

(continued)

engine performance. For example, the torsionally rigid block with contoured sides and horizontal reinforcements has been designed for maximum strength without unnecessary weight. The seven-bearing crankshaft is an example of the advantages of the in-line six. Large crankshaft and bearing dimensions promote reliability and easily support power outputs of up to 550 hp at 1,800 rpm.

For good economy and efficient combustion under high pressure, the TAMD 162 has been equipped with a new injection pump with a piston diameter of .51 inches (13 mm) mounted on the cooler side of the engine in order to help minimize the temperature of the fuel. The pump reacts quickly and efficiently senses variations in load and engine speed. Nozzles are mounted vertically with five holes for better fuel distribution. Also, the injection pump is fitted with a smoke limiter which reduces smoke when under load acceleration and at low speeds.

For more information and free literature from Volvo Penta,

Circle 27 on Reader Service Card

Schichau Seebeckwerft Delivers RO/RO Carrier To Ethiopian Owners

Schichau Seebeckwerft AG of Bremerhaven, West Germany, recently delivered the RO/RO carrier Chamo to her Ethiopian owners.

The 197-foot-long by 39-foot-wide vessel is driven by two main engines of type ZF/MTU 6 V 396 TB 3 each developing 490 kw at 1,650 rpm, producing a speed of about 10 knots.

The vessel was built to rules of Lloyd's Register of Shipping, class LR + 100 A1 + LMC For Red Sea Coastal and Interisland Service.The crew comprises 23 persons.

For free literature giving complete information on the facilities and capabilities of Schichau Seebeckwerft,

Circle 65 on Reader Service Card

Goodway Tool Introduces New Flexible Impeller Transfer Pump

Goodway Tool Corporation, Stamford, Conn., has introduced a new model PF-V100 Pump-All which is designed for efficient transfer or circulation of liquids, filling lines, or spill recovery.

The Pump-All is a self-priming positive displacement stainless steel pump which creates a steady flow of liquids for a wide range of applications.

Goodway Tool's model PF-V100 Pump-All.

The self-lubricating polyurethane flexible impeller will handle watery products as well as lotions and gels. High-pressure Viton lip seals and ball bearings are used on both sides of the stainless steel shaft.

For more information and free literature,

Circle 108 on Reader Service Card

ELECTRONICS UPDATE

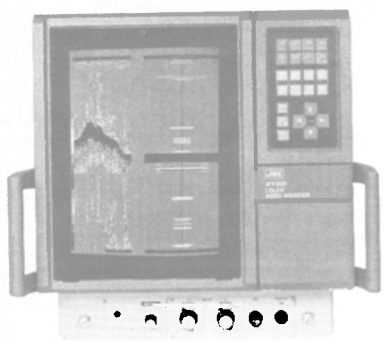
New Color Video Sounder From Raytheon Offers Advanced Multi-Screen Presentations

Raytheon's new JFV-200 Color Video Sounder offers a wide variety of advanced multi-screen presentations, including split-screen A-Scope and horizontal or vertical split-screens. New, U.S. made, high technology, dual-beam transducers produce exceptional target definition and bottom discrimination. Using a high-resolution (512 by 512 pixels), ultra-bright 14-inch CRT, and dual-frequency transmitters (200 kHz, 50 kHz, 38 kHz, 28 kHz), with 3-kw rms output, this new color video sounder gives fishermen the leading edge yet, according to Raytheon, costs less that others in its class.

The JFV 200 offers ultra-high-efficiency dual-beam transducers with a combination of frequencies to maximize fish detection characteristics in the narrow-beam mode, and optimize bottom detail in its wide-beam mode. To get this extra measure of clarity, operators simply flip the front-panel switch from narrow to wide-beam modes.

Raytheon and JRC have worked together with professional fishermen to develop the most effective, easy-to-use controls. Using the JFV-200 unit's logical arrangement of rotary and keypad controls, fishermen can choose a wide selection of high-contract, vivid pictures that are easy to understand.

A choice of eight or 26 colors is available for video-sounding ranges to 5,000 feet, fathoms, or meters. Temperature graph, bottom lock, VRM expand, bottom discrimination, midwater expansion, and A-Scope are a few of the displays available from the JFV-200. Combination displays, with up to four split-screens, can be presented simultaneously. Each of the dual-frequency channels can be independently controlled for all functions.



JFV-200 Color Video Sounder from Raytheon.

Important navigational data is numerically displayed on-screen, including own vessel's position in lat/long or TD's, boat speed, depth, water temperature, date and time. Horizontal and vertical VRMs are standard. Distance and time marks are shown. Event data, including depth, water temperature, and hardness of bottom can be transferred and displayed on Raytheon's new companion NWU-53 Color Plotter, or remote monitors.

Raytheon offers all important CRT symbols, descriptions and menu setup instructions in multiple languages (English, Norwegian, French, Spanish, Icelandic) by plug-in ROM.

For free literature giving complete information on Raytheon's new JFV-200 Color Video Sounder,

Circle 98 on Reader Service Card

Siemens Offers Free 100-Page Catalog On Contractors And Starters

A new 100-page catalog, CP2, describing the complete line of enclosed type contractors and starters has been issued by the Controls Division of Siemens Energy & Automation, Inc.

The catalog highlights Siemens World Series contactors and starters which meet or exceed the requirements of NEMA, UL, and IEC standards. The World Series 3TB contactors are compact and easy to install and maintain, while providing reliable switching throughout a long service life. In addition to these benefits, Siemens World Series starters also offer Class 10 overload protection and inherent phase loss and unbalanced load protection. Diagrams, photos, and charts provide complete technical data, pricing, and catalog number information to simplify the selection process.

The Controls Division of Siemens Energy & Automation, Inc., manufactures and markets motor control centers, medium voltage controllers, and a full line of control products including starters, contactors, and overload relays. Headquartered in Atlanta, Siemens Energy & Automation, Inc. manufactures electrical and electronic equipment and systems for electrical utilities, commercial and residential construction and general industry. A member of the Siemens Group, the company has 24 plants in the U.S., and its products are marketed worldwide.

For further information and a free copy of the 100-page catalog from Siemens,

Circle 73 on Reader Service Card

Crowley Maritime Names Robert P. Andres Senior VP-Administration

Crowley Maritime Corporation, a diversified marine transportation firm with worldwide operations, has named **Robert P. Andres** as senior vice president, administration. The appointment was recently announced by **Leo L. Collar**, Crowley's president and chief operating officer.

Mr. **Andres** will have broad responsibility for information systems, purchasing, strategic planning and facilities management. He joins Crowley from a 32-year career with International Business Machines (IBM), where he held a variety of executive positions.

Crowley has experienced rapid growth over the past few years, particularly in international liner services. The firm has long been a major carrier in the domestic offshore trades and worldwide contract transportation.

National Forge Wins Navy Contracts Totaling More Than $28 Million

The Materials and Components Group of National Forge Co., Irvine, Pa., has won contracts totaling more than $28 million from the U.S. Navy.

The contracts, which specify vital military marine propulsion system components, include propeller shafts for new Aegis cruisers and spares for additional cruisers. Customers are Bath Iron Works, Litton Industries and the Navy for its DD963 Class destroyers.

Under the contracts, National Forge will also build line shafts for two nuclear-powered aircraft carriers from Newport News and one (LHD-1) Wasp class amphibious assault carrier from Ingalls Shipbuilding division.

National Forge will construct propulsion shaft systems for Trident and 688 Class nuclear-powered submarines from General Dynamics-Electric Boat and Newport News.

Two other government contracts won by the Irvine, Pa.-based company include building steam supply system components for U.S. Navy reactors from McDermott/Babcock and Wilcox, and making air cushion shafts for LCAC landing craft from Textron Marine and Gulfport Marine.

For free literature giving complete details on National Forge Co.,

Circle 67 on Reader Service Card

Apelco Introduces New Handheld Radiotelephone —Literature Available

Apelco's low-cost VXL 357 Handheld VHF Radiotelephone is packed with a powerful 3-1/2 watts of output. The energy source of this fully synthesized worldwide marine radiotelephone is a rechargeable slide-on NiCad battery pack. The VXL 357 is ideal for small boats with no power source, as a versatile backup VHF or intercom on larger boats, and for boat-to-tender-to-shore communication.

The Apelco VXL 357 offers two-way communication on all U.S. and international channels, receives all nine weather channels, and has 1-watt selection for in-harbor use. When turned on, it automatically selects emergency Channel 16, and displays channel selection on a backlit LCD.

Its convenient design includes a "rubber duck" antenna and external AC adapter. Optional accessories include lapel speaker/microphone, drop-in battery recharger, and carrying case with belt loops

The VXL 357 measures only 7.6 inches high by 2.6 inches wide by 1.75 inches deep.

Apelco offers a 10-year product protection program which includes a flat-rate service policy in addition to its standard warranties. Apelco is a Raytheon Company.

For more information on this and other 1989 radiotelephones and the full line of Apelco equipment,

Circle 82 on Reader Service Card

$1.25-Million Navy Contract Awarded To Techmatics

Techmatics, Inc., a northern Virginia engineering and professional services company, was recently awarded a three-year, $1.25-million contract to provide cost engineering and acquisition management support to the Navy Standard Signal Processor Division of the Naval Sea Systems Command. This work will utilize the strong programmatic and financial management experience of Techmatics, which supports several major Navy weapons and ship acquisition programs. Services will be coordinated out of the company's Arlington headquarters.

BUYERS DIRECTORY

This directory section is an editorial feature published in every issue for the convenience of the readers of MARITIME REPORTER/Engineering News. A quick-reference readers' guide, it includes the names and addresses of the world's leading manufacturers and suppliers of all types of marine machinery, equipment, supplies and services. A listing is provided, at no cost for one year in all issues, only to companies with continuing advertising programs in this publication, whether an advertisement appears in every issue or not. Because it is an editorial service, unpaid and not part of the advertisers contract, MR/EN assumes no responsibility for errors. **If you are interested in having your company listed in this Buyers Directory Section, contact John C. O'Malley at (212) 477-6700.**

AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION
Adrick Marine Corp., 320 Cantor Ave., Linden NJ 07036
Stal Refrigeration AB, Butangsgatan 16, S-60187 Norrkoping SWEDEN

BALLAST
Genstar Stone Products, Executive Plaza IV, Hunt Valley, MD 21031
Mineral Research & Recovery Inc., 4565 S. Palo Verde, Ste 203, Tucson AZ 85714

BARGE BUILDING
HBC Barge, Brownsville PA 15417

BARGES—Leasing
McDonough Marine Service, P.O. Box 1825, Parkersburg WV 26101

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

BEARINGS—Rubber, Metallic, Non-Metallic
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Kohlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Kingsbury Inc., 10385 Drummond Rd, Philadelphia PA 19154
Lucian Q. Moffitt, Inc., P.O. Box 1415, Akron, OH 44309

BOILERS
Combustion Engineering, Inc., Windsor, CT 06095

BOILER CLEANING
Asea Stal, 50 Chestnut Ridge Rd., Montvail N.J. 07645

BROKERS
Captain Astad Company, Inc., P.O. Box 350486, Ft Lauderdale FL 33335; P.O. Box 1093, Houma, LA 70360
Bergeron & Associates, P.O. Box 726, Chalmette LA 70044
Jack Faulkner Inc., 2419 Caddy Lane, P.O. Box 371, Flossmoor IL 60422
Mowbray's Tug & Barge Sales Corp., 35 De Hart St., Morristown NJ 07960
Ocean Marine Brokerage Services, P.O. Box 1257, Port Canaveral, FL 32927

BULKHEADS
The Waugh Co./Rockment (TNF), 5111-6 Baymeadows Rd., Suite 394, Jacksonville, FL 32217

CARGO ACCESS EQUIPMENT
Morgan Crane Co., Inc. (Hiab SeaCranes and QMC Trident, Ferrari, Fassi marine cranes), 1009 E. Chestnut Ave., Santa Ana CA 92701

CARGO HANDLING SYSTEM
Skarpenord A/S, US Agent: American United Marine Corp., 5 Broadway, Rte 1, Saugus MA 01906

CHAIN
Baldt Inc., P.O. Box 350, Chester PA 19106
Crandall Dry Dock Engineers Inc./Marit Chain, 21 Pottery Lane, Dedham MA 02026
Milligan Marine Supply Inc., 5832 Harvey Wilson, Houston TX 77020

CHOCKING COMPOUND
Philadelphia Resins Corp., 130 Commerce Dr., Montgomeryville, PA 18936

COMPACTORS
ICI Multi-Pak Inc., 14719 Carolcrest, Houston TX 77079
TFC Corp., 9819 Logan Ave., So., Minneapolis MN 55431. Sales Agents: American United Marine, 5 Broadway, Rte 1, Saugus MA 01906

COMPUTERIZED INFORMATION SYSTEMS
TIMSCO, P. O. Box 91360, Mobile AL 36691

CONDENSERS/SEPARATORS
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130
Wright Austin Co., 3250 Franklin St., Detroit MI 48207

CONTROL SYSTEMS—Monitoring
ASEA, Inc., 4 New King St., White Plains, NY 10604
Eldec Corporation, 16700 13th Ave. West, P.O. Box 100 Lynnwood, WA 98036
Imo-Delaval, Inc., Gems Sensors Division, One Cowles Rd., Plainville CT 06062
Indikon Division, Metravib Instruments Inc., 26 New St., Cambridge, Ma 02138
NAMCO Controls, 7567 Tyler Blvd, Mentor OH 44060
Teleflex Inc., 771 First Ave., King of Prussia, PA 19406
Valmet Automation A.S., P.O. Box 130, N-3430, Spikkestad, Norway
WABCO, 1953 Mercer Rd., Lexington KY 40511

CRANES—HOISTS—DERRICKS—WHIRLEYS
ASEA-Hagglund, Inc., 50 Chestnut Ridge Rd., Montvale NJ 07645
The Crosby Group, Inc., P.O. Box 3128, Tulsa OK 74101
Del Gavio Marine Hydraulics Inc., 207 W. Central Ave., Maywood NJ 07607 telex: 132610 DELMARINE
Marine Travelift, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235
Morgan Crane Co., Inc. (Hiab SeaCranes and QMC Trident, Ferrari, Fassi marine cranes), 1009 E Chestnut Ave., Santa Ana CA 92701
J.D. Neuhaus, Hebezeuge, D5810, Witten Heven, West Germany
Pettibone-Tiffin Corp., 235 Miami St., Tiffin, OH 44883

DECK MACHINERY—Cargo Handling Equipment
Braden Carco Gearmatic, P.O. Box 547, Broken Arrow, OK 74013
Gearmatic—see 'Braden Carco Gearmatic' above.
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, WA 98134
McElroy Machine & Mfg. Co., Inc., P.O. Box 4455, Biloxi MS 39535
Morgan Crane Co., Inc. (Hiab SeaCranes and QMC Trident, Ferrari, Fassi marine cranes), 1009 E Chestnut Ave., Santa Ana CA 92701
Schoellhorn-Albrecht, P.O. Box 22110, St Louis MO 63116

DIESEL ACCESSORIES—CYLINDER LINERS
Acurex Corporation, Autodata Division, 555 Clyde Ave., P.O. Box 7042, Mountain View, CA 94039
Colt Industries Inc. Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511
Diesel America Inc., 5217 River Rd., New Orleans LA 70123
FCS Inc., 22 Main St., Center Brook CT 06409
General Thermodynamics Corporation, 210 South Meadow Road, P.O. Box 1105, Plymouth, MA 02360
Kiene Diesel Accessories, 325 S. Fairbanks St., P.O. Box 386, Addison IL 60101

DIESEL ENGINE—Spare Parts & Repair
Bergen Diesel A/S, P.O. Box 924, N-5001 Bergen NORWAY
Bergen Diesel Inc., 2701 Delaware Ave., Kenner LA 70062
Colt Industries Inc. Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511
Cummins Engine Company, Mail Code 60011, Box 3005, Columbus, IN 47202-3005
Goltens, 160 Van Brunt St, Brooklyn NY 11231
MAN B&W Diesel GmbH, Stadtbachstrasse 1, D-8900 Augsburg 1, Federal Republic of Germany
MAN B&W Diesel, 50 Broadway, 18th Fl., New York, NY 10004
Markisches Werk GmbH, P.O. Box 1442, D-5884 Halver 1, Federal Republic of Germany
Sims Pump Valve Co., Inc., 1314 Park Ave., Hoboken NJ 07030
Sulzer Brothers Inc., 200 Park Ave., New York, N.Y. 10166

DIVING & SALVAGE
H.J. Merrihue, P.O. Box 23123, New Orleans LA 70183
Muldoon Marine Services, P.O. Box 3221, Terminal Island, CA 90731
Parker Diving Service Inc., Berth 69, Los Angeles Harbor, P.O. Box 5272, San Pedro CA 90733

ELECTRICAL EQUIPMENT
Eldec Corporation, 16700 13th Ave West, P.O. Box 100, Lynwood WA 98036
L. F. Gaubert & Co., Inc., P. O. Box 50500, New Orleans LA 70150
Ward Leonard Electric, 31 South St., Mt. Vernon, NY 10550
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, OR 97201

ELECTROMAGNETICS
Sentel Corp., 6713 Robinia Rd., Camp Springs MD 20748

ELECTRONIC INFORMATION SYSTEMS
Inventory Locator Service, Inc., 3965 Mendenhall Rd., Suite 10, Memphis TN 38115

ELECTRONIC SYSTEMS
Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 TX: 125327

ENGINE TEST EQUIPMENT
General Thermodynamics Corp., P.O. Box 1105, 210 S. Meadow Road, Plymouth, MA 02360

EQUIPMENT—Marine
Thomas Coudon Associates, 6655 Amberton Dr., Baltimore, MD 21227
Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302
Space Machine & Engineering Corp., 2346 16th Ave North, St Petersburg FL 33713

EVAPORATORS
Equipment Engineering, 666 Baker St., #265, Costa Mesa CA 92626
MECO (Mechanical Equipment), 861 Carondelet St., New Orleans LA 70130
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130

FANS—VENTILATORS—BLOWERS
Carling Turbine Blower Company, 10 Nebraska St., P.O. Box 88, Worcester MA 01613
Flebu A/S, US Agent: American United Marine Corp., 5 Broadway, Rte 1, Saugus MA 01906
Jon M. Liss Associates, Inc., 411 Borel Ave., P. O. Box 5554, San Mateo, CA 94402

FASTENERS
Action Threaded Products Inc., 6955 S. Harlem, Bedford Park, IL 60638
Band-It Division, Houdaille Industries Inc., P.O. Box 16307, Denver CO 80216
Hardware Specialties Co., Ships Division, 48-75 36th St, Long Island City NY 11101
Lee Brass Company, P. O. Box 1229, Anniston AL 36202
Mapeco Products, Inc., 725 Glen Cove Ave., P.O. Box 6, Glen Head NY 11545
Non-Ferrous Bolt & Mfg Co., 4085 Nevso Dr., Suite C, Las Vegas NV 89103
Okabe Co., Inc., 175 Lively Blvd., Elk Grove Village, IL 60007

FENDERING SYSTEMS/BUOYS—Dock & Vessel
Intertrade Ltd., Marine Products Div., 15301 Transistor Lane, Huntington Beach CA 92649
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Milligan Marine Supply Inc., 5832 Harvey Wilson, Houston TX 77020
Seaward International, Inc., Clearbrook Industrial Park, P.O. Box 98, Clearbrook VA 22624

FILTERS
Parker Filter Division, 16810 Fulton County Rd., #2, Metamora, OH 43540

FUEL ADDITIVE
U.S. Borax, Industrial Chemicals, 3075 Wilshire Blvd., Los Angeles CA 90010

GALLEY EQUIPMENT
Gaylord Industries, 10900 S W Avery St, P.O. Box 1149, Tualatin, OR 97062

GANGWAYS, LADDERS
A.L. Don, 1 Don Plaza, Dock St., Matawan NJ 07747
National Specialty Products, 5727 Heffernan St., Houston TX 77087
Rampmaster Inc., 9825 Osceola Blvd., Vero Beach, FL 32960
Westmont Industries, 10805 Painter Ave., Santa Fe Springs, Los Angeles, CA 90670
Wooster Products Inc., 1000 Spruce St., P.O. Box 896, Wooster, OH 44691

HEAT EXCHANGERS
Alfa Laval Inc., 2115 Linwood Ave., Fort Lee NJ 07024
ITT Standard Heat Transfer Technology, Buffalo, NY 14240
MECO (Mechanical Equipment), 861 Carondelet St., New Orleans LA 70130
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130

HORNS/WHISTLES
Kohlenberg Bros Co., P.O. Box 358, Two Rivers, WI 54241

HYDRAULICS
Aeroquip Corporation, 300 South East Ave., Jackson, MI 49203
Cunningham Marine Hydraulics Co., 201 Harrison St., Hoboken NJ 07030
Del Gavio Marine Hydraulics Inc., 207 W Central Ave., Maywood NJ 07607; telex: 132610 DELMARINE
Parker Hannifin Corporation, 17325 Euclid Avenue, Cleveland, OH 44112

INCINERATORS
Teamtec A/S, P.O. Box 100, N-4912 Gjeving, NORWAY
A/S Vesta, 27 Skudehavnsvej, DK-2100 Copenhagen DENMARK. US Agent: American United Marine, 5 Broadway, Rte 1, Saugus MA 01906

INSTRUMENTATION
Technical Services Group, 2900 Main St., Alameda CA 94501

INSULATION—Cloth, Fiberglass
Soundcoat, One Burt Drive, Deer Park NY 11729

JOINER—Watertight Doors—Paneling—Ceiling Systems
Astech, 3030 S. Red Hill Ave., Santo Ana, CA 92711
Walz & Krenzer Inc., 1390 Mt. Read Blvd., Rochester NY 14606

KEEL COOLERS
R.W. Fernstrum & Co., 1716 Eleventh Ave., Menominee, MI 49858
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
The Walter Machine Co., Inc., 84-98 Cambridge Avenue, Jersey City, NJ 07307

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights
Carlisle & Finch, 4562 W. Mitchell Ave., Cincinnati OH 45232

LINE BLINDS
American Piping Products Inc., Box 1056, New Hyde Park, NY 11040
Stacey/Fetterolf, P.O. Box 103, Skippack, PA 19474

LOGISTICS
VL Logistic Consultants, Inc., 3008-C Bienville Blvd., Ocean Springs MS 39564

LUBE-OIL CENTRIFUGES
Hamworthy Engineering Ltd., Fleets Corner, Poole, Dorset, BH17 7LA ENGLAND

MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING
AMT, Inc., 2400 NW 39th Ave., Miami FL 33142
Del Gavio, 207 W. Central Ave., Maywood, NJ 07607. Telex: 132610 DELMARINE
Goltens, 160 Van Brunt St., Brooklyn, NY 11231
In-Place Machining Co., 1929 North Buffum St., Milwaukee WI 53212

MARINE LUMBER
McCausey Lumber Company, 36325 Harper Ave., P.O. Box 46129, Mt Clemens MI 48046

MEDICAL SUPPLIES
Universal Marine Medical Supply, 69-06 3rd Ave., Brooklyn NY 11209

METAL LETTERS
Johnston Brothers Enterprises, Inc., P.O. Box 1138, Patterson, LA 70329

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS
Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Hwy., Arlington, VA 22202
Aero Nav Laboratories, Inc., 14-29 112 St., College Point, NY 11356
American Professional Captains Association, P.O. Box 350398, Ft. Lauderdale FL 33316
American Systems Engineering Corp., P.O. Box 8988, Virginia Beach, VA 23452
Amirikian Engineering Co., P.O. Box 15210, Chevy Chase MD 20815
Armorica Sales Inc., 2 Marineview Plaza, Hoboken NJ 07030
B.C. Research, 3650 Wesbrook Mall, Vancouver, B.C. Canada V6S 2L2
CDI Marine Co., 900 Regency Square Blvd., Suite 203, Jacksonville, FL 32211
C.T. Marine, 18 Church Street, Georgetown, CT 06829
Childs Engineering Corp., Box 333, Medfield, MA 02052
Crandall Dry Dock Engrs., Inc., 21 Pottery Lane, Dedham, MA 02026
Crane Consultants, 15301 First Ave S., Seattle WA 98148
C.R. Cushing, 18 Vesey St., New York, NY 10007
Arthur D. Darden, 3100 Ridgelake Dr., Suite 101, Metairie LA 70002
Design Associates Inc., 14360 Chef Menteur Highway, New Orleans, LA 70129
Designers & Planners, 2011 Crystal Dr., Arlington VA 22202
E.Y.E. Marine Consultants, Belmont House, 33 Alderney Dr., Suite 350, Dartmouth, NS CANADA B2Y 2N4
Encon Management & Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706
GHM Inc. (Industrial Measurement Consultants), P.O. Box 1836, Newport News, VA 23601
Gibbs & Cox, Inc., 119 West 31st Street, New York, NY 10001
John W. Gilbert Associates, Inc., 66 Long Wharf, Boston, MA 02110
The Glosten Associates Inc., 600 Mutual Life Bldg., 605 First Ave., Seattle, WA 98104
Morris Guralnick Associates, Inc., 620 Folsom Street, Suite 300, San Francisco, CA 94107
C. Raymond Hunt Associates, 69 Long Wharf, Boston MA 02110
Hydrocomp, Inc., 45 James Farm-Lee, P.O. Box 865, Durham, NH 03824
Intramarine, Inc., P.O. Box 53043, Jacksonville, FL 32201
JJH Inc., No. 4 Executive Campus, Culbert Blvd. & Route 70, P.O. Box 5031, Cherry Hill, NJ 08034
R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073
James S. Krogen, 1515 NW 7th St., Suite 124, Miami FL 33125
Rodney E. Lay & Associates, 13891 Atlantic Blvd., Jacksonville, FL 32225
Clyde Leavitt Inc., 13901 Puerto Dr, Ocean Springs MS 39564
K.P.G. Integrated Engineering Pty Ltd., P. O. Box 525, Cairns, Qld. 4870 AUSTRALIA
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi, MS 39535-4454
John J. McMullen Associates, Inc., 1 World Trade Center, New York, NY 10048
MacPherson Maritime Services, 141 Jefferson Ave., Westfield NJ 07090
Fendall Marbury, 9 Neal Street, Annapolis MD 21401
Marine Management Systems Inc., 102 Hamilton Ave., Stamford CT 06902
Marine Power Associates, 1010 Turquois St., Ste 217, San Diego, CA 92109
Maritime Design, Inc., 2955 Hartley Rd., Jacksonville, FL 32217
R.J. Mellusi & Co., 71 Hudson St, New York, NY 10013
Nelson & Associates, Inc., 610 Northwest 183rd St., Miami, FL 33169
Nord Marine Inc., P.O. Box 305, Fair Haven NJ 07701
Northern Marine, P.O. Box 1169, Traverse City, MI 49685
Ocean Oil International Engineering Corp., 3019 Mercedes Blvd, New Orleans LA 70114
Capt. H.L. Olsen, Marine Surveyors Company, P.O. Box 283, Port Jefferson NY 11777
Q.E.D. Systems Inc., 4646 Witchduck Rd., Virginia Beach, VA 23455
M. Rosenblatt & Son, Inc., 350 Broadway, New York, NY 10013 and 667 Mission St., San Francisco, CA 94105
Sargent & Herkes, 225 Baronne St., Suite 1405, New Orleans LA 70112
Sea School, 3770 16th Street North, St. Petersburg, FL 33704
Seaworthy Systems Inc., P.O. Box 338, Essex, CT 06426; 17 Battery Pl., New York, NY 10004; P.O. Box 205, Solomons MD 20688; 2 Skyline Pl., 5203 Leesburg Pike, Falls Church VA 22041.
Seaworthy Electrical Systems, 17 Battery Pl. N.Y. N.Y. 10004
George G. Sharp, Inc., 100 Church St., New York, NY 10007
T.W. Speetgens, 156 W. 8th Ave., Vancouver BC CANADA V5Y 1N2
R.A. Stearn, Inc., 253 N. 1st Ave., Sturgeon Bay, WI 54235
Systems Engineering Associates (SEACOR), 200 East Park Dr., Suite 600, Mt Laurel NJ 08054
TIMSCO, P. O. Box 91360, Mobile AL 36691
VSE Corporation, 1417 No Battlefield Blvd, Chesapeake VA 23320

NAVIGATION & COMMUNICATIONS EQUIPMENT
Comsat Maritime Services, 950 L'Enfant Plaza SW, Washington DC 20024
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
General Electric Company, Mobile Communications Division, Lynchburg, VA 24502
Harris Corporation, RF Communications Group, 1680 University Ave., Rochester NY 14610
Henschel Corporation, 9 Hoyt Dr., P.O. Box 30, Newburyport MA 01950
ITT Mackay, 441 U.S. Highway #1, Elizabeth, NJ 07202
Kelvin Hughes Ltd., New North Rd., Hainault, Ilford, Essex 1G6 2UR England
Mackay Communications, 441 US Hightway #1, P.O. Box 331, Elizabeth NJ 07207

Marine Electric RPD Inc., Galbraith Pilot Marine Div., 666 Pacific St., Brooklyn NY 11217
Naval Electronics, 5417 Jetview Circle, Tampa FL 33634
Norcontrol Simulation A/S, Bekkajordet 8A, P.O. Box 1024, N-3191 Horten NORWAY
Petroleum Communications Inc. (Petrocom) Head Office: 5901 Earhart Expwy., New Orleans LA 70123; 556 Jefferson St., Suite 100, Lafayette LA 70501; Allied Bank Plaza, Suite 5440, 1000 Lousisian St., Houston TX 77002
Racal Marine Inc., 70 Jackson Dr., Cranford NJ 07016
Radio-Holland USA, Inc., 6033 South Loop East, Houston, TX 77033
Raytheon Marine Company, 46 River Rd., Hudson NH 03051
Raytheon Service Company, 5760 Northampton Blvd., Ste 102, Virginia Beach VA 23455
Robertson Shipmate Inc., 3000 Kingman St., Suite 207, Metairie LA 70006
S P Radio A/S, DK 9200 Aalborg DENMARK
Sperry Marine Inc., 1070 Seminole Trail, Charlottesville VA 22906
Standard Communications, P.O. Box 92151, Los Angeles CA 90009
Telesystems, 2700 Prosperity Ave., Fairfax, VA 22031 USA
Watercom Communications Systems, 453 E. Park Place, Jefferson IN 47130

OILS—Marine—Additives
B P North America Petroleum, 555 US Route 1, So. Iselin, NJ 08830
Burmah-Castrol Inc., Raritan Plaza II, Raritan Center, Edison NJ 08837
Chevron USA, 575 Market St., San Francisco, CA 94105
Exxon Company International, 200 Park Ave., Bldg 222, Room A279, Florham Park NJ 07932
Texaco, International, 2000 Westchester Avenue, White Plains NY 10650

OIL/WATER SEPARATORS
Alfa Laval Inc., 2115 Linwood Ave., Fort Lee NJ 07024
Centrico, Inc. (Westfalia Separators), 100 Fairway Court, Northvale, NJ 07647
FAST Systems Inc., 1717 Sublette Ave., St Louis MO 63110
Microphor, Inc., 452 E Hill Rd., P.O. Box 1460, Willits, CA 95490

PAINTS—COATINGS—CORROSION CONTROL
American Abrasive Metals Co., 460 Coit St, Irvington NJ 07111
CTI Industries, 10 Sasco Hill Rd., Fairfield CT 06430
International Paint, P. O. Box 920762, 6001 Antoine Dr., Houston TX 77292
Palmer International, P.O. Box 8, Worcester, PA 19490
Unitor Ships Service, Unitor Marine Chemicals Division, 3 High St., Rickmansworth, Herts, WD3 1SW UNITED KINGDOM
White Metals Inc., 6300 Midvale, Houston TX 77087

PIPE-HOSE—Cargo Transfer Clamps, Couplings, Coatings, Supports
Aeroquip, 300 South East Ave., Jackson, MI 49203
Deutsch Metal Components, 14800 S. Figueroa, Gardena, CA 90248
Stauff Corporation, 21-23 Industrial Pork, Waldwick NJ 07463

PORT SERVICES
Port of Iberia, P.O. Box 897, New Iberia LA 70561

PROPULSION EQUIPMENT—Bowthrusters, Diesel Engines, Gears, Propellers, Shafts, Turbines
ASEA Brown Boveri, 1460 Livingston Ave., North Brunswick NJ 08902
Bird Johnson Company, 110 Norfolk St., Walpole, MA 02081
Bergen Diesel A/S, P.O. Box 924, N-5001 Bergen NORWAY
Bergen Diesel Inc., 2701 Delaware Ave., Kenner LA 70062
Boston Metals Co., 313 E. Baltimore St., Baltimore, MD 21202
Burmeister & Wain Alpha Diesel AS, DK-1400 Copenhagen K, Denmark
Caterpillar In., Engine Division, 100 N E Adams, Peoria IL 61629
Cincinnati Gear Co., 5657 Wooster Pike, Cincinnati, OH 45227
Colt Industries Inc. (Fairbanks Morse Engine Div.), 701 Lawton Avenue, Beloit, WI 53511
Combustion Engineering, Inc., Windsor, CT 06095
Cummins Engine Company, Mail Code 60011, Box 3005, Columbus, IN 47202-3005
Deutz Corp., 7585 Ponce de Leon Circle, Atlanta, GA 30340
Fincantieri, Diesel Engines Division—GMT, Bagnoli della Rosandra 334, Trieste, ITALY
GE Naval & Drive Turbine Systems Department, 166 Boulder Dr., Fitchburg MA 01420
General Motors, Allison Gas Turbine, P. O. Box 420, U-6, Indianapolis IN 46206
KHD Canada Inc., 180 Rue de Normandie, Boucherville, Quebec J4B 5S7, Canada
KaMeWa, P.O. Box 1010, S-681 01 Kristinehamn, SWEDEN
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Krupp MAK Maschinenbau GmbH, P.O. Box 9009, D-2300 Kiel 17, WEST GERMANY
Lips Propellers, 3617 Koppens Way, Chesapeake, VA 23323
Marine Gears, Inc., P.O. Box 689, Greenville MS 38707
Markisches Werk, Halve, P.O. Box 1442, D-5884 Halver WEST GERMANY
MAN B&W Diesel, 50 Broadway, New York, NY 10004
MAN B&W Diesel A/S, Ostervej 2, DK-4960 Hoelby, Denmark
MAN B&W Diesel A/S, Alpha Diesel, Niels Juels Vej 15. DK-9900 Frederikshavn Denmark
MAN B&W Diesel GmbH, Stadtbachstrasse 1, D-8900 Augsburg 1 Germany
MAN High Performance Diesels (Nurnberg), 160 Van Brunt St., Brooklyn NY 11231
Michigan Wheel Corp., 1501 Buchabab Ave., SW, Grand Rapids MI 49507
Morrison-Knudsen Company, Power Systems Division, P.O. Box 1928, Rocky Mount NC 27801
MTK Magnetek Inc., 11111 Santa Monica Blvd., Los Angeles CA 90025
North American Marine Jet P.O Box 1232 Benton, AR 72015
Northwest Marine Services Corp., 6452 So. 144th St., Tukwila WA 98168
Schottel-Werft, Josef Becker GmbH, KG, D-5401 Spay, WEST GERMANY
Sulzer Brothers, Dept. Diesel Engines, CH-8401 Winterthur, Switzerland
Sulzer/Escher Wyss, Ravensburg WEST GERMANY
Ulstein International A/S, N-6065 Ulsteinvik, NORWAY
Ulstein Maritime Ltd., 96 North Bend Street, Coquitlam BC CANADA V3K 6H1
J.M. Voith GmbH, Marine Division, Postfach 1940, 7920 Heidenheim/Brenz, WEST GERMANY Voith Schneider America Inc., 121 Susquehanna Ave., Great Neck, NY 11021
Wagner Engineering Ltd., 40 Gostick Pl., No Vancouver BC CANADA V7M 3G2
Wartsila Power Inc., 5132 Taravella Rd., P.O. Box 868, Marrero, LA 70072
ZF of North America, Marine Sales, 500 Barclay Blvd, Lincolnshire IL 60069

PUMPS—Repairs—Drives
Del Gavio, 207 W. Central Ave., Maywood, NJ 07607. Telex: 132610 DELMARINE
Goltens, 160 Van Brunt St., Brooklyn, NY 11231
Imo-Delaval, Inc., IMO Pump Division, Box 447, Monroe NC 28810
Jim's Pump Repair, 48-55 36th St., Long Island City NY 11101
Leistritz Corporation, 165 Chestnut St., Allendale NJ 07401
Megator Corporation, 562 Alpha Drive, Pittsburgh, PA 15238
Vita Motivator, 99 W Hawthorne Ave., Suite 622, Valley Stream NY 11580
Wilden Pump & Engineering Co., 22060 Van Buren St., P.O. Box 845, Colton, CA 92324

ROPE—Manila—Nylon—Hawsers—Fibers
Allied Signal Inc., Fibers Division, 1411 Broadway, New York, NY 10018
American Manufacturing Co., Cordage Div., P.O. Box 52125, Lafayette LA 70505
Samson Ocean Systems, 2090 Thornton St., Ferndale WA 98248

SANITATION DEVICES—Pollution Control
Envirovac Inc., 1260 Turret Dr., Rockford, IL 61111
FAST Systems Inc., 1717 Sublette Ave., St Louis MO 63110
Microphor, Inc., 452 E Hill Rd., P.O. Box 1460, Willits CA 95490
Research Products/Blankenship (Incinolet), 2639 Andjon, Dallas, TX 75220

SCALE MODELS
Sturgeon Bay Model Shop, 187 N Ninth Ave., Sturgeon Bay WI 54235

SCUTTLES/MANHOLES
L.S. Baier & Assoc., 7527 NE 33rd Dr., Portland OR 97211
Juniper Industries, 72-17 Metropolitan Ave., Middle Village, NY 11379
Mock Manufacturing Inc., 777 Rutland Rd., Brooklyn, NY 11203

SHIPBREAKING—Salvage
The River Smelting & Refining Co., 4195 Bradley Rd Cleveland OH 44109
The Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, OR 97201

SHIPBUILDING EQUIPMENT
Eckold Ltd., CH-7203 Trimmis, SWITZERLAND
M.A.N.—GHH, Sterkrade Werfsrabe 112 D-4100 Duisburg 18, West Germany
MAN—GHH, P.O. Box 110240, D-4200 Oberhausen 11, West Germany
NEI Syncrolift, Inc., 8970 S W 87th Ct., Miami FL 33176
Offshore Industries, Inc., 144 Railroad Ave., Suite 206, Edmonds WA 98020
Portable Gun Drilling Systems Inc., P.O. Box 123, Auburn WA 98071

SHIPBUILDING—Repairs, Maintenance, Drydocking
Aluminum Boats Inc., 304 Midway Dr., River Ridge LA 70123
Astilleros Espanoles S.A., Padilla 17, 28006 Madrid, SPAIN
Avondale Industries Inc., P.O. Box 50280, New Orleans LA 70150
Bay Shipbuilding Corp., 605 N. 3rd Ave., Sturgeon Bay, WI 54235
Blount Marine, Box 368, Warren RI 02885
Brodosplit Shipbuilding Industry, Put Udarnika 19, P.O. Box 17, 58000 Split YUGOSLAVIA
Burmeister & Wain Skipsvaerft A/S, P.O. Box 2122, Refshaleoen, DK-1015 Copenhagen, DENMARK
Colonna's Shipyard, Inc., 400 E Indian River Rd., Norfolk VA 23523
Curacao Drydock (U.S.A.) Inc., 26 Broadway, Suite 741, New York, NY 10004
Equitable Shipyards Inc., Trinity Marine Group, Box 29266, New Orleans LA 70189
Fincantieri SpA Cantieri Navali Italiani, Via Cipro 11, 16129 Genoa ITALY
Houston Ship Repair, 1621 Woods Dr., P.O. Box 489, Channelview, TX 77530
Hyundai Corporation, ShipSales Dept., 140-2 Kye dong, Chongro-ku, Soeul, KOREA
Hyundai Mipo Dockyard Ltd., 456 Cheonha-Dong, Ulsan, KOREA
Keppel Shipyard Limited, 325 Telok Blangah Road, P.O. Box 2169, Singapore 0409
Koch Ellis Barge & Ship Service, P.O. Box 9130, Westwego, LA 70094
Paul Lindenau GmbH, & Co., Schiffswerft u. Maschinenfabrik, D-2300 Kiel-Friedrichsort, West Germany
Lisnave, Apartado 2138, 1103 Lisbon, Codex PORTUGAL
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, WA 98134
M.A.N. GHH Sterkrade, P.O.B. 110240, D-4200 Oberhausen 11, West Germany
Marco, Inc., 2300 W Commodore Way, Seattle, WA 98199
T. Mariotti, Calata Chiappella, 16126 Genoa (Port) ITALY
Munson Manufacturing, 150 Dayton, Edmonds WA 98020
Newport News Shipbuilding, 4101 Washington Ave., Newport News, VA 23607
Northwest Marine Ironworks, P. O. Box 3109, Portland OR 97208
SeaArk, P.O. Box 210, Monticello AR 71655
Service Marine Industries, P.O. Box 3606, Morgan City LA 70381
Southwest Marine, Inc., P.O. Box 13308, San Diego, CA 92113
3 Maj Associates Shipbuilding Industry, P. O. Box 117, 51001 Rijeka YUGOSLAVIA
Trinity Marine Group, Box 29266, New Orleans LA 70189
Wartsila Marin Industri AB, P.O. Box 1090, SF 00101 Helskini, FINLAND
Zidell Explorations, Inc., 3121 S.W. Moody Street, Portland, OR 97201
Zodiac of North America Inc., Thompson Creek Rd., P.O. Box 400, Stevensville, MD 21666

SHIP MANAGEMENT
Texaco Marine Servcies Inc., P. O. Drawer 1028, Port Arthur, TX 77641

SIMULATOR TRAINING
Marine Safety International, Marine Air Terminal, LaGuardia Airport, NY 11371

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

STUFFING BOXES
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241

SURVIVAL EQUIPMENT
Parkway/Imperial, 241 Raritan St., So. Amboy, NJ 08879
Viking Life Saving Equipment (America) Inc., 38 NW 11th St., Miami FL 33136

TANK CLEANING
Houston Ship Repair, 1621 Woods Dr., P.O. Box 489, Channelview, TX 77530

TANK LEVELING INDICATORS
Imo-Delaval, Inc., Gems Sensors Division, One Cowles Rd., Plainville CT 06062
King Engineering Corp., P.O. Box 1228, Ann Arbor MI 48106
MMC International (Marine Moisture Control), 60 Inip Dr, Inwood NY 11696
Saab Tank Control, 201 W Passaic St., Rochelle Park NJ 07662

TORSIONAL VIBRATION SPECIALISTS
T.W. Spaetgens, 156 W. 8th Ave., Vancouver, Canada, V5Y 1N2

TOWING—Barges, Vessel Chartering, Lighterage, Salvage, etc.
Jack Faulkner, 1005 W. Harimaw Ct., Metairie, LA 70001
McAllister Bros., Inc., 17 Battery Pl., New York, NY 10004

VALVES AND FITTINGS
Aeroquip, 300 South East Ave., Jackson, MI 49203
Cajon Co., 9760 Shepard Rd., Macedonia, OH 44056
Chemiquip Products Co., Inc., 3 W. 18th St., New York, NY 10011
Circle Seal Controls, Brunswick Corporation, P.O. Box 3666, Anaheim, CA 92803
Cla-Val Co., P.O. Box 1325, Newport Beach, CA 92663
Crawford Fitting Company, 29500 Solon Road, Solon, OH 44139
Deutsch Metal Components, 14800 S. Figueroa, Gardena, CA 90248
Elliott Manufacturing Co., Inc. (Remote Valve Operating Equipment), P.O. Box 773, Binghamton, NY 13902
Stanley G. Flagg Co., 1020 W High St, Stowe PA 19464
Lexair Inc., Airmatic/Beckett, 299 Gold Rush Rd., Lexington KY 40503
Loeffler Machine, US #1 & Robbins Ave., Penndel PA 19047
Nupro Co., 4800 E. 345th St., Willoughby, OH 44094
PBM Inc., RD 6, Box 387A, Sandy Hill Rd, Irwin PA 15642
Parker Hydraulic Valve Division, 520 Ternes Avenue, Elyria, OH 44035
Parker Actuator Division, 9948 Rittman Road, P.O. Box 450, Wadsworth, OH 44281-0450
Parker Systems Division, 651 Robbins Drive, Box 3500, Troy, MI 48007-3500
Skarpenord A/S, US Agent: American United Marine Corp., 5 Broadway, Rte 1, Saugus MA 01906
Stacey/Fetterolf, P.O. Box 103, Skippack, PA 19474
Swagelok Company, 5171 Hudson Dr., Hudson, OH 44236
Teleflex Inc., 771 First Ave., King of Prussia, PA 19406

Mississippi Marine Expands; Announces Personnel Changes

Donald E. Stewart

Jo Ann Rawls

Mississippi Marine Corporation, Greenville, Miss., which provides marine-related construction and repair services, has announced the recent expansion of its Greenville operations to include a South Yard facility.

According to company president **D. John Nichols**, the company has provided a wide range of marine-related construction and repair services for more than 15 years. The addition of the new South Yard allows the company to enhance and improve its service flexibility and to offer additional services in the areas of below-water and topside abrasive blasting and painting of marine vessels, and liquid barge cleaning.

Jeff Nightingale, who has been with Mississippi Marine Corporation since 1972, has been named manager of the new South Yard operations.

Also recently announced was the promotion of **Donald E. Stewart** to manager of engineering at Mississippi Marine Corporation, and the addition of **Jo Ann Rawls** as vice president of administration to its management staff in Greenville.

For further information and free literature on Mississippi Marine Corporation,

Circle 57 on Reader Service Card

Whitey Co., 318 Bishop Road, Highland Heights, OH 44143
Williams Valve Corp., 38-52 Review Ave., Long Island City NY 11101

VIBRATION ANALYSIS
DLI Engineering Corp., 253 Winslow Way West, Bainbridge Island, WA 98110
Vibranalysis Engineering Corp., 4380 S. Wayside, Suite 100, Houston TX 77087

WASTEWATER TREATMENT
EES Corporation/Omnipure, An Eltech Systems Company, 12850 Bournewood Dr., Sugarland TX 77478

WATER PURIFIERS
Alfa Laval Inc., 2115 Linwood Ave., Fort Lee NJ 07024
Everpure, Inc., 660 N. Blackhawk Dr., Westmont, IL 60559
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130

WEATHER CHART RECORDERS
Alden Electronics, 40 Washington St., Westborough, MA 01581

WELDING
Welding Consultants USA, 10399 Paradise Blvd. #101, St. Petersburg, FL 33706

WIRE ROPE
Atlantic Cordage Corp., 60 Grant Ave., Carteret NJ 07008
Sling Max, P.O. Box 2068, Aston PA 19014

WIRE ROPE LUBRICATION SYSTEMS
Atlantis Services, 1057 Kings Ave., Jacksonville FL 32207

WINCHES AND FAIRLEADS
Braden Carco Gearmatic, P.O. Box 547, Broken Arrow, OK 74013
Fritz Culver, Inc., P.O. Box 569, Covington, LA 70434
Gearmatic—see 'Braden Carco Gearmatic' above.
Markey Machinery Co., 79 South Horton St., Seattle, Washington 98134
Nashville Bridge Co., P.O. Box 239 Nashville TN 37202
Smith Berger Marine Inc., 516 S. Chicago St., Seattle, WA 98108

WINDOWS
Kearfott Marine Products, A Singer Co., 550 South Fulton Avenue, Mt. Vernon, NY 10550

WIRE AND CABLE
Seacoast Electric Company, Station Plaza, Rye NY 10580

Boston Whaler Introduces 36-Foot Welded Aluminum Patrol Boat 'Defiance'

Boston Whaler's Caterpillar-powered aluminum patrol boat.

Boston Whaler's Commercial Products Division recently announced the introduction of its new 36-foot welded aluminum patrol boat, the Defiance.

The Defiance is a fast, versatile, rugged and low maintenance patrol boat, designed with the enforcement officer in mind. This boat features excellent maneuverability, at both low and high speeds. The wide side decks, abundant hand rails, watertight collision bulkhead and multiple watertight compartments add to the boat's safety.

The Defiance is powered by twin Caterpillar 3209TA, 375-hp diesel engines providing a range of 400 nautical miles at 19 knots and a top speed of 34 knots. Other propulsion packages are available to suit specific mission requirements.

The Defiance is state-of-the-art in design, performance and construction, and it is said to be ideal for law enforcement, rescue, firefighting and military applications.

Boston Whaler is owned by the CML Company of Acton, Mass.

For more information and free literature on Boston Whaler,

Circle 55 on Reader Service Card

Haynes Buys Bendix Industrial Diesel Fuel Injection System Product Line

Haynes Corporation, Jackson, Mich., recently announced the purchase of all assets pertaining to the Bendix industrial fuel injection system product line for medium to large industrial diesel engines from the Allied-Signal Aerospace Company. The systems are principally utilized on marine, locomotive and stationary power applications.

In announcing the agreement, Haynes noted that all contracts and orders for support parts currently held by Bendix Engine Controls Division, a unit of the Allied-Signal Aerospace Company, will be assigned to the Haynes Corporation.

To insure an orderly business transfer of the product line, Allied-Signal will continue to produce complete industrial injection systems to meet the original engine manufacturer's schedule during an agreed-upon transition period. The Allied-Signal Aerospace Company unit will also accept orders and submit quotations for Haynes through this period.

Haynes Corporation assumed product support and after-market sales responsibility for the Bendix industrial diesel injection systems and components as of November 1, 1988. A spokesman for Haynes stated that the company will continue production of the industrial diesel injection system at the same Naples, Fla., facility previously operated by the Allied-Signal Aerospace Company unit.

For further information and free literature from Haynes Corporation,

Circle 53 on Reader Service Card

Swagelok Offers Literature On Quick-Connects For Corrosive Applications

Quick-Connects with polyethylene seals are now available from Swagelok Quick-Connect Co., Solon, Ohio. This new feature, along with all 316 stainless steel construction, makes the "QT" Series ideal for heavy duty, high pressure and corrosive applications where other seal materials are unacceptable.

The Quick-Connects have a single end or double end shut-off design that allows high flow capacity with minimal pressure drop.

Built to withstand rough handling, the "QT" Series emphasizes safety. A safety release button, built into the front body sleeve, provides protection against accidental uncoupling. Extremely low air inclusion when coupling and low spillage when uncoupling are other important features.

An optional version of the "QT" Series has "keyed" bodies which couple only with matching "keyed" stems to prevent accidental intermixing of fluids in multi-line systems.

Service ratings are to 6,000 psi and 200 degrees F. In addition to the new polyethylene seals, standard TFE seals are also available.

Swagelok Tube Fitting, NPT and 37 degrees AN flare end connections are available in sizes from 1/8-inch to 1 inch.

For more information and free literature from Swagelok Quick-Connect Co.,

Circle 44 on Reader Service Card

CLASSIFIED AND EMPLOYMENT ADVERTISING

HOW TO PLACE CLASSIFIED ADVERTISING: Mail clearly written or typed copy to: MARITIME REPORTER, 118 East 25th Street, New York, NY 10010. Include any photos, drawings or logos if required. Specify size of ad and number of insertions . . . Classified Advertising — Per Issue Rate: Classified advertising is sold at a rate of $70 per column inch . . . MARITIME REPORTER'S classified section carries more advertising and sells more products than any other publication in the marine industry. Closing date for classified advertising is 20 days prior to the date of the issue. For further details contact John C. O'Malley at (212) 477-6700. Send all advertising material to MARITIME REPORTER And Engineering News, 118 East 25th Street, New York, NY 10010.

MARINE ESTIMATOR

This is an excellent career opportunity in the Sunbelt for the following qualified individuals:

Must have extensive background in structural, pipe, machinery, and electrical areas of ship repair estimating, as well as negotiating skills. Experience in both U.S. Navy and commercial estimating is required.

We offer an excellent benefits package. Salary commensurate with experience. Please send resume and salary requirements to:

Personnel Manager
P.O. Box 3255
Jacksonville, FL 32206

Equal Opportunity Employer

PAINT/LABOR SUPERVISOR

We are searching for a Paint/Labor Supervisor to head up the department with a major West Coast shipyard. Must have 6-10 years supervisory experience with Marine paint and labor with proven management and administrative skills. Also experience in the training of lower level supervision and trade workers is a must! The qualified applicant will have the aptitude to manage a diverse workforce, strong communication skills, and the ability to meet strict deadlines. We offer a competitive salary and benefits. Send resume and salary requirements to Box 202, Maritime Reporter, 118 East 25th Street, New York, New York 10010

* WELDING/METALLURGIC ENGINEER
* MARINE PROJECT COORDINATOR

Must have shipyard repair experience. Excellent starting salary and fringe benefit package. Send resume to:

ATLANTIC DRYDOCK CORPORATION
8500 Heckscher Drive
Jacksonville, FL 32226

Equal Opportunity Employer

CITY OF NEW YORK
SKIMMER BOAT PROPOSAL

The City of New York, Department of Sanitation is requesting an Engineering study to evaluate skimmer boat requirements. For further details RFP may be obtained at: New York City Department of Sanitation,, Bureau of Capital Budget, Director J. Della Corte P.E., 125 Worth Street—Room 809, New York, New York 10013, no later than March 15th. All responses are due no later than 5:00 P.M. on April 14, 1989.

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Morgan City, LA 70381

PRODUCTION ELECTRICAL SUPERVISOR

Major West Coast shipyard is currently looking for an Electrical Supervisor to manage a department of up to 100 workers. We are seeking an individual who has 6-10 years supervisory experience within the Marine Industry in the area of electronics specifically having experience in electrical power with proven management and administrative skills. Also experience in the training of lower level supervision and trade workers is a must! The qualified individual must have good verbal and written communication skills, ability to set priorities, and meet heavy deadlines. To be successful as the department supervisor, the individual must be a competent leader and have strong management skills. We offer a competitive salary and benefits. If you are interested in accepting this challenging and rewarding position, please send us your resume and salary requirements to Box 201, Maritime Reporter, 118 East 25th Street, New York, New York 10010.

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Marine/mechanical engineering degree required. Five years experience in marine ship repair estimating. Excellent starting salary and fringe benefit package. Send resume to:

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8500 Heckscher Drive
Jacksonville, FL 32226

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Owner's, operator's enquiries to
Box 203
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118 E 25th St., New York, NY 10010

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McDONOUGH MARINE SERVICE

- NOTICE -

The following items are being offered for sale by sealed bids, which will be privately opened on February 15, 1989. The sale to the successful bidders will be subject to Court approval.

1. Two ALCO 12-251-BF Diesel Engines completely remanufactured by ALCO Distributor. Some final assembly required.
2. Two (2) ALCO 12-251-B Diesel Engines partially disassembled.
3. Two (2) Western Compound Gears (double input-single output), 5.5/1 Red., 3500 H.P., with Fawick Clutches.

Engines and Gears are located in New Orleans, La. For appointment to inspect please call or write agent of record.

AMERICAN SEA VENTURES, INC.
P.O. Box 1470, Houma, La. 70361
(504) 594-5168

FOR SALE

60 Ton Clyde Model 28-DE-11 Floating Crane with 115" Magnet. Boom Length: 110' Barge Dimensions; 111' x 63' x 12'-1"

Contact:
Jay Zimmern or
Robert Kelman
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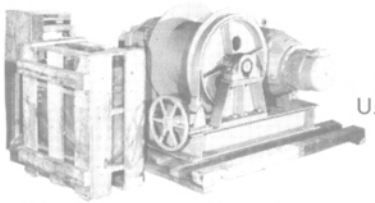

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A.C. Motor drive — 25/12.5 HP — GE 440/3/60 — 40°C AB — 1750 RPM — type KR — full load amps 32. Motor drives winch through Falk reduction gear. Has compressor hand brake with controls.

SPECIAL PRICE: $295.00 F.O.B. Philadelphia, PA

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Typical example, except ours have 16 Bolts.

6 pieces — sizes 66″x72″ - with 12″ coaming $1766.00
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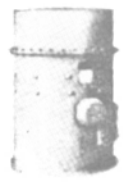
½″ Coaming & 5/16″ Cover. 16 Steel ⅞″ Drop Bolt — Stainless Steel pins & washers & bronze wingnuts — 3 hinges on long side — 2 lifting handles.

24″x24″ — 12″ coaming — ⅜″ Cover — ¼″ 4 Dogs — 2 Hinges $795.00

Above hatches are not spring loaded.

Weight = 66″x72″ - about 1500 lbs. 58″x72″ - about 1300 lbs. weights are only approx.

25,000 CPM U.S. NAVY AXIAL FANS



25000 CFM-A25A4W6 — 42½″ ID — 52″ high P 25/14 HP — 440/3/60 — 1200/900 RPM P36/24 amps. Available 5000 FFM — A5A4W6 — 23¼″ ID — 29½″ high — 4HP p 1150/1750 RPM Mfg by Joy.

25000 CFM. SPECIAL 'AS IS' CLOSE.

$975.00 each. All complete.

Need only cleaning.

5000 CFM — $595.00

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New Joiner Doors — 30″x72″
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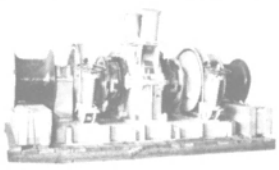
Door Knobs missing

$139.50 F.O.B. Jersey City



WINDLASS - Heavy Duty for 1⅝″ Chain-below deck motor drive. Can handle two 7000 lb anchor & 60 fathoms of chain at 7 fathoms per minute. 56″ Wildcat centers - with extended warping heads - Total wt. including Preselly Drive-vertical shaft & worm drive Convert to Hydraulic or Charge motor to 440 volts AC.

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10,500 CFM Model AF-100, "Baldor" 5 HP motor — 440/3/60 — 40° — 1750 RPM — 7 amps. $695.00

40,665 CFM — size 43AF — 60 HP Baldor Motor — 440/3/60 — 1760 RPM — 75 amps — 50° rise — Frame 364TZ Ins F. $975.00

NEW WATERTIGHT DOORS

6 Dog

6-Dog right and left hand hinged doors with frames. ¼″ panel and 5/16″ frame meet ABS Specs.

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26″x48″ RH & LH — $365.00 each
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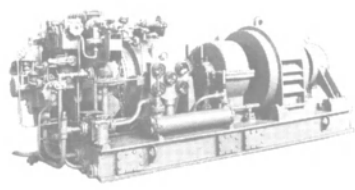
W.P. 150 lbs. — Steel N.R.S.
36″ Fabricated
Factory new Price $15,000.00 OUR PRICE $3,900.00

LOW PRESSURE 450 KW A.C. TURBO GENERATORS suitable for waste heat turbo generators on motor ships



For motorship service. 175 PSIG — D&S — 27½″ vacuum. GENERATOR: Westinghouse 450 KW — 563 KVA — 450/3/60 — 1200 RPM. GEAR: 6097/1200 RPM. TURBINE: 175 lbs/D&S — 27½″ vacuum. Other pressures & temps: 250 lbs @ 40°C — 27½″ vacuum. Turbine serial #7801-7802. OAL 13′ 1 3/16″ — OAH 5′ — OAW 5′ ⅜″. Total dry wt. 17,100 lbs. Plans on request.

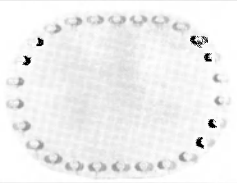
NEW UNUSED QUICK ACTING WATERTITE DOORS — WHEEL OPERATED

ABS SPECS

36″x54″ RH & LH— Wheel operated $640.00 each

30″x69″ RH & LH— Wheel operated $745.00 each

30″x54″ RH & LH— Wheel operated $715.00 each



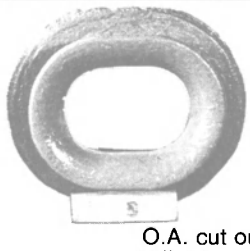
FOR BARGES

18 BOLT Tank Top Cover ½″ Top. ¾″ Deck Ring. $295.00 each.

GOOD CONDITION CRUCIFORM BITTS

18″ OAL width 19¾″ OAL height Vertical pipe 7″ diam — 8″ Tp Lip.

Cross pipe 4¾″ — 96″ end lip. Base 11½″x11½″. 4 Bolt 9½″ centers $197.50 each.



GOOD USED BULWARK CHOCKS

Clear Opening 18″x12″

O.A. cut out to trim down
28″x32″ $429.50

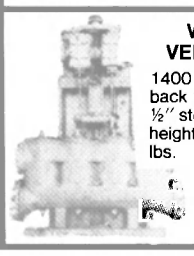
24″ PORTABLE DOCK CAPSTAN WITH BRAKE

20,000 lbs. At 40 FPM

33 HP — 23 VDC, with magnetic brake & controls. SPOOL: 16″ diameter — 26″ high. BASE: Length 11′4″ — width 60″ overall height 69″. Self-contained, in good running condition. Just purchased from Newport News Shipbuilding. Very versatile machine. With D C Controls.

SACRIFICE PRICE — $1995
At this price you can change the motor to AC.

WORTHINGTON 16″ X 14″ X 18″ VERTICAL DUPLEX STRIPPING PUMP



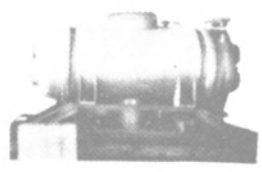
1400 GPM @ 110 PSI — suction lift 11.5 ft. — steam back pressure 15 lbs 14″ Suction — 10″ discharge — ½″ steam — 4″ exhaust. Overall width 6′ 8″ — overall height 9′1½″ — depth 3′9½″. Wt. approx. 10,000 lbs.

RECONDITONED 1980 ABS — READY TO GO

3-ROLLER BOW CHOCK

20″ Roller Centers

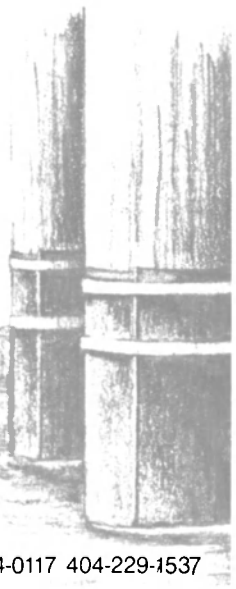
CONDENSERS COMPLETE WITH AIR EJECTOR

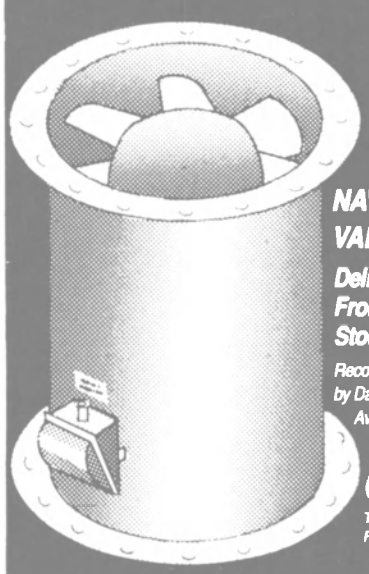


UNUSED ALCO MARINE CONDENSER
700 Sq. ft. — 2-pass — ⅝″ CuNi tubes 0.049 (18BWG) — 108″ effective length — 476 tubes P shell & head hydro test 30 PSI. Empty weight 6350 lbs — 11,000 lbs filled with water — operating 7550 lbs — 2-Pass 9″ inlet & outlet — length of condenser 156″ — about 78″ from exhaust flange to bottom of hot well.

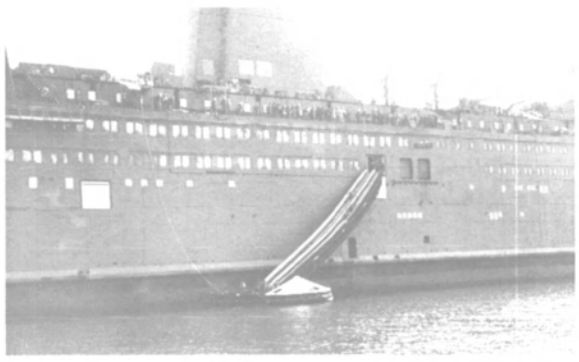
MARITIME POWER CORPORATION

200 Henderson Street • Jersey City, NJ 07302 • Telephone: 201-433-0870
Fax: 201-433-1459 • Telex: 620533 MARPOW





Viking Introduces Ship Evacuation Slide —Literature Available



Viking Life Saving Equipment, Inc. reports that its new dual track marine escape slide (MES) has the capacity to evacuate 360 passengers in 30 minutes.

The efficiency of evacuating high density passenger vessels with high freeboard has been greatly increased by borrowing an idea from the airline industry.

Viking Life Saving Equipment has developed a marine escape slide (MES). Its operation is based on the same principles as those used in aviation escape slides, but with the addition of a number of marine-oriented features.

The Viking dual track MES, for example, consists of one inflatable dual track slide; one inflatable raft embarkation platform; plus a stowage box for the entire system that is fitted into a ship's side up to 60 feet above the water level. In addition, the system has eight inflatable 45-person life rafts.

The company claims that at a height of 45 feet above the water level, the dual track system has the capacity to evacuate 360 passengers within 30 minutes. Two of Denmark's largest ferries are equipped with six MESs.

Operation of an MES is initiated simply by pulling one handle to access the stowage box. Disembarkation can begin after the slide and embarkation platform are inflated with 3-4 minutes.

Passengers come down the slide to the embarkation platform at the end of the slide. It can accommodate 95 passengers. This leaves ample time for crew members on the platform to launch the eight life rafts one by one that are part of each system. Passengers are quickly moved from the embarkation platform to the life rafts. The entire procedure is designed to keep passengers completely dry.

Viking also manufactures single track marine evacuation slides for smaller vessels. These are designed to handle 225 passengers within 30 minutes and have stowing heights of 20 feet above water level.

For free literature completely detailing the features of the Viking marine escape slide,

Circle 106 on Reader Service Card

Watercom Promotes Ulrich And Gassman

Caryl S. Ulrich has been promoted to customer service representative, and **Robert J. Gassman** has been promoted to sales representative for Watercom, **John G. Smith**, vice president of marketing and sales, recently announced.

Watercom makes and markets the inland marine industry's only direct-dial telephone network. The company has its headquarters in Jeffersonville, Ind.

For more information and free literature on Watercom,

Circle 43 on Reader Service Card

$985,250 Contract Awarded Undersea Warfare Center Of General Dynamics By DARPA

The Undersea Warfare Center of General Dynamics Corporation has been awarded a 14-month, $985,250 contract by the Defense Advanced Research Projects Agency (DARPA) to formulate, evaluate and integrate advanced submarine warfare technologies.

The award is part of DARPA's $113-million advanced submarine technology development program for 1988.

Great Lakes Towing Announces Appointments

Ronald C. Ramus, president of The Great Lakes Towing Company, recently announced two new appointments.

Joel M. Koslen, former manager-marine department, was named vice president-sales. Mr. **Koslen** has held various positions in operations, sales and administration since joining the company in 1980.

In another appointment, **John R. Bennett** was named director of fleet operations. A graduate of the U.S. Merchant Marine Academy, he is a licensed tug captain and first class pilot. He was formerly chief, Marine Division, St. Lawrence Seaway Development Corporation, and most recently a Marine Transportation Specialist for the U.S. Navy's Military Sealift Command.

The Great Lakes Towing Company is one of the largest operators of vessel- towing tugs on the Great Lakes. The company has been in continuous operation since 1899 and owns and operates 44 tugboats throughout the Great Lakes from Duluth to Quebec City.

'Immersion' Suits Replace Outdated 'Exposure' Suits —Literature Available

The Imperial Immersion Suit (standard adult Model 1409A) is one of the most widely used in the U.S.

Operators and owners of ships, tankers, mobile offshore drilling units, as well as uninspected commercial vessels, should be aware of the difference between an exposure suit and immersion suit. "Immersion" suit is the term now designated by the Coast Guard to distinguish those suits which meet revised safety standards for cold water survival.

According to **William Riley** of the Survival Systems Branch of the Office of Marine Safety, manufacturers are no longer permitted to produce "exposure" or "survival" suits, effective January 20, 1988. Manufacturers, however, are allowed to sell existing stock.

Immersion suits are labeled "Immersion" suits and must carry the Coast Guard's approval designation 160.171 (not to be mistaken for the old exposure suit approval designation 160.071).

Frank Sanger of Parkway/Imperial, the industry's largest producer of immersion suits, said he is finding most people are getting used to calling these suits immersion suits. "It's a hard transition to make for many people who have called these garments by their old name for years," Mr. **Sanger** added.

Imperial has worked closely with various governing bodies over the years, including the Coast Guard and Underwriters Laboratory, to test and develop safe standards for immersion suits. In addition to being one of the first manufacturers to receive USCG approval for immersion suits under the new rules, Imperial is the only manufacturer of suits in the U.S. to have passed the revised Norwegian Maritime Directorate standards, the most stringent in the world. Imperial supplies well over half the suits used in the U.S., and has a large international sales and service network.

Immersion suits are now required on certain inspected vessels (ships, tankers, MODUs) and are recommended by the Coast Guard on uninspected vessels (commercial fishing, etc.).

For more information and free literature on the Imperial Immersion Suit from Parkway/Imperial,

Circle 81 on Reader Service Card

Repair Of Naval Vessel Aided By Power Team Hydraulic Rams

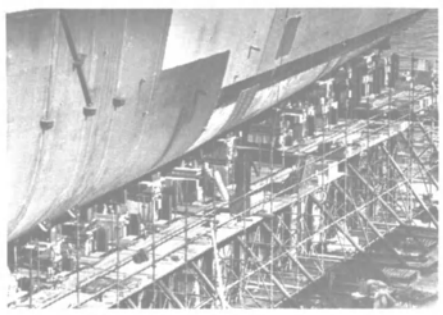
Repair of the guided-missile frigate USS Samuel B. Roberts entailed a massive lifting exercise in which twenty 100-ton aluminum hydraulic rams operating at 10,000 psi were systematically applied to raise the damaged stern of the 3,700-ton vessel to its normal position.

Bath Iron Works (BIW) of Bath, Maine, which built the Roberts in 1986, was contracted by the Navy to repair damage inflicted by an Iranian mine in the Persian Gulf. The lifting project was the largest ever undertaken by the shipbuilder.

The ship's stern, which had sagged 36 inches as a result of the explosion and subsequent flooding, was hinged about 130 feet inward. The hull of the 445-foot vessel had to be cut through up to the main deck so the stern could be jacked up, properly aligned and repaired while in drydock at BIW's Portland facility.

The rams—RA1006 aluminum models from Power Team—were chosen largely for their relatively light weight and BIW's previous experience with that line of hydraulic products. At 49-1/2 pounds, they are approximately half the weight of steel rams of the same capacity.

Ten jacking stools beneath the stern each supported two rams, which were powered by one 10,000-psi Power Team PE172 electric/hydraulic pump. Operators of the pumps were directed via radio communications to preload the rams to compensate for weight shifts and to elevate them simultaneously in required increments, a critical phase of the project.



The OTC Power Team hydraulic jacking system is visible in this view of USS Roberts.

The rams were jacked only 2 to 3 inches per lift to prevent the stern from swinging and causing off-center loading. Oak wedges were installed for cribbing after each lift until the 36-inch correction had been achieved.

In addition to restoring the ship's stern, BIW crews cut out a section of the Roberts for a new engine room module and installed a 10-foot-square patch over the hole blasted by the mine explosion. The engine room module, under construction at Bath, will be barged to Portland for installation.

More information on the hydraulic equipment used in this project is available from Power Team. For free literature,

Circle 80 on Reader Service Card

New Course Available For Network 90 Multi-Function Controller Applications

The E.G. Bailey Training Center recently announced a new course offering on Network 90® Multi-Function Controller (MFC) Applications. The course covers the principles of the Network 90 distributed control system and hardware applications. Hands-on training of the MFC hardware, system configuration and tuning will be emphasized.

This course is targeted towards maintenance and applications engineers responsible for the Network 90 distributed process control system.

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.

For free literature giving full information on the new course offered by the E.G. Bailey Training Center,

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30 YEARS OF PERFORMANCE

OVER 99% OF ALL SHIPLIFT OPERATIONS AROUND THE WORLD ARE ON SYNCROLIFTS®

There are very good reasons why Syncrolift is the world leader in shiplift technology with more than 160 installations in 59 countries. If you're planning a shipyard and comparing docking systems, find out why your best move is with Syncrolift.®

The largest shiplift platform in the world – 655 ft. long by 106 ft. wide at Todd Pacific Shipyards Corporation, Los Angeles Division.

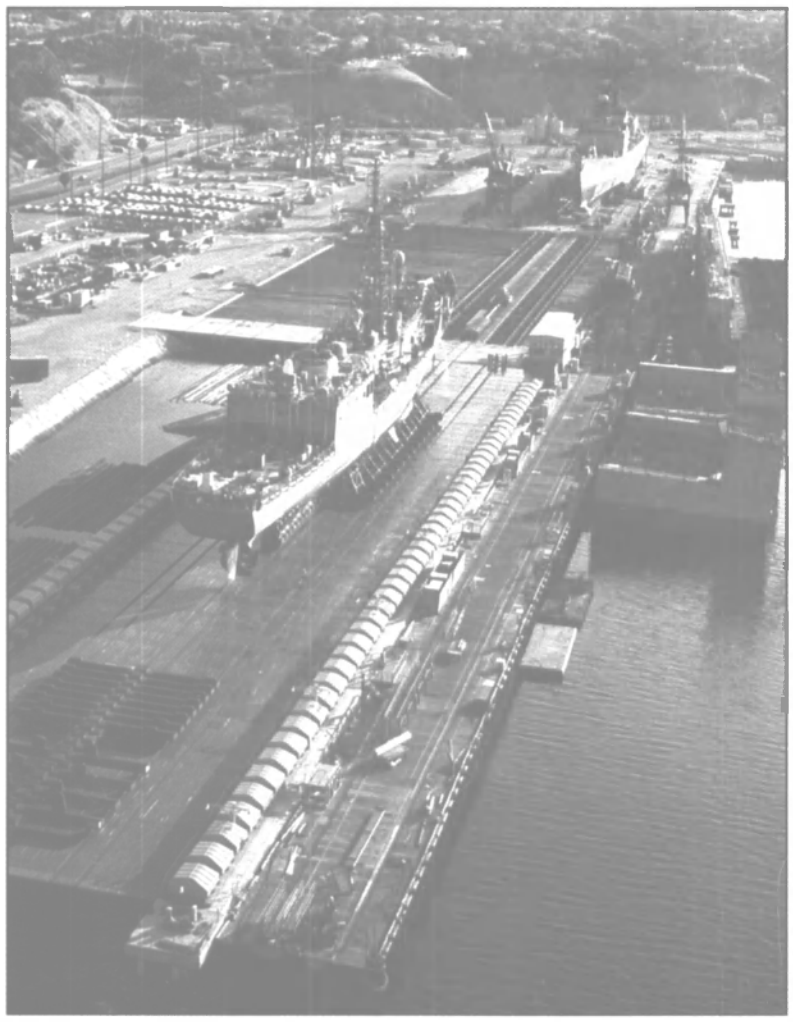

Photo by Joseph Ernest

The highest capacity per metre shiplift in the world – 200 tons per metre for launching concrete caissons at Yunotsu, Japan.

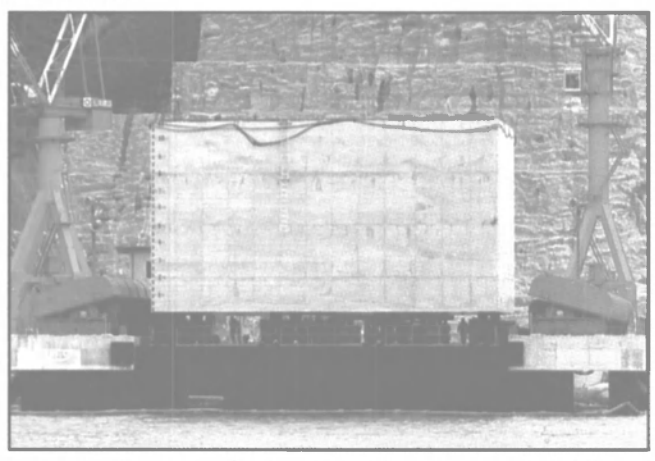

Photo by Penta-Ocean Construction Co., Ltd.

The greatest lifting capacity shiplift in the world – 24,000 tons for nuclear submarines at Barrow-in-Furness, England.

SYNCROLIFT

World Leaders in Shiplift Technology

NEI SYNCROLIFT, INC.

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