# MARITIME REPORTER
AND
# ENGINEERING NEWS



## 1988 NAVY ANNUAL
## OFFSHORE MECHANICAL & ARCTIC ENGINEERING '88
FEBRUARY 1988 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.

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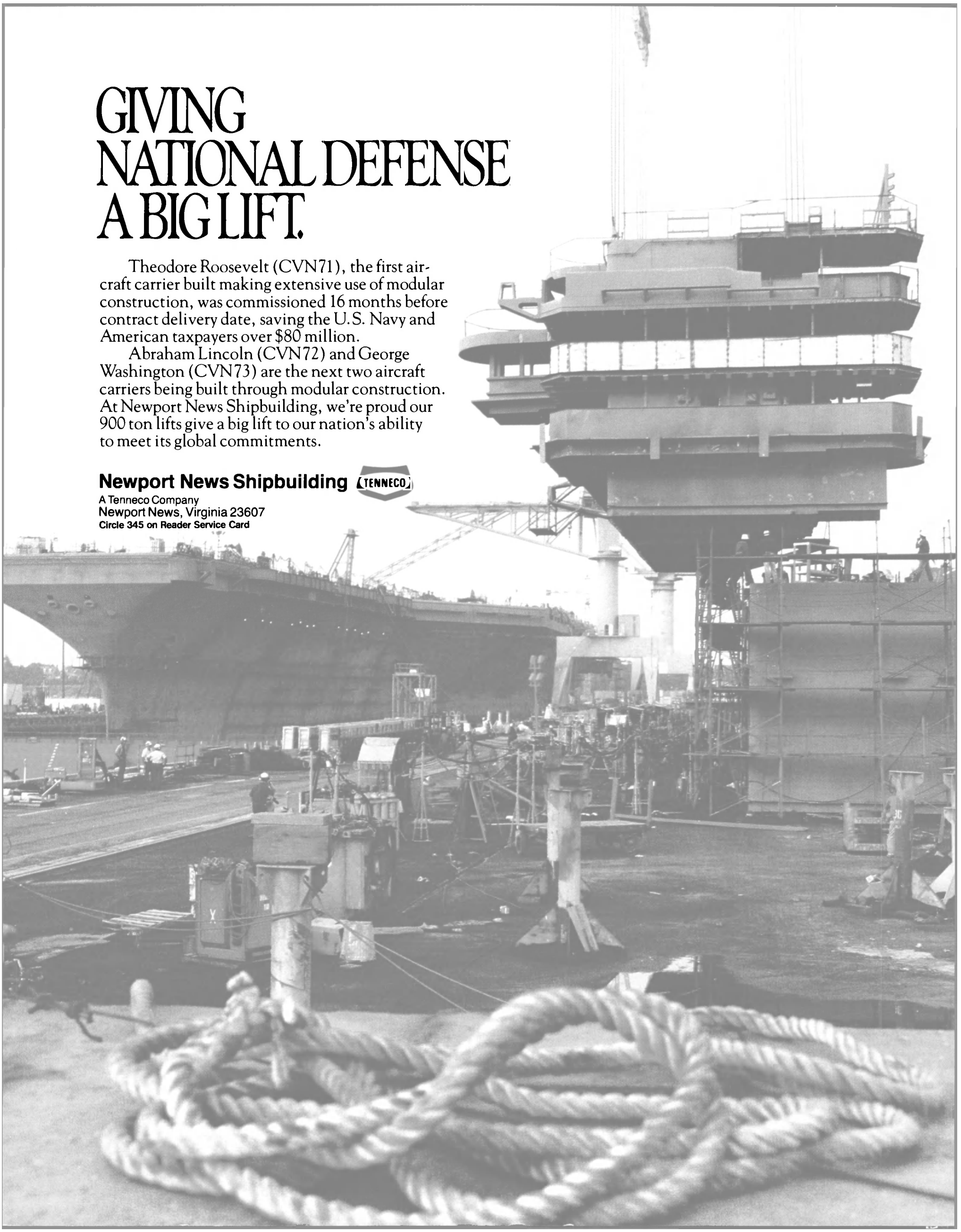

# ON THE COVER



## Econ Associates Buys All 12 USL Econships

A consortium of seven banks holding mortgages on U.S. Lines' huge econships has now bought all 12 vessels at auction.

The consortium, Econ Associates, purchased eight of the vessels at auctions in New York and Seattle for about $32 million. It bought the four other vessels for $18 million at auctions in Hong Kong and Singapore. The ships were originally built for $47.5 million each at Daewoo Shipbuilding in 1984-1985.

Econ Associates plans to sell or charter the vessels. Reportedly, Sea-Land, Nedlloyd and Trans Freight Lines are interested in some kind of deal for the containerships, but nothing has been confirmed.

## Halliburton To Acquire Majority Interest In GSI From Texas Instruments

Halliburton Company and Texas Instruments Incorporated recently announced that the two companies have entered into a letter of intent for Halliburton to purchase a 60 percent interest in TI's wholly owned subsidiary, Geophysical Service Inc. (GSI), with provisions for possible 100 percent ownership within a few years.

The letter of intent provides for an initial payment to TI of approximately $50 million and a potential additional cash payment in 1991. The letter of intent also provides for the possible subsequent sale by TI of the remaining 40 percent of GSI to Halliburton, at the option of either company.


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## Almerico to Manage Trinity's Mississippi Shipbuilding Operations

Vincent R. Almerico Jr.

**Vincent R. Almerico Jr.** has been named vice president, operations, of the Trinity Marine Group. He is now responsible for the overall operations and management of the Halter Marine, Inc. shipyard in Moss Point, Miss., and Moss Point Marine, Inc. in nearby Escatawpa, Miss.

The announcement was made by **John Dane III,** president of the Trinity Marine group, which in addition to the two Mississippi shipyards, includes the Equitable/Halter shipyards in New Orleans and Madisonville, La. Halter Marine's shipyard in Lockport, La., and Gretna Machine and Iron Works in Harvey, La.

All of the shipyards in the group are owned by Trinity Industries, Inc. of Dallas, Texas.

Mr. **Dane** said Mr. **Almerico's** immediate attention will be focused on the construction of six U.S. Navy 224-foot T-AGOS vessels at the Halter facility, and four 275-foot U.S. Army Logistic Support Vessels (LSV) at the Moss Point Marine, Inc.

Mr. **Almerico** joined Moss Point Marine, Inc. in 1985 as vice president of the shipyard. Moss Point Marine, Inc. was acquired by Trinity Industries, Inc. in August 1987.

## New California Offices For Electrocatalytic

Electrocatalytic, Inc. has announced the relocation of their California offices and service center.

Effective immediately, their new address and phone number is: Elcat Corp., 14299 Wicks Blvd., San Leandro, CA 94577, (415) 895-6663, FAX (415) 638-6667. The new facility allows Elcat to better service their customers and provides a larger spare part inventory, training facility and a local engineering and sales staff to better correlate and expedite Elcat system applications.

Electrocatalytic manufactures Capac®, cathodic protection systems for naval and commercial shipping, process plants, electric generating stations and offshore oil platforms. Their Pacpuri® systems are used for the purification and chlorination of potable water, and Chloropac®, for control of biological and marine fouling in systems utilizing seawater.

For more information and free literature,

**Circle 48 on Reader Service Card**

## New Swagelok Tube Fittings Incorporate Sanitary Flanges

Swagelok® tube fittings with sanitary flanged ends, which permit direct connection of utility and process lines, are now available from Swagelok Co., Solon, Ohio. The new fittings are designed for applications in the pharmaceutical, biotechnology, food, beverage and related industries.

The fittings are available in ¾-inch and 1-inch sanitary flange sizes, and ⅜-inch and ½-inch O.D. tube sizes, allowing use in a wide range of systems.

The Swagelok tube fitting end accommodates a variety of metal and plastic tubing materials, providing flexibility in system design. Also, the end connection is gageable, an exclusive feature which permits rapid inspection for proper pull-up before a system is pressurized.

Specific applications include steam sterilization lines, nutrient feed systems, sterile air systems, sampling lines, pilot plants, and instrumentation.

For additional information and free literature,

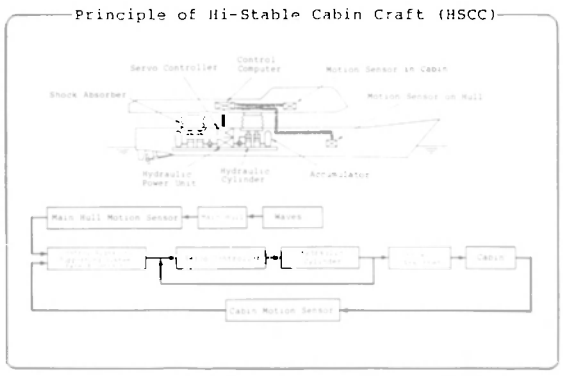
**Circle 76 on Reader Service Card**

## Mitsubishi's High-Speed Passenger Boat Promises New Era In Smooth Sailing

Mitsubishi Heavy Industries, Ltd. (MHI) of Japan has developed a "dream ship" with pitch- and roll-free cabins mounted on hydraulic controlled shock absorbers.

The 48½-foot-long, 17-gross-ton catamaran, which is the first Hi-Stable Cabin Craft (HSCC) high-speed ship, is made of fiber reinforced plastics, has a passenger capacity of 12, and will be used for cruising on the Inland Sea around Mihara Port. The vessel, the Ukishiro, was built at MHI's Shimonoseki Shipyard & Engine Works and will be delivered to Higashi Chugoku Ryoju Kosan.


The first Hi-Stable Cabin Craft (HSCC) was built at MHI's Shimonoseki Shipyard. The craft features cabins mounted on hydraulic controlled shock absorbers.




The cabins remain stable even in rough seas, allowing passengers to enjoy a comfortable cruise without fear of seasickness. A computer detects pitch and roll and dampens them by adjusting hydraulic cylinders, keeping the cabins level. The impact of motion is also absorbed by the shock-absorbing system.

In additon to high-speed vessels, the Hi-Stable Cabin Craft technology can be applied to infirmary cabins on large passenger ships, and precision laboratories and helicopter pads of research vessels.

MHI has completed a tentative design for a larger version of the ship for tourism and leisure purposes for marketing in the Inland Sea area.

For additional information and free literature from MHI,

**Circle 60 on Reader Service Card**

## New Emergency Marker Lights Described In Color Brochure From American Cyanamid Co.

American Cyanamid Company of Wayne, N.J., is offering free color literature on the Cyalume® personnel marker light (PML®) manufactured by the company.

These rugged lights attach securely to life vests, need only one hand for activation and are both waterproof and windproof. No batteries, bulbs or lenses are needed.

The personnel marker light consists of a plastic tube covered with a light protective black plastic sleeve and attached handle. The tube contains fluorescent compounds and glass vials of activator compounds. The system is activated by removing the black sleeve, squeezing the handle which breaks the suspended vials, and shaking to mix the compounds. The mixed compounds produce a yellow-green light effective for eight hours and visible for up to one mile on a clear night.

The lights carry FAA, Coast Guard, and U.S. Navy approval.

For more information and free literature on the Cyalume PML personnel marker light from American Cyanamid,

**Circle 59 on Reader Service Card**

## Hart Receives Award For Marine Industry Service

**Peter D. Clark,** president of the N.Y. Chapter of the U.S.M.M.A. Alumni Assoc. (left) and **Dave Buzanoski,** secretary of the N.Y. Chapter of the U.S.M.M.A. Alumni Assoc. (center) present Capt. **Robert E. Hart,** president, Marine Index Bureau, Inc., with their annual award for leadership in the maritime community and dedication in the industry.

The Port of New York Chapter of the U.S. Merchant Marine Academy Alumni Association recently presented their annual award for leadership in the maritime community and dedication to the marine industry to Capt. **Robert E. Hart,** president, Marine Index Bureau.

**Peter Clark,** president of the Alumni Association, presented the award to Captain **Hart** at a luncheon in New York City which was cohosted by the Propeller Club. Secretary of the Navy, **James H. Webb Jr.,** was the guest speaker at the affair.

Mr. **Clark** said: "Captain **Hart** was chosen to be this year's award recipient in honor of his years of hard work and leadership in bringing together the many sectors of our marine industry. He has been a strong supporter and friend of the U.S. Merchant Marine Academy throughout his career."

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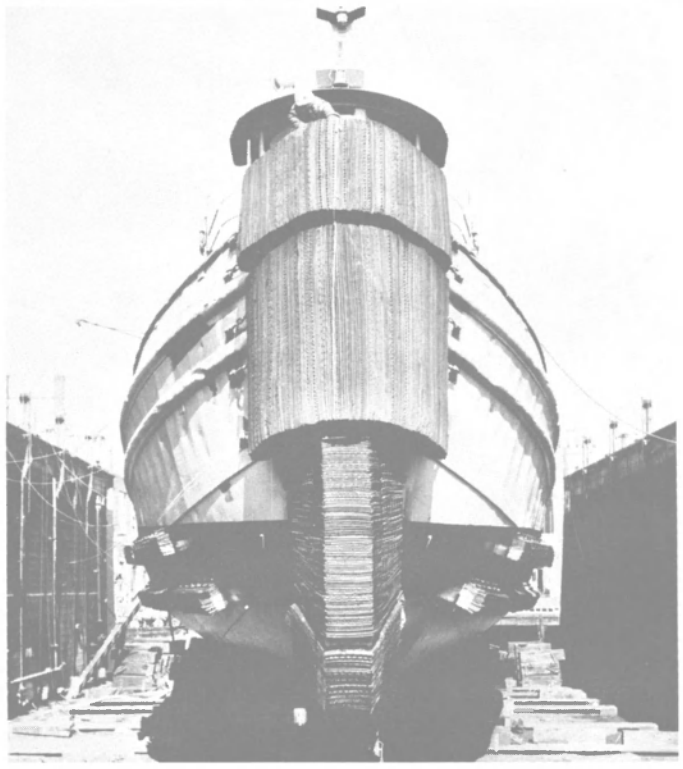

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## New Product Tanker Orders For B&W —Literature Available

Burmeister & Wain Shipyard, Copenhagen, Denmark, has received further orders for their successful CPT54E type Panamax-sized products tanker.

Up to four vessels have been earmarked for the Oslo-based consortium Petrobulk Carriers, which is one of the world's leading operators in oil products transportation.

The Petrobulk ships will be delivered by Burmeister & Wain in 1988 and 1989. The yard has already delivered six CPT54E Series tankers and has three others on order for the Norwegian company Torvald Klaveness & Co. and the Danish company Torm.

For free literature on the shipbuilding and ship-repairing services of Burmeister & Wain of Denmark,

**Circle 36 on Reader Service Card**



# ELECTRONICS UPDATE

## New Products From Furuno: Advanced FAP-50 Autopilot, And Weatherfax 'With A Twist'

Two new products recently introduced by Furuno include the advanced FAP-50 microprocessor-controlled autopilot, and the award-winning FAX-208A weatherfax "with a twist."

Furuno's FAP-50 microprocessor-controlled autopilot provides extremely accurate steering in all weather conditions for various vessel types, from yachts to commercial fishing boats. It provides fully automatic route following when interfaced with loran C; extremely complex trawl or search patterns can be automatically carried out while the operator is occupied with other duties; it saves considerable amounts of time and fuel.

Furuno's FAP-50 autopilot.

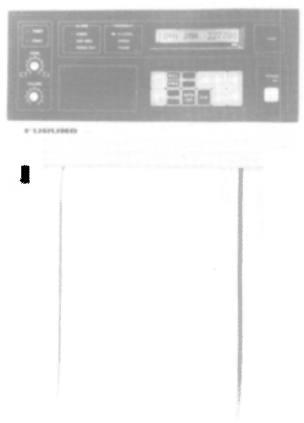
The FAP-50 system comes with fluxgate heading sensor, processor unit, rudder feedback unit, hydraulic pump set, and an attractive splashproof control unit that can be installed almost anywhere with the standard bracket, or flush mounted directly in a console.

It interfaces directly with Furuno loran C and video plotters, or any device supporting NMEA 0180 data format. Up to two heading signals are operator selectable from gyrocompass, magnetic compass or fluxgate sensor and both audible and visual alarms are provided to alert arrival at destination or waypoint.

All system inputs are made via sealed touchpads; the large LCD presentation shows data both intuitively in graphic form and by alphanumeric digital readouts. Course is selected with the familiar and easy to understand rotary knob. On installation, system performance features are set for the individual vessel-handling characteristics; the parameters set and mode selected are displayed across the bottom of the LCD screen. A second full function control station and up to two remote control units may also be fitted.

The FAP-50 operates from a universal 10-42 VDC power supply, or 110/220 VAC with optional rectifier unit.

Furuno's award-winning FAX-208A is one of the most advanced weatherfax receivers ever put on the market, and it is also a fully functional NAVTEX system with an optional built-in receiver/processor. An optional active antenna coupler is available that covers standard fax as well as the 518-kHz NAVTEX transmissions.



The FAX-208A weatherfax.

As a fax receiver, the FAX-208A produces exceptionally clear, detailed weather and satellite charts, with four gray-scale levels on 8-inch nonfading thermal recording paper with no unpleasant carbon dust or crinkled wet-paper readouts. The FAX 208A has a built-in synthesized receiver covering all known or upcoming channels, and offers microprocessor-controlled scanning for any station or combination you may desire to program in. Other standard features include keep-alive batteries to protect data in memory and a timer to activate the unit for preprogramed schedules.

In the NAVTEX mode, the FAX-208A automatically stores all normal incoming traffic for later printout. For urgent messages, it automatically overrides the fax mode and prints them immediately.

Operation is from a 10-40 VDC universal power supply, drawing just 20 W on standby and 40 W operating.

For more information and free literature on Furuno's FAP-50 microprocessor controlled autopilot,

**Circle 23 on Reader Service Card**

For free literature on Furuno's award-winning FAX-508A,

**Circle 24 on Reader Service Card**

## Conrad Industries Names Ronald P. Chiasson To General Manager's Post

**J. Parker Conrad,** founder and CEO of Conrad Industries which specializes in designing, building, renovating and repairing boats and steel barges, recently announced that **Ronald P. Chiasson** has been named general manager of the Morgan City, La., company.

## Ship Contracts Worth Over $90 Million Awarded To Astilleros

Astilleros Espanoles SA recently received a contract worth about $80 million to build two 140,000-dwt tankers for Refineria de Petroleos del Norte (Petronor). The crude carriers are expected to be delivered next year.

In addition, the Spanish shipbuilding and ship-repair group also received a three-year contract to repair the fleets of two Cuban shipping companies, Mambisa and Navicaribe.

The group's yards at Cadiz, Ferrol, Las Palmas, Santander and Sevilla will provide the services under the contract, which is valued at about $10.8 million.

These contracts are in addition to an order that Astilleros Espanoles received late last year from the Del Monte Tropical Fruit Co. for six reefer vessels. The reefers are scheduled for delivery late next year.

For free literature containing detailed information on the shipbuilding and ship-repairing services and facilities offered by Astilleros Espanoles,

**Circle 77 on Reader Service Card**

## Canadian Shipbuilding And Ship Repairing Association (CSSRA) Becomes CMIA

**J.Y. Clarke,** president of the Canadian Shipbuilding and Ship Repairing Association (CSSRA), recently announced that CSSRA will now be known as the Canadian Maritime Industries Association (CMIA). Eligibility requirements to join have been expanded to include ocean industries, both scientific and technical, and industries supporting offshore exploration and production operations.

Implicit in these changes is a major revision to the Association's corporate objectives which are now: "the promotion and development of the Canadian shipbuilding, ship repairing, offshore and ocean industries for the advancement of the industrial, technological, economic, social, defence and sovereign interests of Canada." It is our intent to represent new members from the oceanic and offshore industries to the governments and people of Canada in the same way as we have been doing for many years for shipyards, and suppliers of marine equipment and services.

From now on, there will be only one class of full member of the CMIA, with provision being made for companies or agencies that do not qualify for membership, to be accepted as Associate Members.

Concerning corporate management, the maximum number of directors on the board will remain at 40, with the proviso that directors representing shipyards will always have a majority of at least one. This means that members from companies other than shipyards can be represented by up to 19 directors, a major increase over their current representation of four directors. This provides comprehensive and equitable capability for all member companies in the new CMIA to contribute to the formulation of policy and implementation of corporate objectives.

One of the roles of the new association will be to build upon the existing rapport with the Department of Fisheries and Oceans, and the soon-to-be-formed Department of Industry, Science and Technology, to promote programs of mutual concern.

"This expansion of the association will bring together a more comprehensive and realistic joining of the supply and demand sides of maritime industries in Canada," Mr. **Clarke** stated.

For details and information on joining CMIA, contact: The Canadian Maritime Industries Association, P.O. Box 1429, Station B, 801—100 Sparks Street, Ottawa, Ontario K1P 5R4; telephone 613-232-7127; fax 613-232-2490; telex 053-4848 CSSRA OTT.

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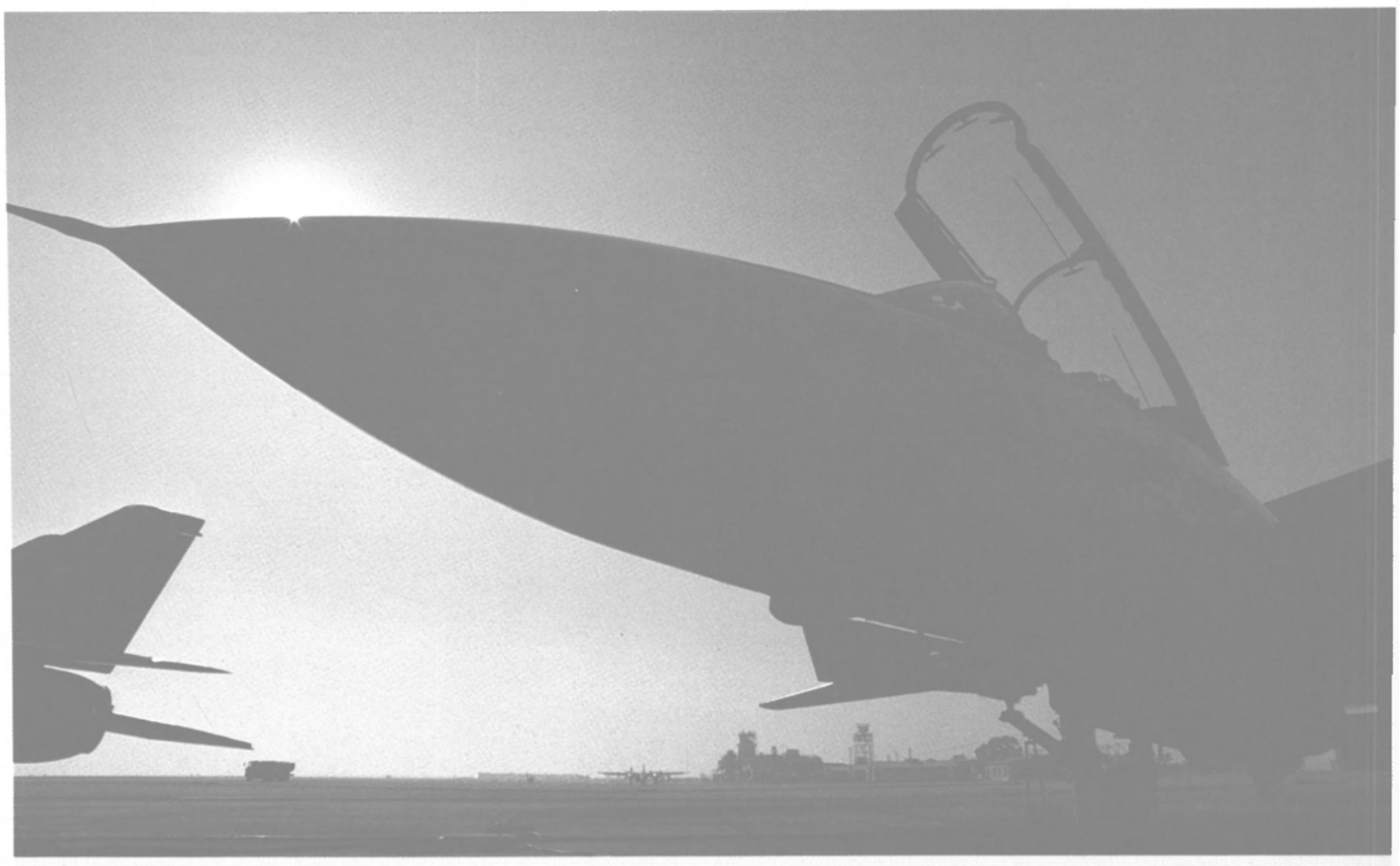

# Cruise Ship Industry Spurs Construction in Italian Yards

The Italian cruise ship industry is providing work for the country's shipyards, including both major refits and newbuildings. Sitmar Lines has commissioned three new cruise ships, two of which are being built in Italy, and Costa Crociere, a newly formed company coordinating the activities of Costa cruise ships, has invested more than $20 million to refit their flagship, the Eugenio Costa.

These developments show a considerable confidence in the future of the cruise industry on the part of the private sector. Additionally, positive legislative support by the Italian government was a contributing factor. Recent Italian legislation provides some financial support for both shipowners and shipyards.

However, government subsidies alone cannot make an industry flourish. It seems that both Sitmar and the Costa Lines see a real future in the cruise ship market. Both companies apparently believe that this market has undergone, and is undergoing substantial changes, and are committed to designing their ships and cruise itineraries with new market demands, and a newly drawn customer profile.

Costa Crociere commissioned the Mariotti yard in Genoa to remodel their flagship, Eugenio Costa. The 30,500-ton ship, originally launched in 1966, left the yard late last year after a two-month stay to take up her winter cruising schedule in South America.

Company spokesmen emphasized that the refit was no mere "facelift," but rather a major transformation of the ship's covered and open deck areas. The newly transformed Eugenio, descibed in company literature as the world's first floating tourist resort, is not aimed at the traditional cruise passenger market. The company has redesigned the Eugenio to appeal to a target market of young, middle to upper middle class couples and families, who in the past may have spent a week's vacation by the sea, rather than on it. The use of space aboard carefully reflects the priorities of this market.

The Eugenio's architects have conceived a layout which incorporates two parallel and complementary "cities." The first is an "open air city" devoted to daytime activities. Facilities in this sector include tennis and volleyball courts, jogging tracks, swimming pools, etc.

The second is a "covered city," which incorporates such standard ship's facilities as a cocktail lounge, tea room, library, etc. In this "city," architects have attempted to create a distinctly Italian urban life aboard, with its own shopping street, the Via Veneto, lined with specialty boutiques offering goods from top Italian and European designers. Like all good shopping streets in Italy, this Via Veneto leads to a Piazza in the Italian style, complete with sculptured fountain, and a sidewalk cafe offering ice cream, drinks and pastries. Clearly, a strong attempt has been made to offer passengers the kind of amenities they would expect to find in a resort town ashore.

The Eugenio's galley was refitted at a cost of about $3.3 million, to permit the preparation of 1,000 meals simultaneously. The dining room was also modified to be able to seat 1,000 passengers and to divide, when necessary, using sliding bulkheads, to accommodate private parties, small conventions, and business groups. About 100 new cabins were added, while existing cabins were redecorated.

The ship's transformation also included the addition of a large structure mounted aft to house a new 600-seat theater. The total cost of the theater was about $4 million.

Costa Crociere is also investing more than $275 million for a new ship of 50,000 tons, due to be delivered in 1991. The 1,500-passenger ship will be used in the Caribbean market.

Two of the three new 1,800-passenger ships ordered by Sitmar Lines, are being built at the Fincantieri yards in Trieste. About 35 percent of the $325 million total cost for each ship is being allotted to the main yard, which is responsible for the design, basic hull deck and superstructure construction, and the coordination of the building. Specialized subcontracting firms supplying outfitting and decor account for 20 percent of the total cost, with the remaining total being allocated to firms supplying engines, machinery, ship's carpentry, etc.

Responsibility for design of the interiors, and overall coordination of the interior outfitting process have been assigned to **Giacomo Mortola,** a man with extensive experience not only in interior design, but in project management of biannual refits for ships of Sitmar Lines. His company, Gem, also supervised quality control aboard six containerships for Finmare. For the design stage of the new Sitmar project, Mr. **Mortola** enlisted the services of two specialized design studios, Aras and Arna.

Mr. **Mortola** maintains that the future of the cruise industry lies with ever larger, more cost-efficient ships. To accommodate a mass market of seagoing "tourists," the bulk of the industry will be seeking to provide an acceptable, if not deluxe, level of comfort and service at a very accessible cost to the customer. A smaller portion of the industry will be providing deluxe service to the high end of the market with small passenger capacity ships. At present in Italy, a 150-passenger ship is under construction in Viareggio and four 70-passenger ships are under construction in La Spezia.

The two Sitmar ships under construction at Fincantieri, both first class vessels of 70,000 tons, are due for delivery in 1990, the first in January, the second in December.

For free literature detailing the ship-repairing and converting facilities at Italian shipyards,

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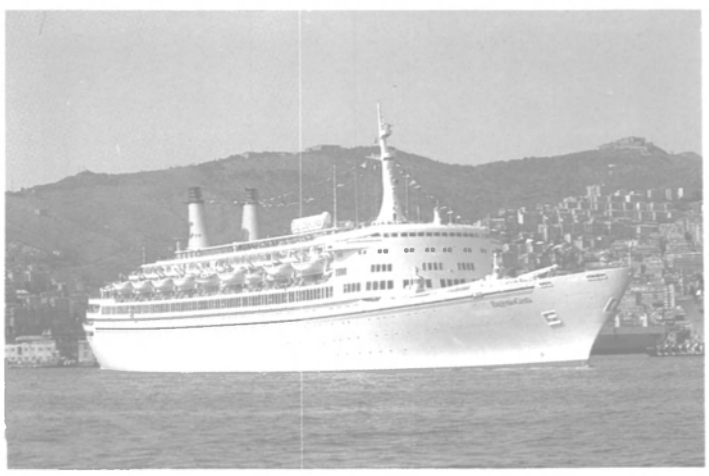


**At left:** the flagship of Costa Lines, the Eugenio Costa, recently underwent a $20-million conversion at the Mariotti yard in Genoa, Italy. **At right:** Conversion work underway on the Eugenio Costa at the Mariotti yard. A large section was mounted aft to house a 600-seat theatre.

# Fincantieri Converting Six Ferries Under $74.4-Million Contract

## —Free Literature Offered—

Fincantieri Cantieri Navali Italiani of Italy has been contracted to undertake a $74.44-million modernization and refit program of a fleet of ferries operated by Tirrenia di Navigazione SpA of Naples. The project, which represents about 1 million hours of direct or subcontracted work, involves the conversion and jumboization of six ferries of the Roman Roads Series.

Work began on three freight/RO/RO ferries, the Apulia, Adria and Torre de Greco, last April at the Fincantieri shipyards of ATSM in Trieste, OARN at Genoa, and SEBM of Naples. The Apulia is scheduled to enter service early this year.

The conversion of the Apulia will transform the vessel into a larger passenger/cargo ferry for trading in Italian waters. Her new dimensions will be 486½ feet long, 81 feet abeam, with a fully loaded winter draft of about 21½ feet. She will be powered by two GMT A420 diesel engines rated at 7,500 hp each, and will have a service speed of more than 20 knots. She will be able to accommodate more than 1,500 passengers and 340 cars during the summer months.

Other conversion work involved the extension of the saloon deck aft and providing in the underlying 'tweendeck two saloons with reclining armchairs for a total of 570 persons, passenger cabins to accommodate a total of 384 and two embarkation halls. The boat deck is being extended forward and three saloons will be built in the 'tweendeck, along with passenger cabins for 11, a saloon-bar, snackbar and game room. The officers' deck will be extended aft to accommodate a restaurant, self-service dining/saloon, kitchens, pantries and associated staterooms. The crew's quarters were also rearranged.

Some of the other conversion work being carried out at the Fincantieri yard includes: the installa-

tion of an additional generator set; the replacement of the single, centrally disposed rudder with two new flanking rudders; improvement of firefighting, lifesaving, sanitary and waste disposal systems; the addition of a second bowthruster; and upgrading of the air conditioning and ventilation systems.

For free literature on the conversion, as well as shipbuilding and ship-repairing capabilities of Fincantieri Cantiere Navali Italiani,

**Circle 31 on Reader Service Card**

## Major U.S. Shipping Companies Form New Industry Association

Five major U.S.-flag carriers serving America's foreign commerce recently announced the formation of a new industry group, the United Shipowners of America (USA). The member firms—American President Lines, Crowley Maritime Corp., Farrell Lines, Lykes Bros. Steamship Co., and Sea-Land Service—said they will jointly press for legislative and regulatory changes to strengthen the U.S. merchant marine.

"The group will serve as a single focal point for the industry's dealings with Congress and the Administration on all key matters affecting U.S. merchant marine policy," said **Timothy J. Rhein,** USA's chairman. "The members are committed to revitalizing an industry that is crucial to both commercial interests and national security, but has long been neglected by government policy makers."

Much of USA's strength will come from the fact that its members represent some 95 percent of the U.S.-flag liner capacity serving America's international trade, Mr. **Rhein** noted.

According to executive vice president **Albert E. May,** to increase the competitiveness of American carriers, USA will press for reform of the operating differential subsidy program and will participate actively in a review of the Shipping Act of 1984. Other agenda items will include working with unions to develop effective manning programs, advocating more open trading and shipping practices worldwide, and conveying to U.S. Customs and other agencies the needs of the industry and its customers.

Adm. **James L. Holloway III,** USA (Ret.), who formerly headed the Council of American-Flag Ship Operators, will serve as president of USA until his retirement and a new president is named. A search to fill this position is presently underway. Admiral **Holloway** has agreed to remain as a consultant to USA following his retirement from the presidency.

USA's headquarters are located at 1627 K Street, N.W., Washington, D.C., 20006.

## Aluminum Boats Constructing 138-Foot Detroit Diesel-Powered Luxury Dinner/Cruise Vessel

Aluminum Boats, Inc. of Crown Point, La., is constructing a 138-foot seagoing yacht, the Kathleen W., for Windridge Yacht Charters, Inc. of Ft. Launderdale, Fla.

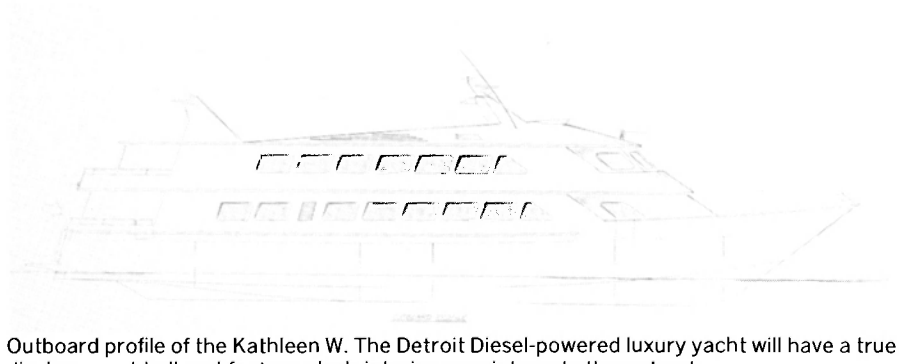
The luxury yacht Kathleen W. will be able to seat 150 diners on the 60-foot by 27-foot second deck. This and the other two levels will be decorated with suede walls and ceilings and complemented by beveled mirrors, gold mylar blinds, and plush carpeting.

The first deck will include a large lounge with European furnishings, bar, disco with dance floor, and full-size galley. The dance floor, which will be above the engine room, will be lined with lead and overlaid with parquet wood floorings.

Other sound dampening throughout the boat will include vibration isolators, acoustical insulation, lead shielded insulation in the engine room, and extra sound dampeners for the boat's exhaust system which will exit through an open dry stack atop the rear quarter.

The three staterooms below the main deck, one of which is 26 feet by 15 feet, will be furnished with king-sized beds, and marble showers and heads. This level will also have accommodations for four crew members.

The Kathleen W. will be cooled by 25 tons of air conditioning supplied by Lemoine Marine Refrigeration Inc., and powered by two Detroit Diesel 1671NA diesel engines supplied by George Engine. Her hull will draw only five feet to navigate the shallow canal depths in the Ft. Lauderdale area.



Outboard profile of the Kathleen W. The Detroit Diesel-powered luxury yacht will have a true displacement hull and feature plush interior appointments throughout.

Other equipment on the Kathleen W. includes two Columbian Bronze propellers; two Cummins generators, 75 kw each, supplied by Cummins Mid South, Metairie, La.; Twin Disc 518 reduction gears; and Seamaster bowthruster supplied by C. L. Assoc. of Ft. Lauderdale, Fla. The complete electronics package was supplied by Rich Electronics of Ft. Lauderdale, Fla.

Aluminum Boats president **Salvador Guarino** said the Kathleen W. is the largest boat ever built by Aluminum Boats, Inc., and possibly the largest of its type built in Louisiana.

For free literature giving full information on the facilities and capabilities of Aluminum Boats, Inc.,

**Circle 18 on Reader Service Card**

## Free New Color Brochure Features Dampa Products

Dampa Inc. of Hunt Valley, Md., recently published a new brochure, "An Ocean of Possibilities," which is designed to give an overall impression of Dampa, and also an idea of the possibilities available to customers through Dampa.

In addition to their traditional product, ceilings, Dampa now is able to supply complete and complex joiner and HVAC packages. Discussed in the publication are such Dampa products as bulkhead panels and floating floors, ceilings and lightings, doors, wet space modules, HVAC systems, and furniture and accessories.

Also included are color photographs of the interiors of showroom cabins and photos from some of the many vessels now in service worldwide which have been outfitted with Dampa-supplied materials.

For more information and a free copy of the new color brochure from Dampa,

**Circle 71 on Reader Service Card**

## U.S. Opens Port Of Coos Bay To Polish Ship Repairs

The U.S. Government, pushed by Senator **Bob Packwood** (R-OR) and Congressman **Peter DeFazio** (D-OR), in concept, has given permission on a "case-by-case" basis for Polish fishing vessels operating off the Pacific Northwest coast to enter the International Port of Coos Bay for long-term repairs and drydocking service.

**Frank Martin,** general manager of the International Port of Coos Bay said, "The agreement gives us the opportunity to bid on $22 to $24 million in annual maintenance of Polish fishing vessels that ply American waters. The Congressional teamwork that led to this decision is greatly appreciated by this region."

Currently, as many as 24 midwater fishing vessels operate in the Polish North American fleet. Because drydock facilities in Coos Bay remain closed to the Polish vessels, this works is now being performed in Vancouver, British Columbia at a cost roughly 30 percent higher than the cost at Coos Bay.



## American Welding Society Announces Spring Welding Education Seminar Series

The American Welding Society has announced that its spring 1988 Welding Education Seminar Series of six seminars will be presented between January 11, 1988 and April 8, 1988, in 16 cities around the country. In addition, four special Seminar/Certified Welding Inspector Testing Events have been announced.

The topics in the Welding Education Seminar Series are: AWS D1.1 Steel Code Clinic; Welding Inspection Technology Seminar; Practical Inspection Clinic; Welding Structural Design; Maintenance and Repair Welding; and Welding and Cutting Processes.

Locations for these seminars are: Albuquerque, N.M.; Dallas; Atlanta; Houston; San Francisco; Charlotte, N.C.; Tampa, Fla.; Washington, D.C.; Denver; Schenectady, N.Y.; Portland, Ore.; Providence, R.I.; Somerset, N.J.; Salt Lake City; Cleveland; and Chicago.

The Special Seminar/CWI Testing Events will be held in San Diego, New Orleans, Atlantic City, N.J., and Phoenix in May 1988. Applications are due by April 4, 1988.

Complete schedules as well as registration and accommodations information are available from the Education Department, American Welding Society, 550 N.W. LeJeune Road, P.O. Box 351040, Miami, Fla. 33135. Phone: (305) 443-9353 or 1 (800) 443-9353. In Florida, call 1 (800) 423-9353.



## Smith Appointed VP-Marketing & Sales At WATERCOM®

John G. Smith

According to a recent announcement, **John G. Smith** has been appointed the new vice president of marketing and sales at Waterway Communications System Inc.

In his new position at the Jeffersonville, Indiana-based company, Mr. **Smith** will be responsible for directing efforts of the WATERCOM sales staff. WATERCOM is a direct-dial telephone service developed for the marine industry by the company.

Mr. **Smith,** who has 14 years of sales and marketing experience, most recently served as director of marketing at ITT Mackay Marine.

## China Shipbuilding To Build 2 Containerships

China Shipbuilding Corporation, Kaohsiung, Taiwan, recently received a contract from Orient Overseas Container Lines Ltd. for the construction of two containerships.

Reportedly, the ships will have capacities equivalent to 3,000 TEUs and service speeds of 24 knots.

The deliveries of the vessels are scheduled for April and June 1989.

The amount of the contract was not disclosed.

## Norton Lilly Names Bohlman Assistant VP

Robert T. Bohlman

Norton Lilly International has promoted **Robert T. Bohlman** to assistant vice president. He will maintain operational and administrative responsibilities for the Pacific Northwest and northern California territories for all Norton Lilly activities and subsidiaries, based at the West Coast headquarters in Federal Way, Washington. Mr. **Bohlman** has served with Norton Lilly in various capacities for more than 15 years.

## Combustion Engineering And Icad Announce Joint Market Agreement

Icad Inc., one of the leading suppliers of knowledge-aided engineering systems for mechanical design and manufacturing, recently announced a joint market development agreement with Combustion Engineering of Windsor, Conn. Combustion Engineering will use Icad systems to develop engineering automation applications for end users or consulting engineering firms in the power generating, process, pulp and paper, and waste disposal industries. The systems developed under the agreement will help users and consultants design production plant equipment more quickly than they could using conventional manual or computer-aided design systems, and help them reduce their development costs.

Combustion Engineering is a major supplier of engineered products and services to the marine, power generating, process, pulp and paper, and waste disposal industries.

For free literature giving full information on Combustion Engineering,

**Circle 12 on Reader Service Card**

## Video Describes Port Design Process And Use Of Simulation

The application of real-time and fast-time simulation to port design problems is illustrated by a 20-minute videotape produced by Marine-Safety International (MSI), privatized operator of the Computer-Aided Operations Research Facility (CAORF) at the National Maritime Research Center in Kings Point, N.Y.

The video outlines the problems faced by ports in efficiently and safely handling today's larger ships. Three examples are discussed: The Panama Canal, Oakland Harbor and Tampa Bay. The role of simulation in helping to solve the problems faced each of these areas is discussed and illustrated.

Task flow diagrams for desk-top studies, fast-time simulations, and man-in-the-loop real-time simulations are described and compared.

The videotape is available for free loan by calling Capt. **John Townley** at (516) 773-5602, or writing to MSI/CAROF, U.S. Merchant Marine Academy, Kings Point, N.Y. 11024.

For free literature giving full information on MSI/CAROF,

**Circle 73 on Reader Service Card**

## Coast Guard Certifies First Passenger Sub

The U.S. Coast Guard recently certified the first passenger-carrying submarine, the 65-foot Atlantis III, under Sub-chapter T of the rules and regulations for small passenger vessels. The certification of the vessel, which was built by Sub-Aquatics Development Corporation, required unique adaptations to the rules.

The adaptations have produced guidelines that are expected to help simplify certification for additional submarines.

## Peter Palladino Joins SPD Technologies As Project Engineer

Peter J. Palladino

**Peter J. Palladino** has joined SPD Technologies as project engineer responsible for the company's advanced new computerized battery monitoring systems.

Prior to joining the Philadelphia-based producer of electrical systems protection equipment, Mr. **Palladino** had been engineering manager for Megatran Electronic Power, Bordentown, N.J., where he was responsible for design and development of microprocessor based control systems.

## Thomson-Gordon Supplying Rudder Bearings For Large Single-Screw Motorships

A contract to supply rudder bearings for the largest single-screw motorships in the world was recently placed with Thomson-Gordon Limited of Burlington, Ontario, Canada.

Worth over $76,000, the rudder bearings are to be installed on the five 3,800-TEU-capacity container vessels being built for American President Lines at the HDW shipyard in Kiel, West Germany. Measuring 869 feet by 129 feet, each ship is designed with two rudder bearings.

Cast from Thordon SXL elastomeric polymer-alloy material, the bearings are among the largest ever made by Thomson-Gordon.

For more information and free literature on Thomson-Gordon products,

**Circle 49 on Reader Service Card**

## Hägglunds To Acquire Dutch Crane Group

Hagglunds Marine & Offshore, a division of AB Hagglund & Soner of Sweden, has signed an agreement under which it will acquire all the shares in the Dutch Kenz Cranes Group.

Kenz Cranes is among the leading makers of offshore cranes in the range 5-100 t SWL. The group, which has about 60 employees at factories at Zuiddijk in the Netherlands and Great Yarmouth in England, has annual sales of approximately $5 million.

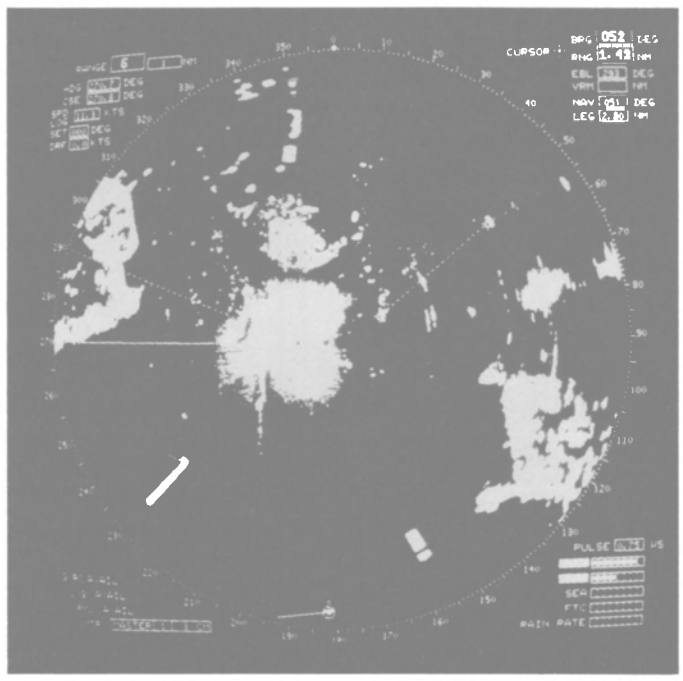
The takeover creates interesting opportunities for Kenz Cranes through access to Hagglunds' worldwide sales organization. The pooling of the technical resources and experience of the two enterprises will also strengthen their competitive position.

The activities of Hagglunds' marine and offshore subsidiary in the Netherlands, ASEA Hagglunds, will be integrated with Kenz Cranes. Hagglunds' service to shipping in Rotterdam will continue as before.

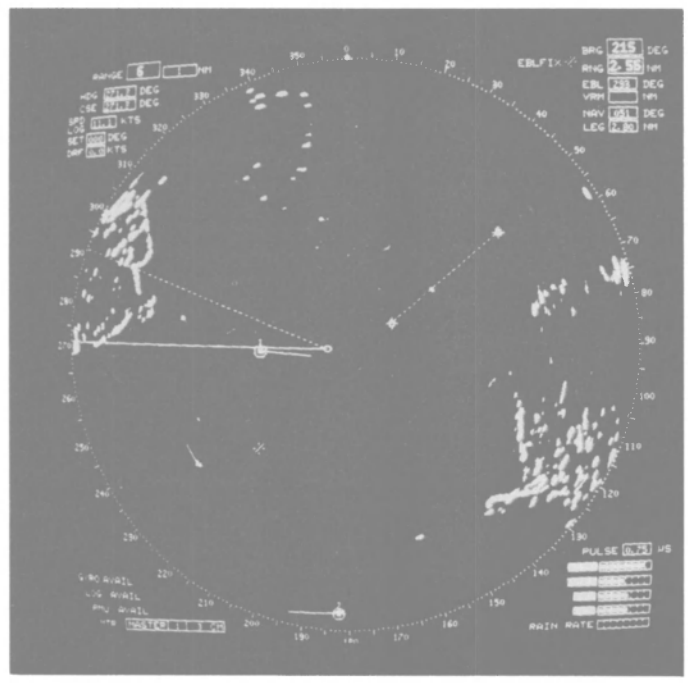
Hagglunds Marine & Offshore Division is one of the world's leading manufacturers of deck cranes. The acquisition of Kenz Cranes secures a corresponding position in the market for offshore cranes.

For further information and free literature,

**Circle 53 on Reader Service Card**



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



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

## 5 Canadian Consortiums Contend For $5-Billion Domestic Sub Project

Five Canadian consortiums recently submitted letters of interest to the Canadian Ministry of National Defense in order to enter into the bidding for a $5-billion contract to build nuclear submarines under a new program.

The Canadian consortiums that expressed interest were: CSE Submarines Group, Inc., of Toronto; Lavalin Inc. of Montreal; Marine Industries Ltd. of Montreal; Marine Industries Ltd. of Montreal; Paramax Electronics Inc. of Montreal; and St. Johns Shipbuilding, St. Johns, New Brunswick.

At present, the Canadian government is in the process of evaluating submarine designs for the 10- to 12-vessel project. So far, the British Trafalgar Class and French Rubis/Amethyste Class submarines are the only contenders.

According to Canadian Minister of Defense **Perrin Beatty,** the majority of the work and equipment will be supplied by domestic companies.

However, he noted that it was not the intention of the Canadian government to exclude any industry, including American, which offered a useful and competitive project.

The selection of the builder for the new Canadian nuclear submarine is expected to be finalized in 1990.

## General Motors-EMD Appoints John Archer

John R. Archer

The appointment of **John R. Archer** as director of quality and product assurance of the Electro-Motive Division (EMD) of General Motors was announced recently by **Clifford J. Vaughan,** GM vice president and general manager of EMD.

In addition to his responsibilities with Electro-Motive Division, Mr. **Archer** will have coordinating responsibility for the locomotive quality and product assurance activities of Diesel Division, General Motors of Canada, Ltd.

## Ceramic Coatings Approved By ABS For Diesel Engine Use

The American Bureau of Shipping issued a Certificate of Approval to Turbine Components Corporation of Branford, Connecticut, on June 17, 1987. A.B.S. has surveyed T.C.C.'s facility and reviewed the process, specifications, and quality assurance program for the application of a unique ceramic thermal barrier coating on various diesel engine components. The thermal barrier coating consists of a metallic bond coat and a ceramic top coat of yttria stabilized zirconia.

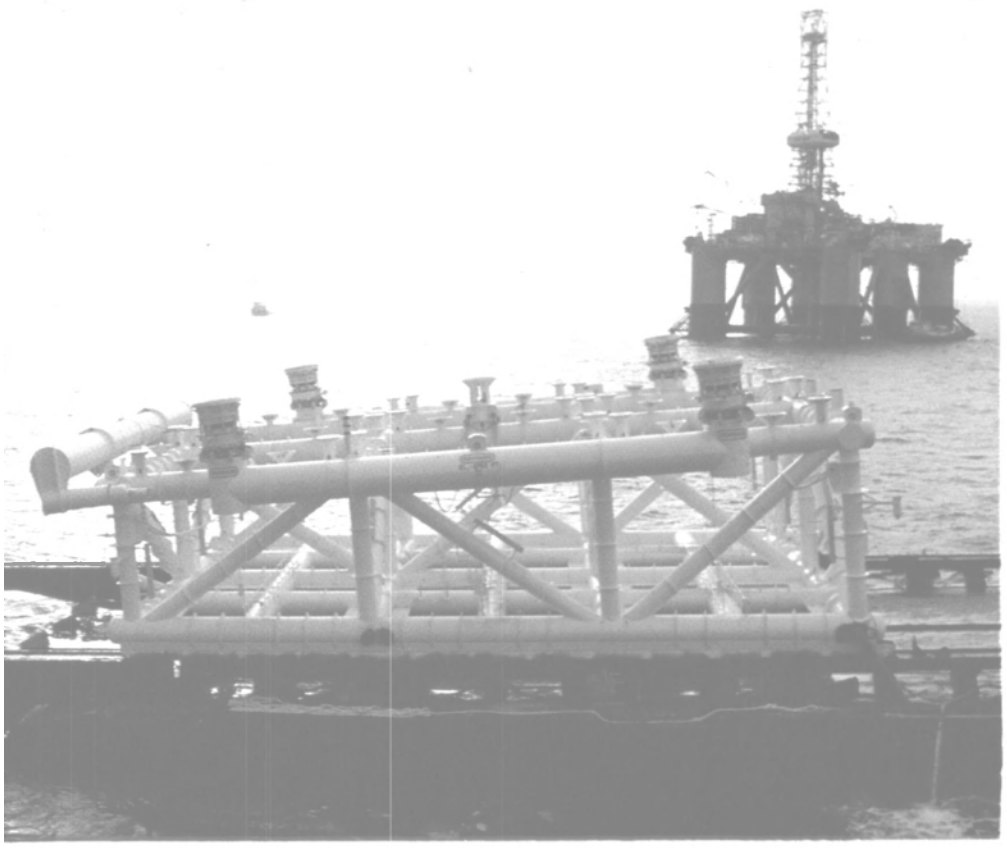
Tubrine Components Corporation was established in 1970 to provide gas turbine engine users with specialized repair and coating of turbine blades, vanes, and other components. Turbine Components Corporation was a pioneer in improving the maintenance of gas turbine components with ceramic coatings and holds F.A.A. license number 119-20. Now, Turbine Components Corporation has decided to offer this unique ceramic protection for diesel engine components.

Diesel engines coated with T.C.C.'s ceramic thermal barrier have demonstrated, during actual commercial operation, reduced fuel consumption, reduced ignition delay, and smoother, cleaner combustion.

Turbine Components Corporation guarantees its ceramic coatings not to peel, flake, or come off during normal operation.

For free literature giving complete details from Turbine Components Corporation,

**Circle 102 on Reader Service Card**



# 7th International Symposium

# Offshore Mechanics And Arctic Engineering

## Houston, Texas, February 7-12

The seventh international symposium and exhibit on Offshore Mechanics and Arctic Engineering, OMAE '88, sponsored by the American Society of Mechanical Engineers (ASME), Offshore Mechanics and Arctic Engineering Division, will be held at the Adam's Mark Hotel, Houston, Texas, February 7-12, 1988.

This year the conference will feature several special symposia: "The First International Symposium on Offshore and Arctic Materials Technology; the First International Pipeline Symposium; and the First International Symposium on Computers in Offshore and Arctic Engineering. Also scheduled are sessions on "The Offshore Outlook—1988," "Pipeline Industry Outlook—1988," "Pipeline Construction," and "Pipelines on Unstable Grounds."

The OMAE '88 program features more than 70 sessions that present recent international developments and the review of frontier technologies in offshore mechanics and technology, arctic engineering and technology, pipelines, materials technologies, computer technology, and ocean energy technology.

The conference opens with the panel session "Offshore Outlook—1988," with top experts presenting important worldwide projects. It is followed by seven panel and state-of-the-art review sessions of international experts, in addition to authoritative review papers.

On Tuesday, February 9 at noon, **Alessandro Andreani,** executive vice president and managing director, Saipem, Milan, Italy, and president, International Pipe Line Contractors Association, will deliver a keynote luncheon address on "International Pipeline Transportation Projects.'" Mr. **Andreani** will provide an authoritative review on the international pipeline projects, their role as political stabilizing factors, and pipelines' versatility and efficiency will be presented.

On Wednesday, February 10 at noon, a second keynote address will be presented by **Dennis E. Gregg,** general manager, International Production, Conoco Inc., Houston, Texas, and past president, the Society of Petroleum Engineers. The title of the keynote speech is "Deep Water Without Deep Pockets." Mr. **Gregg** will discuss opportunities for both new concepts and hard-nosed application engineering in the deep-water oil exploration market.

In all, about 350 papers, each manuscript reviewed by recognized specialists and revised prior to final acceptance, will be presented by researchers, engineers, managers and other industry personnel representing over 30 countries.

The annual international OMAE conference will once again be holding one of the largest annual technical programs with refereed papers in these fields in the world. The conference is organized by the International OMAE Conference Committee, which is chaired by Dr. **Jin Chung** of the Colorado School of Mines, and the American Society of Mechanical Engineers (ASME)-Offshore Mechanics and Arctic Engineering Division and is sponsored by 23 international engineering societies and associations. The technical exhibition is sponsored by the OMAE Council.

ASME is a technical and educational organization with over 117,000, including 23,000 students. It conducts one of the world's largest technical publishing operations, holds more than 30 technical conferences each year, and sets many industrial and manufacturing standards.

OMAE Conference chairman Dr. **Chung** announced that OMAE Europe 1989 would be held in Genoa, Italy, April 2-7. The abstract deadline for OMAE '89 is April 20, 1988. Those interested in submitting abstracts, or learning more about OMAE '89, contact: Dr. **Jin Chung,** OMAE Conference Committee, 12757 West 57th Drive, Arvada, Colo. 80002-1301; telephone: (303) 273-3673; or telex: 910-934-0190 CSM GLDN.

**OMAE '88 Exhibitors**

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## OMAE PREVIEW

(continued)

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BOLIDT
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Earth Technology, The
Engineered Software
Engineering Cybernetics
Engineering Design Automation
Gripper
Heriott-Watt University
Industrial Systems
Kawasaki Steel
Kongsberg Albatros
Moody Tottrup International
Nansen Remote Sensing Center
Novacorp International Consulting
Productoro Mexicana de Tuberia
RETSCO/Quaker Chemical
Seaflo Systems
Seimac
Springer-Verlag
Structural Analysis
Submar
Trade Abed
TV Ferret
UE Systems
United Overseas Technology

**SESSION SUMMARY TABLE**

**Special and Panel Sessions:**

| | | |
|---|---|---|
| 1. | *Offshore Outlook - 1988 | Mon 9 a.m. |
| 23. | *Pipeline Industry Outlook - 1988 | Tue 2 p.m. |
| 3. | *Northern Pipelines on Unstable Grounds | Mon 9 a.m. |
| 43. | *Offshore Pipeline Constructions | Wed 2 p.m. |
| 33. | *Codes and Materials Specifications | Wed 9 a.m. |
| 13. | *Arctic Research Programs | Tue 9 a.m. |
| 70. | *Fracture Mechanics in Offshore Industry | Thu 2 p.m. |
| | *Fracture Control and LBZ (Local Brittle Zone) | Tue - Thu |
| 2. | *3-D Graphics | Mon. 9 a.m. |

**Offshore Mechanics/Technology (25 sessions):**

| | | |
|---|---|---|
| 1. | Offshore Outlook - 1988 | Mon 9 a.m. |
| 15. | Compliant Structures I | Tue 9 a.m. |
| 25. | Compliant Structures II | Tue 2 p.m. |
| 5. | Floating Production System | Mon 2 p.m. |
| 53. | Drilling and Systems | Thu 9 a.m. |
| 65. | Flexible Pipes | Thu 2 p.m. |
| 36. | Marine Risers I | Wed 9 a.m. |
| 46. | Marine Risers II | Wed 2 p.m. |
| 16. | Geotechnical Engineering I. Geotechnical | Tue 9 a.m. |
| 26. | Geotechnical Engineering II. Foundation | Tue 2 p.m. |
| 6. | NDT and Ultrasonic Inspection | Mon 2 p.m. |
| 48. | ROV | Wed 2 p.m. |
| 35. | Ocean Waves I | Wed 9 a.m. |
| 45. | Ocean Waves II | Wed 2 p.m. |
| 44. | Flow-induced Vibrations | Wed 2 p.m. |
| 54. | Motions of Floating Structures I | Thu 9 a.m. |
| 63. | Motions of Floating Structures II | Thu 2 p.m. |
| 34. | 2nd Order Effects and Slow Drift | Wed 9 a.m. |
| 4. | Hydrodynamic Forces I | Mon 2 p.m. |
| 14. | Hydrodynamic Forces II | Tue 9 a.m. |
| 24. | Hydrodynamic Forces III | Tue 2 p.m. |
| 57. | Structural Mechanics/Analysis I | Thu 9 a.m. |
| 66. | Structural Mechanics/Analysis II | Thu 2 p.m. |
| 56. | Underwater Cables & Mooring | Thu 9 a.m. |

**OMAE Pipeline Symposium (14 sessions):**

| | | |
|---|---|---|
| 23. | Pipeline Industry Outlook - 88 | Tue 2 p.m. |
| 3. | Northern Pipelines on Unstable Grounds | Mon 9 a.m. |
| 43. | Pipeline Constructions | Wed 2 p.m. |
| 9. | Pipeline Loads and Dynamics I | Mon 2 p.m. |
| 19. | Pipeline Loads and Dynamics II | Tue 9 a.m. |
| 29. | Pipeline Loads and Dynamics III | Tue 2 p.m. |
| 58. | Pipeline Design | Thu 9 a.m. |
| 38. | Pipeline Testing & Monitoring | Wed 9 a.m. |
| 18. | Measurements of Pipeline Leak Detection | Tue 9 a.m. |
| 59. | Multiphase Flows | Thu 9 a.m. |
| 39. | Pipleine Materials I | Wed 9 a.m. |
| 49. | Pipeline Materials II | Wed 2 p.m. |
| 68. | Underwater Pipeline Operations | Thu 2 p.m. |
| 67. | Arctic Pipelines | Thu 2 p.m. |

**OMAE Materials Technology Symposium (16 sessions):**

| | | |
|---|---|---|
| 70. | Fracture Mechanics in Offshore Industry | Thu 2 p.m. |
| 33. | Codes and Materials Specs | Wed 9 a.m. |
| 21. | Fracture Mechanics Analysis | Tue 9 a.m. |
| 31. | Fracture Control and LBZ I | Tue 2 p.m. |

| | | |
|---|---|---|
| 41. | Fracture Control and LBZ II | Wed 9 a.m. |
| 51. | Fracture Control and LBZ III | Wed 2 p.m. |
| 61. | Fracture Control and LBZ IV | Thu 9 a.m. |
| 12. | Advances in Welding Technology | Mon 2 p.m. |
| 22. | Weldability of Offshore and Arctic Steels | Tue 9 a.m. |
| 42. | Fatigue Analysis and Design I | Wed 9 a.m. |
| 52. | Fatigue Analysis and Design II | Wed 2 p.m. |
| 28. | Tubular Joints | Tue 2 p.m. |
| 11. | Advanced Composites | Mon 2 p.m. |
| 32. | Concrete and Structures | Tue 2 p.m. |
| 71. | Structures and Corrosion | Thu 2 p.m. |
| 62. | Stainless Steel and Aluminum | Thu 9 a.m. |

**OMAE Computer Technology Symposium (6 sessions):**

| | | |
|---|---|---|
| 2. | 3-D Graphics | Mon 9 a.m. |
| 7. | Robotics/Systems Control | Mon 2 p.m. |
| 17. | CAE and CAD | Tue 9 a.m. |
| 27. | Computer Systems | Tue 2 p.m. |
| 37. | Expert System II. Analysis and Design | Wed 9 a.m. |
| 47. | Experts System I. Design and Manufacturing | Wed 2 p.m. |

**Arctic Engineering/Technology (10 sessions):**

| | | |
|---|---|---|
| 13. | Arctic Research Programs | Tue 9 a.m. |
| 10. | Ice Properties I | Mon 2 p.m. |
| 20. | Ice Properties II | Tue 9 a.m. |
| 40. | Applied Ice Mechanics | Wed 9 a.m. |
| 50. | Ice Forces I | Wed 2 p.m. |
| 60. | Ice Forces II | Thu 9 a.m. |
| 69. | Ice Forces III | Thu 2 p.m. |
| 30. | Ice Drift and Dynamics | Tue 2 p.m. |
| 55. | Arctic Drilling/Thermal Design I | Thu 9 a.m. |
| 64. | Arctic Drilling/Thermal Design II | Thu 2 p.m. |
| 67. | Arctic Pipelines* | Thu 2 p.m. |
| 3. | Pipelines on Unstable Grounds* | Mon 2 p.m. |
| 22. | Arctic Steels* | Tue 9 a.m. |

| | | |
|---|---|---|
| 8. | **Ocean Energy and Resources** | Mon 2 p.m. |

## Port of Los Angeles Announces Promotions

Port of Los Angeles executive director **Ezunial Burts** has announced the promotions of two port employees to the position of chief harbor engineer.

Appointed chief harbor engineer effective March 28, 1988, is **Vernon E. Hall** who has been serving as a project manager in the engineering division of the port since 1980. He will be in change of engineering and will replace **Ed Gorman** who has announced his retirement June 30, 1988.

Appointed to a new position of chief harbor engineer and assigned as the director of construction management is **Bruce E. Seaton,** who has been the assistant director of construction management since 1983.

## Joint Shipping Venture Formed By OMI Corp. And The East Asiatic Company

OMI Corp. of New York, N.Y., a major U.S. bulk shipping company, recently announced the formation of a joint shipping venture with The East Asiatic Company Ltd. A/S (EAC), Copenhagen, a Danish international group of companies with significant interests in bulk shipping.

The new jointly owned company, called Rubicon Tankers Ltd. (RTL), has acquired from EAC an 80,000-dwt product carrier newbuilding, Panda, recently delivered from the 3. Maj shipyard in Yugoslavia. RTL will shortly acquire from OMI two 1976-built 39,000-dwt petroleum product carriers, Ottawa and Saguenay. RTL plans to pursue further opportunities for expansion in the international product tanker market.

# Marine coatings & corrosion control

Manufacturers of marine coatings and other corrosion-fighting systems continue to improve their products and services, with emphasis on reducing costs, both of the products and their application, and by extending drydocking times.

The editors of MR/EN asked the following major suppliers of marine coatings and other corrosion-control products and services to tell us about their latest and most important products and capabilities. The review that follows is based upon the replies received at press time.

**FOR MORE INFORMATION**

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

## AMERON MARINE

**Circle 57 on Reader Service Card**

Within the last year, Ameron Marine Coatings Division, Ameron, Inc. of Monterey Park, Calif., has introduced a new high-solids, high-build urethane coating for marine and offshore applications. Called Amershield™, it is a multifunctional product offering many important features, including long-term color and high gloss retention, outstanding resistance to abrasion and flexing, plus excellent resistance to direct and reverse impact. It also provides good resistance to chemicals and staining.

Amershield provides an excellent barrier coating and can be applied without a primer to clean, blasted, galvanized or phosphated steel, and to many other substrates including aluminum. It can also be used as a refresher coat over intact, old paint, or as a finisher coat over a high-performance anticorrosion system such as Amerlock® 400, Ameron's high-solids, high-build epoxy coating.

Many areas of marine structural steelwork can benefit from the versatile, durable protection offered by Amershield, including offshore platforms, barges and the superstructures, decks, topsides and boottops of ships. It is also an ideal coating for dry cargo holds, and the combined Amerlock/Amershield system has recently been awarded the North of England Industrial Health Service's Certificate of Approval for the carriage of grain cargoes.

Amershield can be applied simply and easily using standard conventional, airless and electrostatic spray equipment or, because of the product's good flow characteristics, by brush or roller.

Amershield is also an environmentally acceptable product, more than meeting the U.S.'s stringent EPA VOC requirements.

## CHESTERTON

**Circle 10 on Reader Service Card**

Chesterton High Temperature Metal Repair System, consisting of three products formulated for the toughest marine environments, particularly high heat, extreme corrosion and wear, has been introduced by Chesterton's Technical Products Division.

The three products—#910 High Temperature Steel Putty, #952 High Temperature Super Abrasion-Resistant Putty and #958 High Temperature Abrasion Control Putty—are in two components. They can be applied to surfaces or new equipment to protect against damage, exposure to erosion, corrosion and abrasion, or to rebuild and protect damaged equipment.

To be effective, all three must be heat-cured before being placed in service. External heaters are sufficient, as well as the heat generated by the equipment to which it is to be applied. Unlike conventional two-component products, the properties of these products will not improve in time without the application of heat.

Once the heat cure cycle is completed, full physical and chemical properties are restored. Equipment can immediately be put back into service without awaiting maximum properties. Equipment can be operated continuously in temperatures up to 450 degrees F after heat curing, and the products will retain more than 75 percent of their original hardness. Subsequently, hardness will be restored fully, to 100 percent of the original.

Chesterton's #910 High Temperature Steel Putty is a metal-filled product designed for applications in which corrosion resistance is more important than resistance to erosion impact or abrasion. Its chemical resistance is high, and it will not rust or corrode. #910 is readily machinable, and can be applied in a smooth finish. It stays in place during application to vertical surfaces with minimal sag.

The company's #952 High Temperature Super Abrasion-Resistant Putty is a rough textured product with a high concentration of ceramic beads. It is not machinable because of its highly abrasion-resistant properties. Chemical resistance of the product is high.

Chesterton's #958 High Temperature Abrasion Control Putty produces a smooth wear-resistant finish. It is especially useful in fluid flow applications, in which a smooth finish is essential to minimize cavitation and enhance efficiency. The product is effective in protecting against erosion, corrosion and chemicals. Chesterton's #958 can be machined, but diamond-tipped tools are recommended.

## DEVOE MARINE

**Circle 11 on Reader Service Card**

Devoe Marine Coatings Co., a division of Grow Group, Inc., continues to offer unique, high technology solutions to the fouling and corrosion problems of the marine industry.

Devoe Marine developed ABC® #3 Tin-Free Ablative Antifouling which provides the shipowner the long life antifouling properties, reduced drag resistance, hull smoothing, fuel and maintenance savings previously associated with the TBT self-polishing copolymers without utilizing TBT. ABC #3 has been applied to over 200 vessels covering millions of square feet of underwater hulls in applications ranging from tugs to tankers and aircraft carriers to nuclear submarines. The company reports that nearly five years in-service experience with ABC® #3 Tin-Free Ablative Antifouling has established performance which equals or exceeds that of the TBT copolymers.

Of ever-mounting significance is the owner's requirement to protect substrates economically without downtime and costs associated with abrasive blasting. Bar-Rust™ 235, a New Technology Epoxy, is specifically designed to meet this need and is intended for application over tight rust. Required surface preparation is Swedish Standard D St 2 for non-immersion service and D St 3 for immersion service. Bar-Rust™ 235 is capable of being applied and will cure at temperatures below freezing. The cured paint film provides a permanent, hard epoxy lining with outstanding seawater resistance. Bar-Rust™ 235 was designed for use in nearly every possible marine application where abrasive blasting is impossible, impractical or too costly—ballast tanks, voids, potable water tanks, dry food spaces, cargo holds, bilges and vessel exterior areas both above and below the waterline. Bar-Rust™ 235 is a product with a proven track record which has successfully protected over sixty million square feet of marine vessels.

In 1984, Rensselaer Polytechnic Institute, under the sponsorship of the U.S. Maritime Administration, evaluated rust compatible coatings for marine applications. Results of the tests showed Bar-Rust™ 235 to be superior to all of the coatings tested.

Noxious fumes and flammable solvents can pose hazards when painting interior spaces in either maintenance or new construction situations. Furthermore, many governmental agencies are exhibiting increased concern regarding solvent emissions and are requiring VOC (Volatile Organic Compound) compliant coatings. In answer to these problems, Devoe developed its Devflex product line of fire-retardant, water-based enamels. Devran® 258 and Devran® 259, a water-based epoxy system which can be utilized on the vessel exterior or in certain tank applications also addresses safety and environmental concerns. Additionally, a line of 100% solids products are available.

Aged recoatability of coatings has been a long-standing problem in the marine industry. In many instances, a vessel owner must sand sweep the existing coating in order to recoat the vessel during drydock periods. Devoe Marine developed a water-based cleaner, Devprep #88, which may eliminate the need for grit sweeping, solvent wiping or sanding an existing, intact painted surface prior to recoating. In many applications, all that is necessary to properly prepare the aged surface is to apply Devprep #88 followed by a high pressure water wash and application of the top coat. It is biodegradable and contains no phosphates, halogens, solvents or distillates.

## DREW CHEMICAL

**Circle 12 on Reader Service Card**

Drew Chemical Corporation, Boonton, N.J., manufactures Magnakote™ rust-preventive compound for ballast tank protection intended to economically and effectively control corrosion of ballast tanks. Magnakote can be described as an inorganic-organic complex that forms a platelet, crystalline structure similar to fish scale. These platelets, being polar in nature, function by being attracted to the metal to form a thin but a dense and tightly adhering coating that provides an effective barrier to corrosion by maintaining an extremely low rate of vapor transmission.

The active corrosion-preventive materials in Magnakote™ rust preventive compound are carried in a matrix that includes a "gelling" oil, making the final coating even more effective. Because there are no solvents to evaporate, the coating is 100 percent active. It is thermally stable, has no offensive odors, has low toxicity, and has a high flash point for safety in application. It is not required that Magnakote be completely removed to make mechanical repairs; only the area where the work is to be done will require local cleaning.

Drew Chemical also markets Protecsol™-100 seawater corrosion inhibitor, a liquid blend of organic and inorganic corrosion inhibitors specifically developed for the protection of ballast tanks filled during lay-up with seawater. It forms a passivating film on ballast tank surfaces that protects the steel from corrosion. This film remains even

corrosion. This film remains even when the ballast is discharged.

The rust-retarding qualities of Protecsol-100 have been found to be outstanding when based on tests by a leading independent laboratory specializing in marine corrosion studies. Exposure of steel to a Protecsol-100 solution provides protection that remains even after the inhibited solution is replaced by uninhibited water. The solution contains no chromates, nitrites, or organo-nitrogen compounds.

## ELECTROCATALYTIC

**Circle 15 on Reader Service Card**

Chloropac™ and Capac™ systems manufactured by Electrocatalytic are recognized leaders in marine applications. Both products are offered in a complete range of capacities to meet the needs of commercial and military use. After sales needs are fulfilled by worldwide, factory stocked service centers, manufacturing licensees and service representatives.

Chloropac installations control the complete range of marine growth—from bacteria and slime to barnacles and mussels. Marine operators select Chloropac to eliminate downtime for cleaning and improve heat transfer. Now studies show that eliminating bacteria reduces corrosion—a further benefit in both reduced maintenance and extended service life.

Capac has introduced a new corrosion control anode for high pressure or deep submergence (DS). Utilizing proven military concepts, this DS design incorporates wrought platinum clad on a niobium substrate. The anode is mounted either flush or recessed into the structure. Once the gland is welded in place the anode can be replaced while the structure is submerged.

DS anodes were initially installed on offshore oil production platforms. The diver serviceable (DS) feature of the anode is highly preferred when damage to the anode is likely. Therefore, icebreakers now utilize the DS design as well. Other ship and rig operators have specified DS for their applications, since the diver serviceable feature assures 100% cathodic protection capacity without delay and cost of drydocking.

Electrocatalytic is a world leader in providing equipment and service, to the marine field, which protect the user's investment and offers cost saving alternatives to historical technology.

## HEMPEL'S

**Circle 54 on Reader Service Card**

Hempel's Marine Paints Ltd. recently introduced Uniprimer 1385, a one-coat primer which can be used on all areas of a ship above the waterline.

Uniprimer 1385 is the latest product to be added to Hempel's "Maintenance-Made-Easy" program.

The other two products currently in the program are Hempel's "two-primer and finish in one coat—and Hempel's Multi-Mil system which combats pitting in cargo tankers.

Hempel's Uniprimer 1385 provides excellent corrosion protection on hand-prepared surfaces, dries rapidly and provides a sound fabrication for a wide range of top coats.

According to the company, Uniprimer reduces costs to a shipowner because it is the only onboard primer an owner may need for any area of a ship except below waterline, thus making it unnecessary to stock different primers. Also, the risk of mixing incompatible paint systems is eliminated.

Hempel's "Maintenance-Made-Easy" program is being backed by new "tailor-making" maintenance posters and manuals, designed for each individual ship.

Through computerization, tailor-made manuals and posters can be produced for each individual ship type, including variations depending on the main engine type the ship is equipped with.

For each area of the ship (14 areas) the individual maintenance specification to be used is given in these manuals and posters. In addition, the manuals give individual user instructions for each paint system.

Tailor-making of this sophistication has been made possible through

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## Coatings Review

(continued)

the development of a special computer program. Within minutes, Hempel's office can prepare an individual poster and manual for an individual ship as the program includes all conceivable combinations of Hempel's maintenance systems.

The "Maintenance-Made-Easy" program and the introduction of computerized maintenance posters and manuals are all part of the Hempel's Service Concept, first introduced in May of last year.

In addition to the posters and manuals, a videotape has been produced in which guidelines are given on the correct on-board applications of the paints.

### INTERNATIONAL PAINT

**Circle 51 on Reader Service Card**

The exceptional and predictable levels of performance achieved by Intersmooth and Interswift self-polishing copolymer antifoulings are well proven. The use of tributyltin (TBT) biocides plays a critical role in achieving this performance. International Paint expects its copolymer products to meet the proposed EPA environmental recommendations.

However, in the light of existing and proposed legislation covering the use of TBT antifoulings International Paint has developed a new range of TBT free antifoulings based on controlled depletion polymer technology.

This new range of antifoulings—Interclene BRA540 Series—has been used by the U.S. Navy for several years and is now available in the commercial sector.

BRA540 Series antifoulings offer better performance than traditional long-life and conventional antifoulings, and the best performance next to TBT type antifoulings.

Application of BRA540 Series antifoulings over existing antifoulings is possible, but is dependent on the coatings history of the vessel and the coating condition at drydocking.

Red and black versions of this antifouling are currently available.

### JOTUN VALSPAR

**Circle 14 on Reader Service Card**

Jotun Valspar is the Marine Division of the Valspar Corporation, which is one of the largest manufacturers of coatings in the U.S. Within the past two years, Valspar has acquired Mobil's North American Coatings Division, Farboil Marine Coatings, and Jotun A/S North American Marine Coatings business. These recent acquisitions are now identified as Jotun Valspar.

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 epoxy tank linings, which are cured or converted by a reaction catalyst at atmospheric temperatures. Sovapon has been applied to liquid cargo tanks, and/or 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 with Jotun Valspar's line of zinc coatings are a variety of products based on various generic resin systems, as for example, organic zinc coatings, manufactured with chlorinated rubber, or epoxy resins. Inorganic zinc coatings are provided either 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 hull topsides, deck and cargo tanks of vessels.

A recent innovation is the introduction of Vepok, a unique group of protective coatings that can be applied over oily, wet, rusty surfaces.

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 antifouling points and specification coatings that are used by government agencies, including the U.S. Navy.

## PHILADELPHIA RESINS

**Circle 56 on Reader Service Card**

Three new materials called Super Repair Products have been formulated by Philadelphia Resins, Montgomeryville, Pa., to resist abrasion, impact, cavitation and corrosion at elevated temperatures and in adverse environments. Developed especially for high-temperature, high-friction aerospace, marine and industrial applications, these easy-to-use materials include an alloy paste, a ceramic repair liquid and a ceramic repair putty.

Phillybond® Super Alloy is a titanium-based compound, used to recondition compressor housings, propulsion shafting, valve bodies and other equipment which must operate in adverse environments with temperatures between −100° to 500°F. In addition to permanently repairing and protecting marine, industrial and aircraft components made from steel, aluminum, brass, carbides, zinc and zinc alloys, this new compound bonds dissimilar metals without galvanic corrosion problems. After curing for 18 hours at 72°F, it may be machined and finished with standard metalworking equipment.

Phillybond® Ceramic Repair Putty and Phillybond® Ceramic Repair Liquid are specialty repair compounds, developed for coating, lining and protecting pump casings, valves and other new or worn equipment subjected to friction, corrosion/erosion and cavitation. With convenient, long-term repairs of worn metal surfaces on-site, the brushable liquid and the nonsagging trowelable putty reduce downtime in repairing vital machinery. Their useful thermal envelope is also −100° to 500°F.

No heat, pressure or special tools are needed to create an integral bond between the titanium-based, machinable repair compound (or the severe-service ceramic liquid or putty) and new or worn equipment. The company reports abrasion resistance, per ASTM D406, is five times better than competitive products.

## PRC

**Circle 22 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, 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 the most effective, the Proreco® III coating systems have an inherent flexibility to withstand normal stress caused by deck movement. The fire-retardant systems provide the ultimate in corrosion control and are resistant to the heaviest abrasion and impact. The advantages of the Proreco® III systems over rigid coatings is the Proreco® elastomeric base which is not brittle and not 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 proves itself again and

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**Circle 252 on Reader Service Card** ➔

## Coatings Review

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again as 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.

Products Research & Chemical Corporation developed the first one-part polysulfide marine caulk many years ago. Currently PRC supplies to the marine market a full line of both one-part and two-part polyuretane and polysulfide sealants and caulking compounds.



## WILSON WALTON

**Circle 23 on Reader Service Card**

Wilson Walton International has been one of the leaders in corrosion control technology for many years. As a result of extensive experience in the field and many years of research and development, four new innovative products have been developed and recently introduced—Aquamatic II Computerized Controller, Aquamatic Data Logger, Aquamatic Preloader and Zincolite Pit-Guard Anode.

The Aquamatic II impressed current cathodic protection system incorporates what is said to be the industry's only computerized controller. Mechanical meters have been replaced by large LED digital displays. Precise circuitry allows for controller accuracy to one-thousandth of a volt, and all calibration and self-testing is automatically carried out every nine hours. Most importantly, the computer controller ensures that the hull will receive the best possible protection from corrosion.

Wilson Walton has a policy of providing free analysis of recorded log readings, as this service enables ship owners and operators to maintain complete sets of analyzed data on file. Because the effectiveness of this analysis is solely contingent on the accuracy of these readings, an Aquamatic Data Logger has been developed to automatically record readings. The Data Logger will print a complete set of readings twice each day, with all operational parameters being indicated during each printout, and all recorded readings are automatically analyzed.

The Aquamatic Pre-Loader was specifically designed to prevent over-protection of the hull, which can result in premature coating failure. Depending on the manufacturer, cathodic protection systems produce a leakage current of 3 to 10 percent of rated capacity. This excess current is normally permissible, except on hulls which have been painted with a sophisticated coating which has remained in excellent condition. The Pre-Loader completely eliminates this problem by automatically redirecting the leakage current back into the system, thereby lowering the operating voltage at the anodes.

Wilson Walton International has also made great strides with zinc and aluminum sacrificial anode applications. The Zincoline Pit-Guard anode is specifically designed to prevent corrosive pitting on the bottom shell plating in cargo tanks. With each anode resting directly on the tank bottom, protection is provided during cargo voyages when residual water settles below the oil, as well as during saltwater ballast voyages.

## Grow Group, Inc. Announces Personnel Changes

J. Robert Desjardins

Joseph M. Quinn

Robert H. Osmer

Grow Group, Inc. of New York, N.Y., recently announced the retirement of **J. Robert Desjardins** as president of Devoe & Raynolds Division, and the appointment of **Joseph M. Quinn** to the position of president and chief executive officer, Devoe & Raynolds Co. Division of Grow Group, Inc. Also announced by Devoe Marine Coatings Co. Division of Grow Group, Inc. was the promotion of **Robert H. Osmer** to vice president and general manager of the division.

Mr. **Desjardins** joined Grow Group in 1980 as executive vice president of the trade sales division. Under his guidance, Grow's architectural coatings operations have registered record sales and earnings. Mr. **Desjardins** will continue as consultant to the Devoe & Raynolds Division.

In addition to heading up the Devoe & Raynolds Division, which is the flagship company of Grow's architectural coatings operations, Mr. **Quinn** retains his responsibilities as Group vice president of Grow's marine and maintenance coatings operations.

Mr. **Osmer** has been in the marine and corrosion control industries since 1974. His professional career includes operations and senior management positions with several major shipping companies.

Grow Group, Inc. is one of the nation's leading producers of specialty chemical coatings and paints, private label household products and over-the-counter pharmaceuticals, health and beauty aids.

For more information on marine coatings from the Grow Group,

**Circle 33 on Reader Service Card**


The Detroit Diesel-Powered Maui Princess is equipped with Niad Hydraulic stabilizers which automatically adjust to maintain the stability of the vessel.

# Converted Detroit Diesel-Powered Crewboat Includes Airliner Features For Passengers, Cargo

A new application in crewboat conversion was recently achieved by Aluminum Boats, Inc., of Crown Point, La., and Sealink of Hawaii, Inc., a Maui passenger vessel operator, in converting the former 110-foot aluminum Sabine Pass into the 117-foot Maui Princess.

Because the converted boat would have the multipurpose role of cruise vessel, ferry and freighter, airline-type seats were chosen and mounted on tracks for quick removal and conversion of the passenger cabin to a cargo bay. When carrying passengers and cargo, the vessel can haul 10 tons of cargo. In the all-cargo mode, she can carry up to 60 tons.

Aluminum Boats, Inc., extended the passenger compartment 50 feet aft and added all new seats, 7½ tons of air conditioning, and an open promenade deck for 100 above the passenger cabin. To provide easier access, sliding port and starboard cabin doors were installed which open 78 inches for the passage of people, cargo and containers. Also, a total of 7 feet was added to the stern for a combination dive/swim and loading platform.

Niad hydraulic stabilizers were installed below the platform for reduced roll and passenger comfort, highlighting a joint work effort by the shipyard and the boat owner. Aluminum Boat's crews installed the stabilizers, rebuilt the vessel's four Detroit Diesel 12V71 engines, and overhauled her two Delco 40-kw generators.

For free literature containing full information on Aluminum Boats, Inc.,

**Circle 29 on Reader Service Card**

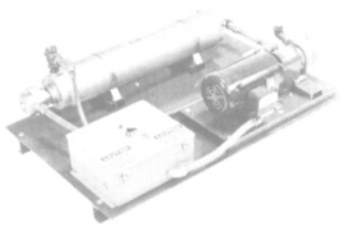
# Kim Hotstart Pre-Heating Systems Shrink Engine Idling Costs

When an engine is equipped with a Kim Hotstart engine pre-heating system, its idling costs are nearly eliminated.

That's because electricity is used to keep the engine warm, not gallons of expensive diesel fuel that are required for hours of idling. And since the engine is warm enough to start at a moment's notice and reach full power quickly, getting to a job fast is assured.

In addition, using a Kim Hotstart pre-heating system prevents two cold-starting problems: excessive wear on critical engine parts and emission of white smoke pollutants. Ships and workboats can be kept in service longer as time between overhauls is extended.

Kim Hotstart manufactures three types of heating systems for marine use: lube oil heating systems, coolant heating systems and a combination of the two. Each system has the following approvals: (1) approved by the U.S. Coast Guard; (2) CSA-approved for hazardous and wet locations; and (3) approved by major engine manufacturers.



Idling costs are nearly eliminated with the use of a Kim Hotstart engine pre-heating system. By preventing excessive wear on critical engine parts, ships and workboats can be kept in service longer and the time between overhauls is extended.

"It's a turnkey package," explains **Bill Harnish,** industrial sales manager for Kim Hotstart Manufacturing Co. "All the components are designed to work together for consistent starts. Keeping the engine warm also shortens starting procedures, extends engine life and reduces cold start-ups that damage the engine."

The systems can be operated manually or automatically, and are available with an automatic start-stop control. Each system carries a 12-month warranty and can be easily installed horizontally, vertically or base down.

Additional features include: sentry control remote alarm system, flow control detection valve, motor relay lockout, true temperature controls, fused 120 volt control voltage, and pre-wired, palletized components.

For additional information and free literature on the Kim Hotstart engine pre-heating system,

**Circle 26 on Reader Service Card**

## Research Institute Predicts Need For Construction Of Gas Carriers

According to the Japan Maritime Research Institute, about thirty 75,000 cubic meter LPG carriers will need to be built over the next three years.

The institute's forecasts were based on a prediction of a 24 percent expansion of the gas trade from 1985-1990 and the need to replace an aging gas carrier fleet.

## Lykes Bros. Announces Organizational Changes

**Eugene F. McCormick,** president and chief operating officer of Lykes Bros. Steamship Co., Inc., recently announced organizational changes as part of the company's increasing commitment to containership service and its stated objective of maintaining and upgrading its conventional fleet.

**Robert J. Brennan,** executive vice president of the company, will assume direct responsibilities for all of the company's conventional services operation, including the continuing upgrading of the conventional fleet through acquisition and charter.

**Robert T. Martinez** has been named senior vice president-South America and will manage the bi-weekly container service from the East Coast of the U.S. to the north and west coast of South America.

**James Wachtel** has been named senior vice president-Atlantic division, responsible for Lykes weekly containership service between the Gulf ports and northern Europe and the United Kingdom.

## Robertson Autopilot Wins NMEA Honors


Robertson Shipmate personnel shown above with recent NMEA award are, left to right: **Bill Altman,** product support manager; **Dayna Risebrow,** marketing assistant; **Tom Mackie,** sales engineer; **Riva Schwartz,** vice president/general manager; **Bob Herold,** product support engineer; and **Dean Silver,** sales manager.

For the third year in a row, Robertson's microprocessor-controlled autopilots have been awarded top honors by the National Marine Electronics Association at their recent banquet in Seattle, Washington. This, for any manufacturer, is a significant achievement as it represents peer recognition by a broad spectrum of the marine electronics industry. These NMEA awards are voted by the entire association membership, consisting of electronics dealers, technicians and other manufacturers.

Robertson autopilots have gained a reputation over the last few years as the "top of the line" units for both recreational and commercial vessels of just about any size. Feature for feature, Robertson pilots are among the most cost effective products on the market today, with an exceptionally broad range of standard features. For yachts, the AP1000 and AP200DL pilots have become extremely popular, while the AP9MkII and AP40B pilots have been widely accepted on commercial vessels and very large yachts. All Robertson pilots are available from authorized dealer outlets all over the country.

For free literature giving complete information on Robertson-Shipmate, Inc.,

**Circle 64 on Reader Service Card**

## Rockwell's Collins International Service Co. Wins $7-Million Navy Contract

A $7-million contract to operate and maintain four U.S. Naval Radio Communications facilities has been awarded to Rockwell International Corporation's Collins International Service Company (CISCO) by the Naval Regional Contracting Office in Washington, D.C.

Under the three-year contract, CISCO will provide Operations and Maintenance (O&M) support to Naval Radio Communications facilities at Norfolk and Driver, Va., Key West, Fla., and Summit, Panama.

For further information and free literature,

**Circle 66 on Reader Service Card**

## Miguel Rossy Named Senior VP And General Manager At Crowley Caribbean Transport

**Miguel A. Rossy** has been named senior vice president and general manager of Crowley Caribbean Transport (CCT). He succeeds **Hector M. Calderon** who will be leaving CCT to pursue personal interests, following a three-month transition period.

The change in CCT's top position was announced by **William B. Bru,** Atlantic Division president, Crowley Maritime Corporation, of which CCT is a part.

Mr. **Rossy** has been associated with Crowley Maritime since 1979 and has held senior management positions in several Crowley companies heavily involved in transportation services throughout the Caribbean and Latin America. Most recently, Mr. **Rossy** was vice president and general manager of Crowley's AmTrans South America service. In other executive positions, Mr. **Rossy** was responsible for the development of several new Crowley services.

## Davis Engineering Awarded $10.5-Million Contract For Wave Generator System

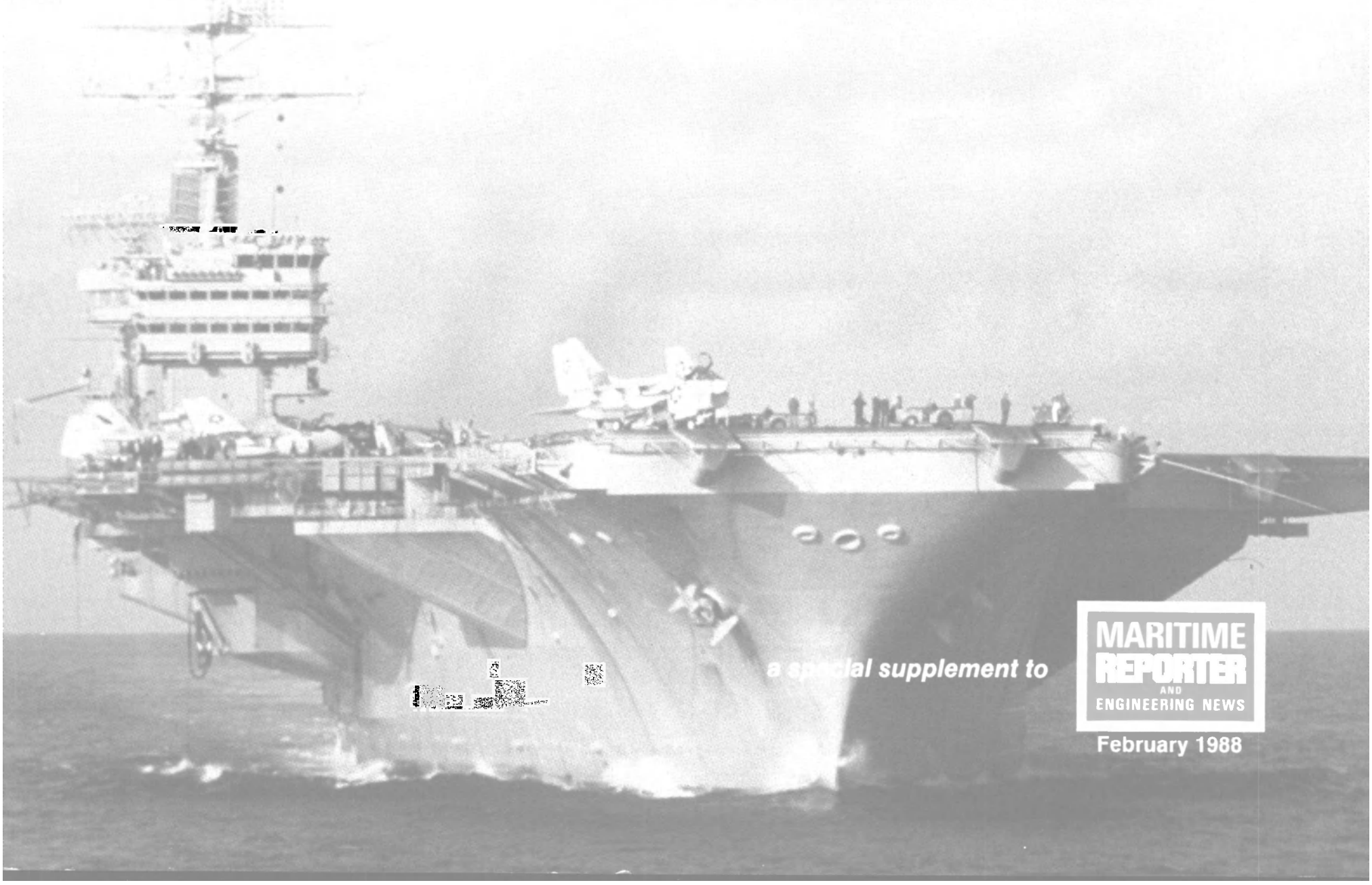
Davis Engineering Limited of Ottawa, Canada, was recently awarded a $10.5-million contract by the Department of Supply and Services to construct a wave generator system for the seakeeping and maneuvering basin at the National Research Council of Canada (NRC) Institute for Marine Dynamics (IMD) at St. John's, Newfoundland. Approximately 55 percent of this 11-million-dollar contract will be subcontracted within Newfoundland. Sixty-six person-years of employment will be created in St. John's and Ottawa. Final completion date is 1990.

The system uses 180 segments, or paddle-like sections, that operate independently under computer control to create various wave patterns which will simulate conditions at sea.

The indoor maneuvering basin in Newfoundland will be one of the largest of this type in North America. The wave generator will be one of the largest machines in the world capable of creating multidirectional or short-crested waves.

# NAVAL TECHNOLOGY

## & SHIPBUILDING

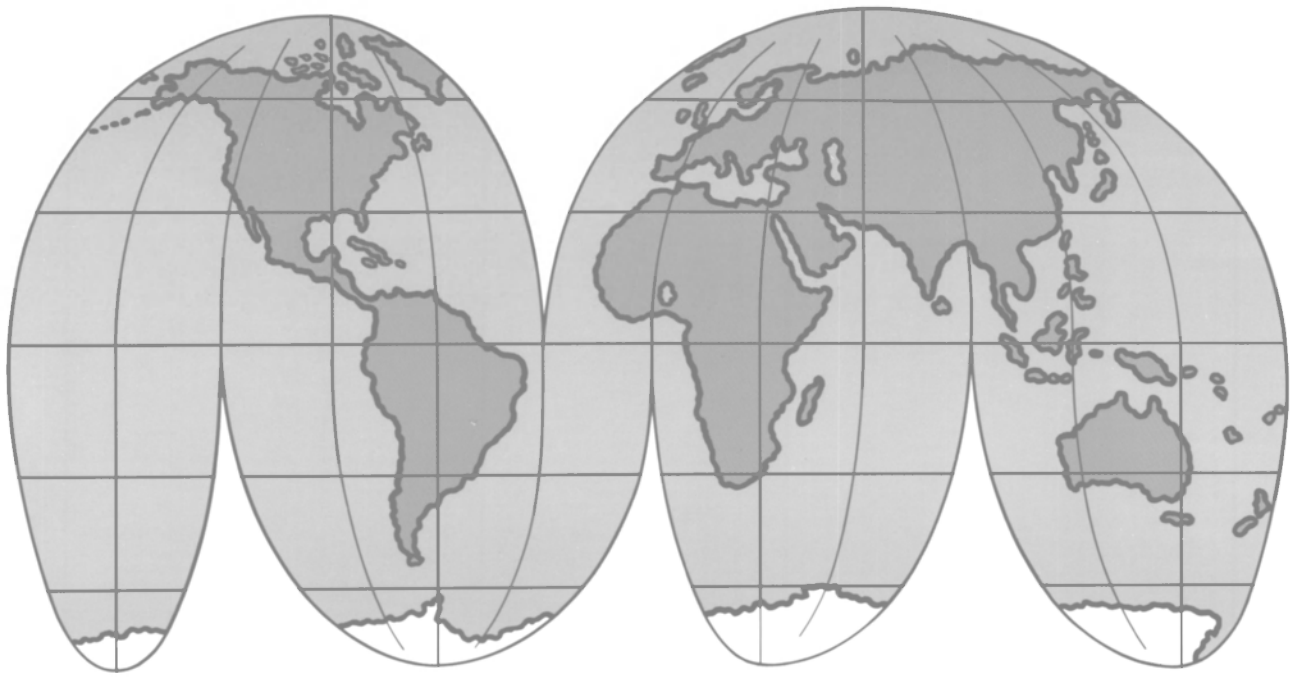


*a special supplement to*

MARITIME REPORTER AND ENGINEERING NEWS

February 1988

# ALLISON MARINE ENGINES HAVE BEEN PROVEN ONLY IN THE AREAS CAREFULLY MARKED IN BLUE.



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# FULL FUNDING FOR TWO NEW CARRIERS GIVES NAVY 46% INCREASE FOR SHIPBUILDING

## An Update On Navy Spending For Ships, Equipment And Maintenance in FY 1988

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

There were some nice surprises in the defense budget approved by the Congress late last December. The main surprise was the approval of full funding for two new aircraft carriers. This action sets the scene for continued heavy spending on ships and equipment through the 1990s.

**Changes in FY '88 Overall Procurement Budgets**

| | % Change |
|---|---|
| Air Force | −15 |
| Army | −7 |
| Navy | +7 |

The overall Navy budget increase of 7 percent for procurement is the result of an increase of 46 percent for ships alone—an additional $5 billion for ships.

The implications of this development are enormous for suppliers of equipment and services to the new aircraft carriers as well as support vessels.

### SHIPBUILDING & CONVERSION

The Congress approved a major increase in the Navy shipbuilding budget for FY 1988. The Navy requested $11.1 billion to build or convert 20 ships. The Congress appropriated $16.1 billion for 19 ships. This $5 billion (46 percent) increase—in a period of growing budget pressures—shows the Navy spending for new ships continues to be accorded high priority.

A breakdown of the FY 1988 budget request for shipbuilding and the final funding approvals is shown in Exhibit 1.

### Aircraft Carriers (CVN-74 and 75)

In a show of strong support for naval aviation, the Congress provided full funding for two new aircraft carriers in the FY1988 continuing appropriations bill. DOD had asked for $644 million to fund long lead nuclear component purchases for these two ships starting in FY 1988. Congressional conferees in late December agreed to appropriate $6.3 billion—virtually assuring the two carriers will not be cancelled at a later date. One of the carriers is to be named the USS John C. Stennis, in recognition of the

(continued)

# U. S. NAVY

**Exhibit 1—FY 1988 Program for Ship Construction & Conversion**
**($ in millions)**

| | Budget Request | | Authorization | | Appropriations | |
|---|---|---|---|---|---|---|
| | No. Ships | $ | No. Ships | $ | No. Ships | $ |
| **Construction** | | | | | | |
| Trident Submarine (SSBN) | 1 | $1,331 | 1 | $1,291 | 1 | $1,261 |
| Aircraft Carrier (CVN) | — | 644 | — | 644 | 2 | 6,325 |
| Attack Submarine (SSN 688) | 3 | 1,737 | 3 | 1,677 | 3 | 1,677 |
| New Attack Submarine (SSN 21) | — | 258 | — | 258 | — | 258 |
| Aegis Cruiser (CG 47) | 2 | 1,938 | 5 | 3,329 | 5 | 4,127 |
| Aegis Destroyer (DDG 51) | 3 | 2,197 | 0 | 6 | 0 | 6 |
| Amphib. Assault Ship (LHD) | 1 | 773 | 1 | 753 | 1 | 753 |
| Amphib. Landing Craft (LSD 41 CV) | 1 | 324 | 1 | 324 | 1 | 258 |
| Mine Countermeasure Ship (MCM) | 3 | 297 | 0 | 0 | 0 | 0 |
| Fleet Oiler (TAO-187) | 2 | 279 | 2 | 279 | 2 | 256 |
| Ocean Surveillance Ship (TAGOS) | 0 | 0 | 2 | 97 | — | — |
| Landing Craft (LCAC) | — | 44 | — | 34 | — | 37 |
| **Conversion** | | | | | | |
| Carrier Modernization (CV SLEP) | 1 | 730 | 1 | 730 | 1 | 730 |
| Fleet Oiler Lengthening (AO 177) | 1 | 44 | 1 | 44 | 1 | 44 |
| Crane Ship Conversion (TACS) | 2 | 53 | 2 | 53 | 2 | 52 |
| **Other** | | | | | | |
| Service Craft | — | 13 | — | 13 | — | 13 |
| Strategic Sealift | — | 43 | — | 43 | — | 43 |
| Sealift Enhancement | — | 18 | — | 0 | — | 0 |
| Fast Sealift Initiative | — | 0 | — | 5 | — | — |
| Outfitting | — | 203 | — | 196 | — | 184 |
| Post Delivery | — | 141 | — | 133 | — | 132 |
| General Reduction | — | — | — | — | — | — |
| **Total Budget** | | **$11,067** | | **$9,909** | | **$16,156** |
| **Number of Ships:** | | | | | | |
| Construction | 16 | | 15 | | 15 | |
| Conversion | 4 | | 4 | | 4 | |

**Source:** Defense Authorization and Appropriations Bills

**Exhibit 2—FY 1988 Program for Navy Weapons**
**($ in millions)**

| | Budget Request | | Authorization | | Appropriations | |
|---|---|---|---|---|---|---|
| | No. | $ | No. | $ | No. | $ |
| **Missiles** | | | | | | |
| Trident II | 66 | 2,251 | 72 | 2,251 | — | 2,041 |
| Tomahawk | 475 | 994 | 475 | 865 | 475 | 847 |
| Harpoon | 124 | 162 | 124 | 111 | 124 | 143 |
| SM-2 | 1,150 | 583 | 1,500 | 715 | 1,150 | 583 |
| Other Missiles | — | 1,647 | — | 1,431 | — | 1,637 |
| | | 5,637 | | 5,373 | | 5,251 |
| **Torpedoes** | | | | | | |
| MK 48 ADCAP | 100 | 243 | 100 | 243 | 100 | 243 |
| MK 30 Target | 12 | 31 | 12 | 31 | 12 | 31 |
| MK 50 ALWT | 153 | 222 | 60 | 108 | 16 | 108 |
| VLS ASROC | 160 | 58 | 0 | 0 | 0 | 0 |
| Related Activities | — | 80 | — | 81 | — | 107 |
| | | 634 | | 463 | | 489 |
| **Other Weapons** | | | | | | |
| CIWS | 5 | 28 | 5 | 28 | 5 | 28 |
| Other Guns & Mounts | — | 74 | — | 74 | — | 72 |
| | | 102 | | 102 | | 100 |
| Spares | | 130 | | 130 | | 127 |
| Budget Adjustments | | | | (78) | | |
| **Total Budget** | | **$6,503** | | **$5,990** | | **$5,967** |

**Source:** Defense Authorization and Appropriations

**Exhibit 3—FY 1988 Program for Other Procurement**
**($ in millions)**

| | Budget Request | Authorization | Appropriations |
|---|---|---|---|
| Ship support equipment | $ 784 | $ 870 | $ 813 |
| Communications & electronics | 1,713 | 1,809 | 1,657 |
| Aviation support | 693 | 815 | 675 |
| Ordnance support | 770 | 895 | 829 |
| Civil engineering support | 117 | 107 | 94 |
| Supply support | 122 | 112 | 109 |
| Training, computers, other | 478 | 449 | 417 |
| Spares | 309 | 309 | 279 |
| Budget Adjustments | — | (45) | — |
| **Total Budget** | **$4,984** | **$5,322** | **$4,872** |

Source: Defense Authorization and Appropriations Bills

(continued)

Senate Appropriations Committee chairman's continued support of Navy programs.

CVN-74 and -75 are to be completed in the mid-1990s. They will replace two Forrestal-class carriers.

Actual spending for equipment and material will be spread over the next 13 years. As shown below, projected outlays will peak between FY 1994-1996.

**Projected Outlays for CVN-75 and -75**
($ in millions)

| Fiscal Year | Amount |
|---|---|
| 1988 | $ 6.4 |
| 1989 | 80.3 |
| 1990 | 333.4 |
| 1991 | 552.2 |
| 1992 | 768.5 |
| 1993 | 891.4 |
| 1994 | 1,247.8 |
| 1995 | 1,206.2 |
| 1996 | 1,139.3 |
| 1997 | 385.0 |
| 1998 | 182.2 |
| 1999 | 134.8 |
| 2000 | 42.4 |
| Total | $6,969.9 |

Newport News will obviously benefit from the program, being the only U.S. shipyard able to build aircraft carriers. Many other suppliers and manufacturers will also directly and indirectly benefit.

There has been talk of lowering Navy's force objective to 13 instead of 15 carrier battle groups as a cost saving measure. Scheduled delivery of these new carriers in the mid-1990s helps ensure 15 carrier battle groups will be in place. This creates a continued requirement for the surface combatants and other ships which comprise the battle group formation.

### Aegis Ships (CG-47 and DDG-51)

The Navy requested funds for two CG-47 class cruisers and three DDG-51 class destroyers in FY 1988. Citing technical problems in the DDG-51 program, the Congress refused to authorize or appropriate funds for DDG's this year. Instead, the Congress provided funds for five CG-47s. These five ships will complete the program objective of building 27 Aegis cruisers.

Litton-Ingalls and Bath Iron Works are builders of both CG-47 and DDG-51 ships.

Another action is Congressional direction that Navy open FY 1989 competition for DDG-51 contracts to other technically qualified bidders. This will enable Avondale to compete for future orders.

### Minewarfare Ships (MCM and MHC)

The Navy had planned to order three MCMs in FY 1988. Citing technical and contractual difficulties in the program, the Congress refused to fund more MCMs until the problems are resolved. Navy's objective is to build 14 MCMs. Seven are on order and one has been delivered. The six remaining MCMs are to be opened to full competition.

Peterson Builders and Marinette Marine are building MCMs.

**Exhibit 4—FY 1988 Program for Navy RDT&E**
**($ In millions)**

| | Budget Request | Authorization | Appropriations |
|---|---|---|---|
| Basic technology | $ 841 | $ 749 | $ 750 |
| Advanced technology devel. | 258 | 258 | 227 |
| Strategic programs | 1,370 | 1,310 | 1,257 |
| Tactical programs | 6,130 | 5,904 | 5,662 |
| Intelligence & communications | 1,128 | 971 | 907 |
| Defensewide mission support | 763 | 703 | 748 |
| Conventional defense initiative | 0 | 51 | 30 |
| Budget Adjustments | 0 | 0 | (86) |
| **Total Budget** | **$10,490** | **$9,946** | **$9,495** |

**Source:** Defense Authorization and Appropriations Bills

Meanwhile, the Navy has been directed to qualify a second source for the MHC program in FY 1988. Intermarine is the current contractor. The original plan had been to delay second source qualification until FY 1989.

### Army Tugboats

The Congress refused to appropriate new funds for procuring Army tugboats in FY 1988. A report was requested from DOD assessing the alternatives for manning and operating these tugboats. Among the options is transfer of the mission to the Military Sealift Command.

### Fast Sealift Initiative

Navy has been directed to survey the international shipping market to determine whether used ships are available which could be purchased and converted similar to the SL-7 program. If no such ships are available, Navy is directed to begin design of a new ship capable of sustained speeds exceeding 30 knots. Surface effect technology is among the design options to be explored.

### High Speed Patrol Boats

Congressional authorizers have recommended that Navy evaluate a new high speed assault and missile boat.

## WEAPONS & OTHER PROCUREMENT

Funding for weapons and other procurement was set at a slightly lower level than requested. The Navy asked for $11.5 billion for these programs. Congress appropriated $10.8 billion. Details are shown in Exhibits 2 and 3.

### Small Submersible

Navy was given $15 million to purchase a small submersible in order to assess its performance as an advanced swimmer delivery system.

### Ship Survival Systems

MSC received approval to spend $10 million in FY 1988 to procure U.S. built, totally enclosed survival systems. These state-of-the-art enclosed lifeboats will be fitted aboard T-ships in the MSC fleet.

### MK 50 Torpedo

Navy asked for $222 million to buy 153 MK 50 Advanced Lightweight Torpedoes in FY 1988. There have been technical problems in this program and Congress limited procurement to 16 units. GAO has been directed to perform a cost effectiveness study of breaking out the MK-50 afterbody. Honeywell and Westinghouse are contractors for MK 50 manufacture.

### Ship Survivability Initiative

Congressional authorizers directed Navy to initiate actions to improve ability to fight fires in combat damaged ships. The Stark incident is cited as an example of existing deficiencies. Among items directed to be procured are additional oxygen breathing apparatus and their canisters, thermal imagers, wire-free damage control communications, smoke curtains, exothermic cutters, helmet lights, firefighter overboots, high-capacity fans, and non-sparking mechanical emergency extraction equipment.

### Seasheds

An additional $12 million was

(continued)

# U.S. NAVY

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

| SHIPYARD<br>Navy Designation | NAME | APPROX.<br>CONTRACT $ | EST.<br>DELIVERY |
|---|---|---|---|
| **Avondale Shipyards** | | | |
| T-AO-193 | Walter S. Diehl | 116,000,000 | 8/88 |
| T-AO-195 | Leroy Grumman | 101,000,000 | 5/89 |
| T-AO-197 | unnamed | 100,633,789 | 2/90 |
| LSD-44 | Gunston Hall | 166,000,000 | 8/88 |
| LSD-45 | Comstock | 153,400,000 | 11/88 |
| LSD-46 | Tortuga | 153,400,000 | 4/89 |
| LSD-47 | unnamed | 150,000,000 | 11/89 |
| LSD-48 | unnamed | 150,000,000 | 5/90 |
| **Bath Iron Works** | | | |
| CG-58 | Philippine Sea | 252,800,000 | 1/89 |
| CG-60 | Normandy | 191,800,000 | 9/89 |
| CG-61 | Monterrey | 191,800,000 | 12/89 |
| CG-63 | Cowpens | 193,300,000 | 4/90 |
| CG-64 | Gettysburg | 193,300,000 | 11/90 |
| CG-67 | unnamed | 236,041,276 | 4/92 |
| DDG-51 | Arleigh Burke | 321,000,000 | 7/90 |
| DDG-53 | John Paul Jones | 189,900,000 | 7/92 |
| DDG-51 Class | — | 22,600,000[1] | 5/92 |
| **Bender Shipbuilding** | | | |
| LCM-8 Class (4) | unnamed | 3,000,000[2] | — |
| **Bethlehem-Sparrows Point** | | | |
| T-AGS-39 | Maury | 66,000,000 | 4/88 |
| T-AGS-40 | Tanner | 66,000,000 | 8/88 |
| **Bollinger Shipyard** | | | |
| WPB (16) | unnamed | 99,306,516 | 2/90 |
| **General Dynamics-Electric Boat** | | | |
| SSN-751 | San Juan | 280,100,000 | 6/88 |
| SSN-752 | Pasadena | 280,100,000 | 10/88 |
| SSN-754 | Topeka | 324,500,000 | 2/89 |
| SSN-755 | Miami | 324,500,000 | 6/89 |
| SSN-757 | Alexandria | 283,000,000 | 10/89 |
| SSN-760 | unnamed | 258,166,750 | 2/90 |
| SSN-761 | unnamed | 258,166,750 | 6/90 |
| SSN-762 | unnamed | 258,166,750 | 10/90 |
| SSN-763 | unnamed | 258,166,750 | 2/91 |
| SSN-21 Class | — | 28,900,000[3] | — |
| SSBN-734 | Tennessee | 523,700,000 | 12/88 |
| SSBN-735 | Pennsylvania | 531,600,000 | 8/89 |
| SSBN-736 | unnamed | 500,870,000 | 4/90 |
| SSBN-737 | unnamed | 616,400,000 | 12/90 |
| SSBN-738 | unnamed | 674,100,000 | 12/91 |
| SSBN-739 | unnamed | 615,000,000 | 12/92 |
| SSBN-734 Class | — | 48,400,000[3] | 12/88 |
| SSBN-734 Class | unnamed | 644,000,000 | 7/94 |
| **Halter Marine** | | | |
| T-AGOS-13 | Adventurous | 14,250,000 | 3/88 |
| T-AGOS-14 | Worthy | 14,250,000 | 7/88 |
| T-AGOS-15 | Titan | 13,844,067 | 3/89 |
| T-AGOS-16 | Capable | 14,031,914 | 7/89 |
| T-AGOS-17 | unnamed | 14,031,914 | 11/89 |
| T-AGOS-18 | unnamed | 14,031,914 | 3/90 |
| **Ingalls Shipbuilding** | | | |
| CG-56 | San Jacinto | | 1/88 |
| CG-57 | Lake Champlain | | 8/88 |
| CG-59 | Princeton | 325,500,000 | 10/88 |
| CG-62 | Chancellorsville | 238,600,000 | 6/89 |
| CG-65 | Chosin | 242,600,000 | 11/90 |
| CG-66 | Hue City | 193,980,662 | 10/91 |
| CG-68 | Anzio | 163,980,664 | 4/92 |
| DDG-52 | John Barry | 162,149,000 | 9/91 |
| LHD-1 | Wasp | 1,365,700,000 | 3/89 |
| LHD-2 | Essex | 402,494,000 | 4/92 |
| LHD-3 | Kearsage | 378,685,000[4] | 1/93 |
| CG-47 Class | — | 44,128,775[5] | — |

| SHIPYARD<br>Navy Designation | NAME | APPROX.<br>CONTRACT $ | EST.<br>DELIVERY |
|---|---|---|---|
| **Intermarine USA** | | | |
| MHC-51 | unnamed | 20,926,936 | 4/91 |
| **Lockheed-Gulfport** | | | |
| LCAC (2) | unnamed | 24,800,000 | 88 |
| **Lockheed-Seattle** | | | |
| LCAC (7) | unnamed | 115,586,251 | 6/91 |
| LCU (Army-7) | unnamed | 26,000,000 | — |
| **Lockheed-Savannah** | | | |
| LCU (Army-13) | unnamed | — | 11/87-11/89 |
| **Marinette Marine** | | | |
| MCM-2 | Defender | 46,000,000 | 8/88 |
| MCM-4 | Champion | 42,000,000 | 12/88 |
| MCM-7 | Patriot | 51,848,816 | 10/89 |
| **McDermott Inc.** | | | |
| SWATH T-AGOS-19 | unnamed | 25,424,347 | 10/89 |
| **Moss Point Marine** | | | |
| LSV (Army-3) | unnamed | 30,598,019 | 3/88 |
| **NASSCO** | | | |
| AOE-6 | Supply | 290,097,944 | 4/91 |
| **Newport News Shipbuilding** | | | |
| CVN-72 | Abraham Lincoln | 1,550,000,000 | 12/89 |
| CVN-73 | George Washington | 1,550,000,000 | 12/91 |
| SSN-723 | Oklahoma City | 225,100,000 | 5/88 |
| SSN-750 | Newport News | 278,000,000 | 8/88 |
| SSN-753 | Albany | 319,000,000 | 7/89 |
| SSN-756 | Scranton | 259,833,000 | 9/89 |
| SSN-758 | Asheville | 259,833,333 | 1/90 |
| SSN-759 | unnamed | 259,833,333 | 6/90 |
| SSN-760 | unnamed | 55,000,000[6] | — |
| SSN-764 | unnamed | 257,118,500 | 2/91 |
| SSN-765 | unnamed | 257,118,500 | 5/91 |
| SSN-766 | unnamed | 257,118,500 | 8/91 |
| SSN-767 | unnamed | 257,118,500 | 11/91 |
| SSN-21 Class | — | 325,000,000[7] | 2/94 |
| SSN-21 Class | — | 23,390,510[8] | 4/88 |
| SSN-21 Class | — | 28,900,000[3] | — |
| **Norfolk Shipbuilding** | | | |
| LSV (Army-4) | unnamed | 80,000,000 | 89 |
| **Pennsylvania Shipbuilding** | | | |
| T-AO-191 | Benjamin Isherwood | 111,000,000 | 10/88 |
| T-AO-192 | Henry Eckford | 111,000,000 | 5/89 |
| T-AO-194 | John Ericsson | 97,500,000 | 2/90 |
| T-AO-196 | unnamed | 95,025,000 | 11/90 |
| **Peterson Builders** | | | |
| MCM-3 | Sentry | 57,900,000 | 7/88 |
| MCM-5 | Guardian | 57,900,000 | 6/89 |
| MCM-6 | Devastator | 48,287,461 | 8/89 |
| MCM-8 | Scout | 48,287,461 | 6/90 |
| **Robert E. Derecktor Shipyard** | | | |
| WMEC-909 | Campbell | 30,160,000 | 1/88 |
| WMEC-910 | Thetis | 30,160,000 | 5/88 |
| WMEC-911 | Forward | 30,160,000 | 9/88 |
| WMEC-912 | Legare | 30,160,000 | 1/89 |
| WMEC-913 | Mohawk | 30,160,000 | 5/89 |
| TB (Army-2) | unnamed | 16,500,000 | 89 |

Footnotes: 1. Lead yard services contract; 2. Under subcontract from Twin City Shipyard 3. Design contract; 4. Contains $26 million for advance procurement of material for LHD-4; 5. Yard planning services; 6. Long lead procurement; 7. Detail design contract; 8. Contract services.

### KEY TO NAVY DESIGNATIONS

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

*Assigned to Military Sealift Command
†Coast Guard

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

(continued)

| SHIPYARD<br>Navy Designation | NAME | APPROX. CONTRACT $ | EST. DELIVERY |
|---|---|---|---|
| **Tacoma Boatbuilding** | | | |
| T-AGOS-11 & 12 | unnamed | 18,590,001 | 10/89 |
| **Textron Marine** | | | |
| LCAC 10-12 (3) | unnamed | 51,000,000 | NA |
| LCAC-13-24 (12) | unnamed | 187,000,000 | NA |
| LCAC (2) | unnamed | 38,625,343 | 11/88 |
| LCAC (10) | unnamed | 186,936,237 | 89-6/91 |
| MSH-1 | Cardinal | 28,300,000 | 88 |
| **Todd Pacific-San Pedro** | | | |
| FFG-61 | Ingraham | 96,100,000 | 11/88 |

## Navy Update

(continued)

provided by Congress in FY 1988 to procure seasheds and adapters. Navy had asked for $52 million for this program. Congress appropriated $64 million.

### RESEARCH & DEVELOPMENT

Congress has provided funds totalling $9.5 billion in FY 1988 for Navy research and development programs. Details are shown in Exhibit 4.

**Revolutionary Ship Designs**

Navy has established a high level effort to develop revolutionary design concepts for future combatant ships. The Congress authorized $5 million for continued development efforts in FY 1988—stating the research should involve cooperative efforts of Navy, industry and academia.

**Advanced Submarine Development**

The Defense Advanced Research Projects Agency (DARPA) was given $113 million in FY 1988 for advanced submarine research and development. These funds are to be used to look beyond the SSN 21 attack submarine now in final design. The goal is to identify design options not now feasible by incorporating technologies such as boundary layer control, advanced material, automated control systems, high temperature superconductors and quiet propulsors. Underlying this program are doubts about the ability of the SSN 21 to satisfy long term attack submarine mission requirements.

### SHIP REPAIR & MAINTENANCE

The Navy plans to spend $4.4 billion for ship maintenance and repair in FY 1988. This is about $600 million under Navy's request. It is also significantly lower than actual spending on ship repair and maintenance in FY 1987. Details for the FY 1988 program are shown in Exhibit 5.

**Depot Maintenance**

The appropriations conferees agreed to cut $285 from requested depot maintenance of ships in FY 1988. Among the actions were cutting "unncessary voyage repairs" by $21.7 million and reducing planned inactive ship upgrades by $18.0 million.

**FF-1052 Upgrades**

Congress has directed Navy to review initiating a program to modernize Knox class frigates. There are 46 ships in this class—delivered between 1969-1974. More than half were built by Avondale. The primary objective of the proposed modernization would be to upgrade the ASW sensor and weapons suite.

**New Threat Upgrade**

The appropriations bill requires one FY 1988 NTU overhaul to be performed in the Philadelphia Navy Shipyard. Remaining NTU over-

(continued)

**Exhibit 5—FY 1988 Program for Navy Ship Maintenance ($ in millions)**

| | Budget Request | Appropriations |
|---|---|---|
| Ship overhauls | 1,365 | |
| Restricted availabilities | 1,410 | $4,149 |
| Modernization | 1,291 | |
| Intermediate maintenance | 331 | |
| Technical support | 153 | 153 |
| Outfitting | 347 | 34 |
| Inactivations | 87 | 62 |
| **Total Budget** | **$4,984** | **$4,398** |

**Source:** Defense Authorization and Appropriations Bills

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

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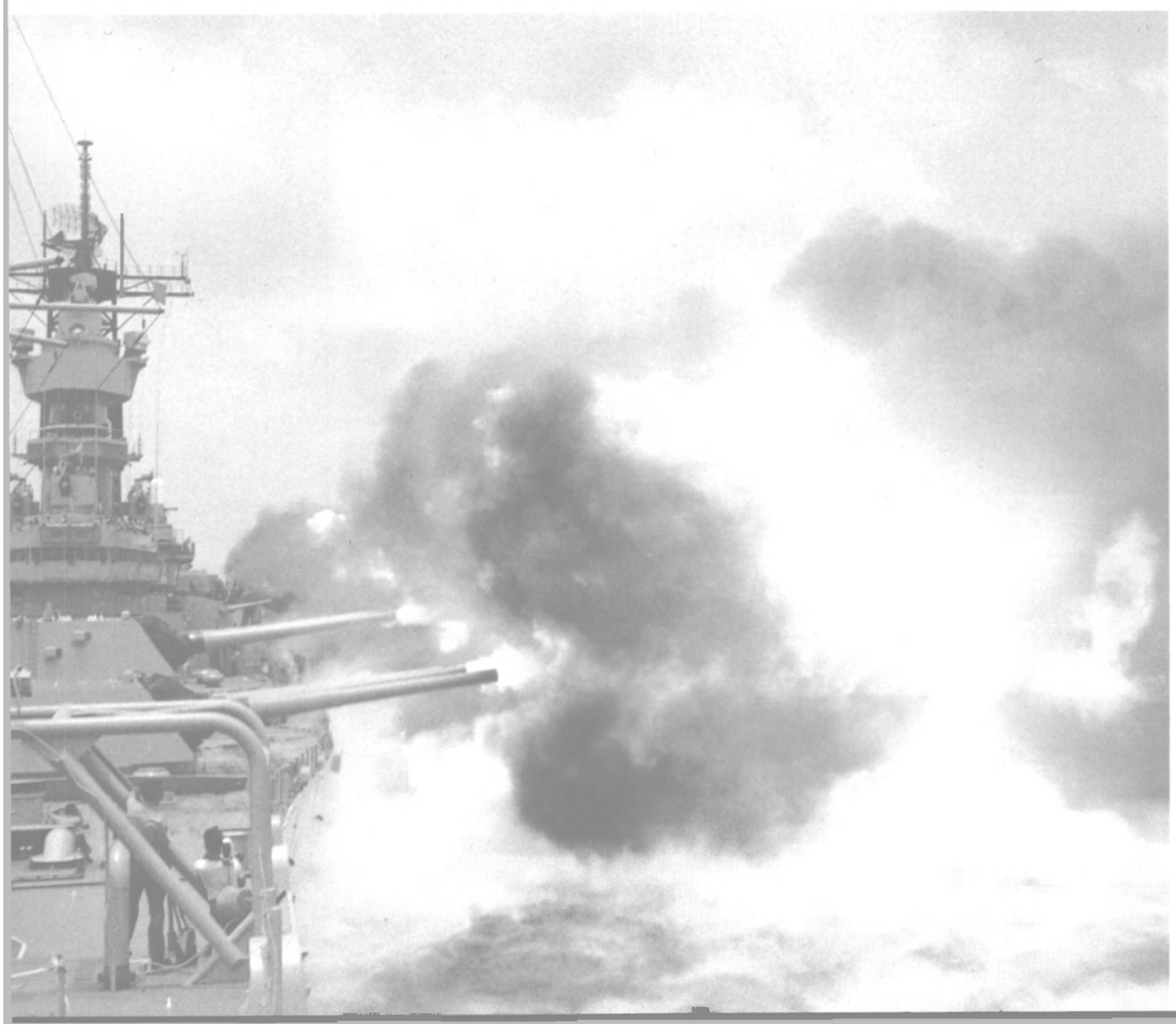

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neers, scientists and dignitaries are expected at OTC '88. These leaders nore industry will discuss all aspects of offshore drilling, production, t. The April Double issue of MARITIME REPORTER will be there . . .

**and**

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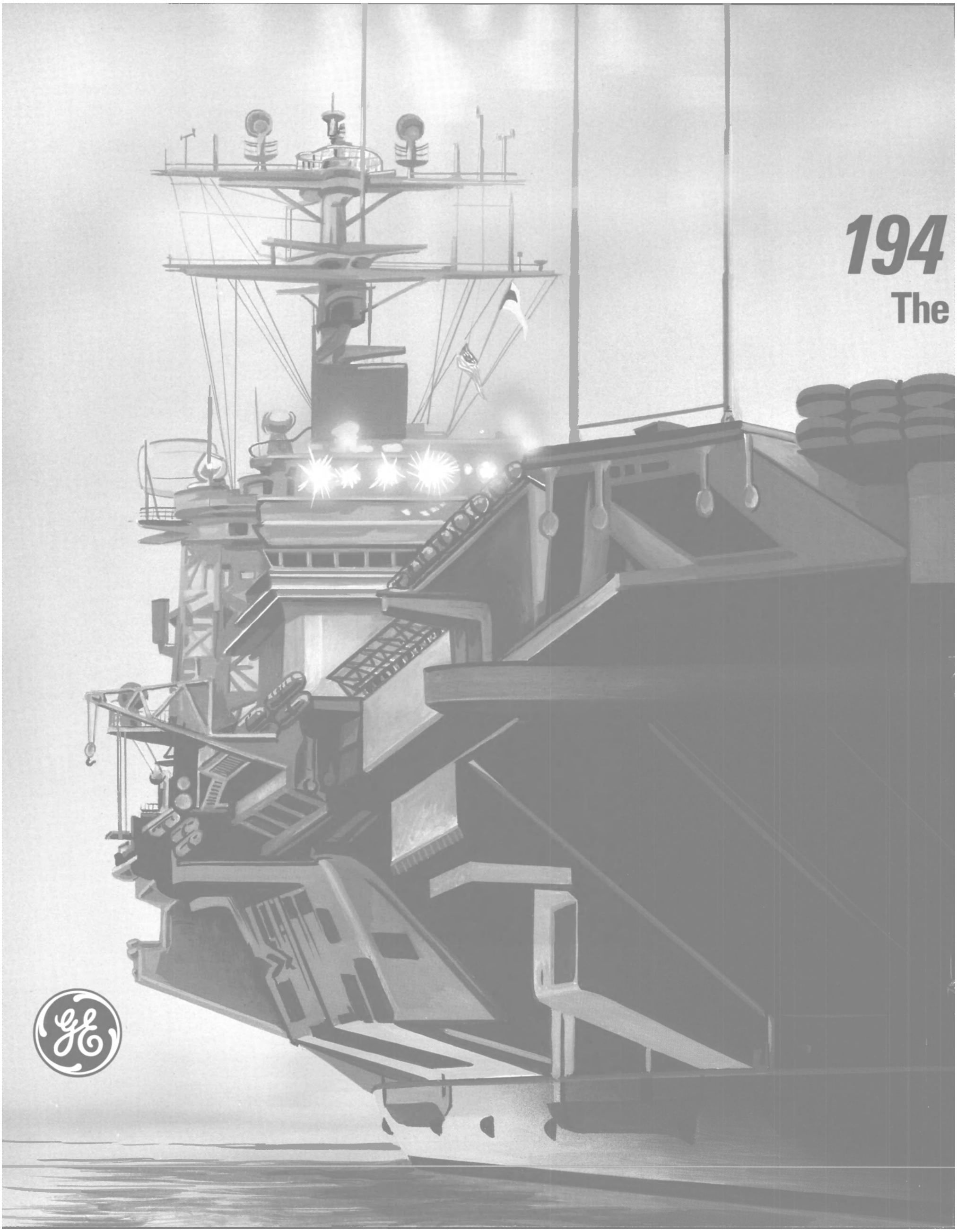
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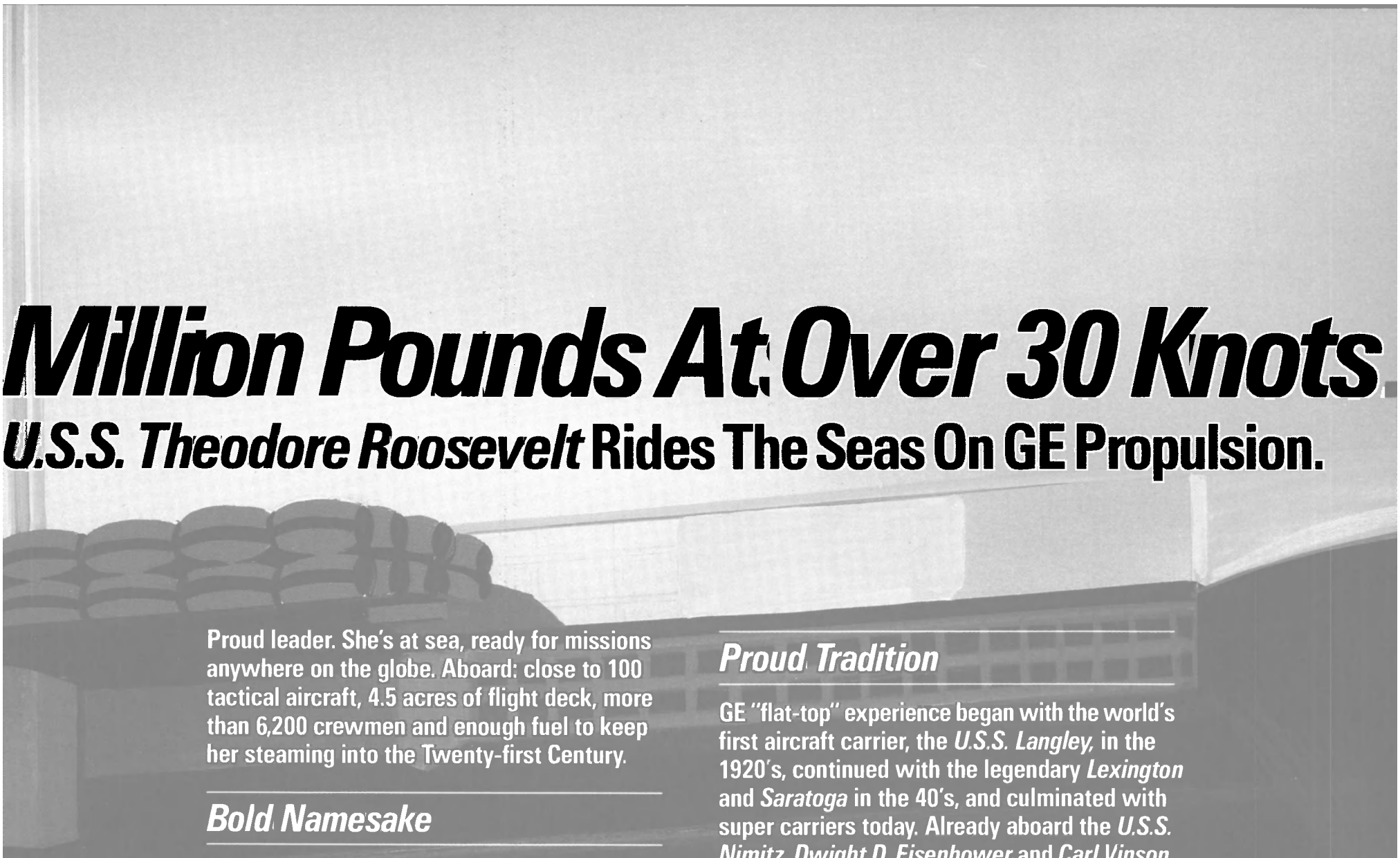
# Million Pounds At Over 30 Knots

## *U.S.S. Theodore Roosevelt* Rides The Seas On GE Propulsion.



Proud leader. She's at sea, ready for missions anywhere on the globe. Aboard: close to 100 tactical aircraft, 4.5 acres of flight deck, more than 6,200 crewmen and enough fuel to keep her steaming into the Twenty-first Century.

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GE steam propulsion systems power the entire Nimitz Class, including the *U.S.S. Theodore Roosevelt.* No other class of vessel in U.S. Navy history has demanded more raw propulsion power and rugged durability. Why? Because flight operations demand extensive maneuvering at high power, which subjects propulsion systems to punishing duty cycles... day after day, year after year. That's where GE experience meets the challenge.

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# U.S. NAVY

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

(As of December 1987)

| SHIPYARD | SHIP | TYPE OF WORK | $VALUE | COMP |
|---|---|---|---|---|
| **A & E Industries** | USS Hepburn (FF-1055) | SRA | 1,969,015 | 12/87 |
| **Alabama Dry Dock** | USS Lexington (AVT-16) | PM | 10,131,466 | 8/90 |
| **Arowel Corporation** | USS Constellation (CV-64) | SRA | 3,318,868 | 2/88 |
| **Atlantic Dry Dock** | USS Aubrey Fitch (FFG-34) | DSRA | 6,950,000 | 3/88 |
| **Avondale Shipyards** | USS Boone (FFG-28) | SRA | 9,998,452 | 7/88 |
| | USS John J. Hall (FFG-32) | DSRA | 11,170,581 | 9/88 |
| **B & A Marine** | Cape Avinof (RRF) | REP | 3,474,555 | 1/88 |
| **Bath Iron Works** | 4 USCG Cutters | ROH | 117,452,000 | 89 |
| | USS Brumby (FF-1044) | ROH | 14,501,392 | 4/88 |
| | USS Koelsch (FF-1049) | OH | 12,000,000 | 8/88 |
| **Bender Shipbuilding** | USNS Sirius (T-AFS-8) | ROH | 6,428,920 | 1/88 |
| **Bethlehem Steel— Port Arthur** | SS Buyer, Mar Ad Ship | UPG | 2,018,745 | — |
| **Braswell Shipyards** | USS Antigo (YTB-792) | SRA | 1,047,448 | 4/88 |
| **Charleston Naval Shipyard** | USS Andrew Jackson (SSBN-619) | OH | 112,058,684 | 3/90 |
| | USS Woodrow Wilson (SSBN-624) | OH | 120,928,007 | 3/89 |
| **Colonnas' Shipyards** | 2 USCG Cutters, Courageous & Durable | MMA | 11,961,478 | 12/87 |
| **Continental Maritime** | USS Robinson (DDG-12) | SER | 5,551,884 | 12/87 |
| | USS Constellation (CV-64) | REP | 8,100,000 | 2/88 |
| | USS Mars (AFS-1) | DPMA | 10,073,284 | 5/88 |
| **Detyens Shipyards** | USS Alamogordo (ARDM-2) | ROH | 4,243,424 | 2/88 |
| | USS Sunbird (ASR-15) | ROH | 3,500,000 | 4/88 |
| **General Dynamics— Electric Boat** | USS Providence (SSN-719) | SRA | 6,100,000 | 12/87 |
| **General Ship Corp.** | USS Trippe (FF-1075) | ROH | 8,801,078 | 5/88 |
| | USS Stephen W. Graves (FFG-29) | EDSRA | 10,969,490 | 6/88 |
| **Honolulu Shipyard** | USS Reclaimer (ARS-42) | ROH | 3,312,606 | 1/88 |
| **Houston Ship Repair** | SS Buyer, RRF Ship | UPG | 2,018,745 | — |
| **Ingalls Shipbuilding** | USS Stark (FFG-31) | REP | 28,700,000 | 8/88 |
| | USS Wisconsin (BB-64) | MOD | 221,762,170 | 10/88 |
| | USS Mobile Bay (CG-53) | PSA | 17,500,000 | 2/88 |
| | USS Richmond K. Turner (CG-20) | ROH | 28,780,830 | 7/89 |
| **Jonathan Shipyard** | USS Saginaw | PM | 9,900,000 | 6/90 |
| **Long Beach Naval Shipyard** | LPH Class Ships | PM | 8,096,132 | 10/90 |
| **McDermott Inc.** | IX-513 Barge | MODIF | 7,422,802 | 4/88 |
| **Metro Machine** | Atlantic Fleet LPDs | PM | 5,334,400 | 8/91 |
| | USS Bowen (FF-1079) | OH | 6,900,000 | — |
| **Moon Engineering** | USS Josephus Daniels (CG-27) | REP | 1,447,514 | 2/88 |
| | USS Conynham (DDG-17) | REP | 1,484,444 | — |
| **NASSCO** | 4 LSTs | PM | 3,500,000 | 90 |
| | 3 LSTs | MAINT | 5,858,543 | — |
| | USS Hewitt (DD-966) | ROH | 26,619,695 | 4/88 |
| | USS Kinkaid (DD-965) | ROH | 23,499,988 | 1/88 |
| | USS Sacramento (AOE-1) | ROH | 19,977,007 | 12/87 |
| | USS Elliot (DD-967) | ROH | 27,779,349 | 9/88 |
| **Newport News Shipbuilding** | USS Pittsburgh (SSN-720) | SRA | 7,055,300 | 7/88 |
| | USS Enterprise (CVN-65) | OH | 34,277,751 | 9/88 |
| | USS George Bancroft (SSBN-643) | OH | 19,400,000 | 3/88 |
| | USS Newport News (SSN-750) | PSA | 3,400,000 | 1/89 |
| | Surface Ship Support Barge | REP | 48,095,123 | 7/89 |
| | USS Oklahoma City (SSN-723) | PSA | 3,367,692 | — |
| | USS Key West (SSN-722) | PSA | 38,000,000 | 12/88 |
| **Norfolk Naval Shipyard** | USS Baton Rouge (SSN-689) | SRA | 5,462,494 | 10/88 |
| | USS Vulcan (AR-5) | DSRA | 4,800,000 | 5/88 |
| **Norfolk Shipbuilding** | USS Fulton (AS-11) | DSRA | 3,413,022 | 3/88 |
| | USS Adroit (MSO-509) | REP | 1,946,025 | 1/88 |
| | AO-178, -179 & -186 | PM | 38,900,000 | — |
| | USS Lawrence (DDG-4) | REP | 4,966,666 | — |
| | Flickertail State (T-ACS-5) | CONV | 15,653,333 | 12/87 |
| | Cornhusker State (T-ACS-6) | CONV | 15,653,333 | 2/88 |
| | USS Puget Sound (AD-36) | ROH | 12,210,546 | 5/88 |
| | USS Moinester (FF-1097) | ROH | 4,538,545 | 1/88 |
| | USS Resolute (AFDM-10) | ROH | 9,200,000 | 6/88 |
| | USS Hunley (AS-31) | DSRA | 4,400,000 | 12/87 |
| | Mormacsea & Mormacsaga (RRF) | UPG | 7,973,482 | — |
| **Northwest Marine Iron Works** | USNS Observation Island (MSC) | OH | 5,498,890 | 2/88 |
| | USS Anchorage (LSD-36) | ROH | 15,800,000 | — |
| | USS Paul Foster (DD-964) | ROH | 26,423,466 | 5/88 |
| **Pennsylvania Shipbuilding** | USS Clark (FFG-11) | SRA | 3,420,709 | 12/87 |
| | USS Sustain (AFDM-7) | ROH | 5,500,000 | 2/88 |
| | USS Patterson (FF-1061) | PM | 5-10 mil/yr | 91 |
| **Philadelphia Naval Shipyard** | USS Independence (CV-62) | SLEP | 240,000,000 | — |
| **Philly ship** | USS Dale (CG-19) | PRA | 7,994,080 | 2/88 |
| **Portsmouth Naval Shipyard** | USS James K. Polk (SSBN-645) | OH | 135,000,000 | 87 |
| | USS Kamehameha (SSBN-642) | ROH | 112,100,000 | 11/88 |
| | USS Albuquerque (SSN-706) & USS Philadelphia (SSN-690) | SRA | 11,416,336 | 11/88 |
| **Puget Sound Naval Shipyard** | USS Nimitz (CVN-68) | REP & OH | — | 89 |
| | **USS Alexander Hamilton (SSBN-617)** | **ROH** | **110,713,798** | **11/88** |
| | **USS Scamp & two other subs** | **DEACT** | **—** | **87-88** |
| **Robert E. Derecktor** | USS Connole (FFG-12) | ROH | 2,500,000 | — |
| **Service Engineering** | USNS Spica (T-AFS-9) | OH | 10,700,000 | — |
| | AE-29, -32-34 | PM | 4,154,000 | 89 |
| | USS Vancouver (LPD-2) | ROH | 13,280,669 | 2/88 |
| | APL-4 Barge | REP | 3,921,562 | 2/88 |
| **Southwest Marine** | USS Dubuque (LPD-8) | OH | 10,000,000 | — |
| | USS Wichita (AOR-1) & USS Kansas (AOR-3) | REP | 41,600,000 | — |
| | USS Ogden (LPD-5) | DSRA | 6,749,238 | 1/88 |
| | USS Pluck (MSO-464) | SRA | 1,041,000 | — |
| | LST-1185, -1186 & -1191 | OH | 35,000,000 | 87-89 |
| | USS Prairie (AD-15) | SRA | 7,156,797 | 1/88 |
| | USS Okinawa (LPH-3) | ROH | 16,114,285 | 7/88 |
| | USS Roark (FF-1053) | PMA | 3,531,443 | 12/87 |
| **Tacoma Boatbuilding** | USNS Hayes (T-AG) | CONV | 33,878,232 | 11/89 |
| **Tampa Shipyards** | T-ACS-7 & -8 | CONV | 43,158,333 | 10/88 |
| **Todd-Galveston** | C-5 (T-AVB) | CONV | 27,500,000 | 87 |
| **Todd-San Pedro** | USS Bolster (ARS-38) | ROH | 4,572,293 | 2/88 |
| **Todd-Seattle** | 8 WHECs | OH | 234,903,000 | 2/91 |
| **USCG-Curtis Bay** | 14 buoy tenders | SLEP | 8,500,000 | — |
| | 16 WMECs | MAINT | — | — |

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

## Navy Update

(continued)

hauls are to be opened to competition among public and qualified commercial shipyards.

**Homeport Policy**

The Congress reaffirmed current policy to reserve short term ship repair work to homeport area shipyards. Short term is defined as work requiring six months or less to complete. An exception is made for Naval Reserve Force ships homeported on the West Coast. Voyage repairs are also exempt from this bidding restriction.

# NAVY RESEARCH AND DEVELOPMENT

### A Major Business Opportunity For Manufacturers, Technology And Engineering Firms

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

International Maritime Associates (IMA) hs just issued a new report examining future business opportunities in the $9.5-billion Navy research and development program. In this report, there is a detailed assessment of each program element—describing the program, showing past and projected funding, naming key contractors and identifying near and long term program direction. This excerpt dealing with ship design shows the type of coverage provided for a specific program element.

This excerpt covers only the surface ship design part of the program with expenditures of between $60 to $100 million annually.

The entire 200+ page report is available from IMA for $550. It can be ordered by contacting: International Maritime Associates, Inc., 835 New Hampshire Avenue, NW, Washington, DC 20037; telephone: (202) 333-8501; (202/333-8504; telex: 64325 IMA.

**Surface Ship Design And Engineering**

This program funds five phases of ship design: (1) exploratory development, (2) advanced concept studies, (3) feasibility studies, (4) preliminary design and (5) contract design and engineering development. Efforts involve improvement in hull forms, concepts to reduce weight and cost, improved machinery integration, development of sybsystem technologies, etc.

Recent work in the first phase includes composite shaft testing, evaluation of low noise gears and model testing a flow smoothing propulsor. Work in phases 2 through 4 includes the NATO frigate feasibility study, evaluation of foreign ship technologies and analysis of SWATH ship designs. Phase 5 work includes land testing the LSD 41 propulsion system, CRP design/testing for the DDG 51 and oceanographic survey ship/AO 177 jumbo/LSD 41CV designs.

**Navy Managers:** David Taylor Naval Ship R&D Center—Bethesda & Annapolis, MD; Naval Sea Systems Command—Washington, DC; Naval Ocean Systems Center—San Diego, CA; and Naval Research Lab—Washington, DC.

**Key Contractors:** J.J. McMullen—Arlington, VA; M. Rosenblatt & Son—New York, NY; Designers & Planners—Arlington, VA; Gibbs & Cox—New York, NY; Adv. Marine Enterprises—Arlington, VA; JJH—Cherry Hill, NJ; George C. Sharp—Arlington, VA; MAR Inc.—Rockville, MD; Westinghouse—Pittsburgh, PA; Advanced Technology—Reston, VA; Seaworthy Systems—Essex, CT; Tracor Hydronautics—Laurel, MD; Band Lavis—Annapolis, MD; Arctec—Columbia, MD; and NKF Engineering—Reston, VA.

**Future Direction**

Exploratory research will include (1) flow-smoothing propulsor design and test, (2) metallic and composite sandwich panels, (3) blast damage algorithms, (4) liquid armor for ship protection, (5) explosive armor side protection systems, (6) GRP superstructure concepts, (7) SWATH structural research, (8) contrarotating homopolar components, (9) rotary diesels for propulsion and gensets, (10) superconducting components, (11) ceramic coating for marine gas turbines and (12) breadboard composite heat exchanger.

Design and engineering development work will include (1) Revolutionary Surface Combatant concepts, (2) Battle Force Combatant, (3) Fast Sealift Initiative SES, (4) Mission Essential Unit, (5) SWATH auxiliary ship design, (6) lightweight structure concepts, (7) ASW helicopter/ship interface, (8) improved missile UNREP technology and (9) demonstration of Arctic hovercraft, (10) NATO frigate design, (11) DDG 51 second flight block upgrade, (12) AGX/AGOR oceanographic ships, (13) AE ammunition ship (may be cut), (14) LCAC block upgrade and (15) standard cargo/weapon elevator components.

**Comments/Issues**

The Navy has begun a major high level study to improve surface ship design. The goal is to produce a family of combatant designs suited to the next century. In an initiating paper, the study group observed (1) basic ship design has not changed since World War II, (2) in contrast, revolutionary changes have occurred in combat systems development over the past 40 years (AEGIS, VLS, Tomahawk), (3) surface combatant acquisition costs have risen more than 480 percent over the past 30 years, (4) shipboard manning requirements are increasing, despite advances in automation, (5) payload/weight ratio has been decreasing—while overall displacement has been increasing and (6) cubic feet per man for habitability and personnel support spaces and storerooms is growing.

The Navy had requested $94.4 million for surface ship design and engineering RDT&E in FY 1988. Congress provided $67.0 million—a cut of 29 percent. Showing that funding priorities are weighted in favor of submarine design and development, Congress added $100 million this year for advanced attack submarine design while cutting surface ship design efforts. ■

IMA has just published a detailed assessment of future spending for Navy research and development. This 200+ page report will interest all firms doing business with the Navy. It provides a detailed projection of spending by specific program, assesses policy and technical issues driving each program, identifies current competitors, provides a contract history and identifies key contacts for developing business. The report is available for $550 by contacting International Maritime Associates, 835 New Hampshire Ave., NW, Washington DC 20037; Telephone 202 333-8501; Fax 202 333-8504; Telex 64325 IMA

## Westmont To Install Portal Crane For Navy At Mare Island Yard

Westmont Industries of Los Angeles, Calif., was recently awarded a contract with the Department of the Navy to engineer, fabricate and install one 100-long-ton portal crane for Mare Island Naval Shipyard, South Waterfront Area, Vallejo, Calif.

Westmont is also in the fabrication phase of another contract with the Department of the Navy to provide four 25-ton-capacity portal cranes. Two portal cranes will be installed at Kings Bay Submarine base, St. Marys, Ga., and the other two will be installed at the Bangor Submarine base near Bremerton, Wash. The cranes will be used to service the trident submarines.

For additional information and free literature from Westmont,

**Circle 55 on Reader Service Card**

# Southern California Sections Of American Society Of Naval Engineers To Hold Centennial Symposium

## February 18-19, San Diego, California

The purpose of the symposium is to provide government and industry personnel with a forum to ponder the challenges that will confront the naval engineering profession in the future. The aim is to stimulate serious thought on how to improve the naval engineer's ability to apply engineering and technology to the design, construction and ownership of naval ships, aircraft and combat systems. The symposium will concentrate on the role of the engineer and what will be required of him.

Leaders from government, industry and academia will present a technical program on the practice of naval engineering and the human element in modern seagoing technology. Among the notable speakers will be Vice Adm. **William H. Rowden,** USN, Commander, Naval Sea Systems Command, who will present the keynote address on Thursday, February 18, and Vice Adm. **Benedict L. Stabile,** USCG (Ret.), president of Webb Institute of Naval Architecture, who will present "Naval Engineering—Is the Past Prologue?" at lunch on February 18. Thursday evening's banquet speaker is scheduled to be Adm. **Kinnaird R. McKee,** USN, Director, Navy Nuclear Power.

On Friday morning, February 19, a panel of experts, moderated by Capt. **Clark C. Graham,** USN, Commander, David Taylor Naval Ships Research & Developmental Center, will discuss the technological and human challenges facing naval engineers. The panel will include: **Lester Rosenblatt,** M. Rosenblatt & Son and former president of the Society of Naval Architects and Marine Engineers (SNAME); Vice Adm. **George Davis,** USN, Commander, Naval Surface Forces-Pacific; **Ronald K. Kiss,** Director of Shipbuilding, Office of Assistant Secretary of the Navy; **Arnold P. Moore,** director of design engineering, Ingalls Shipbuilding; and Capt. **H.V. Habermeyer,** USN, commandant of midshipmen, U.S. Naval Academy. There will also be technical sessions on "Personal Perspectives" and "Man's Relationship to Combat System Technology."

A special exhibit at the symposium will display the America's Cup, regained last year by **Dennis Connor,** after he had lost it to the Alan Bond Syndicate of Australia in 1983.

The Southern California Sections of the American Society of Naval Engineers (ASNE) will hold a symposium entitled "Naval Engineeering—The Challenge of the Next 100 Years" in honor of the society's centennial on February 18-19 in San Diego, Calif. The symposium, which is also being sponsored by the Supervisors of Shipbuilding, Conversion and Repair of San Diego and Long Beach and the Naval Weapons Engineering Station, Port Hueneme, will be held at the Hotel Del Coronado, Coronado, Calif.

VADM **William Rowden**

VADM **Benedict Stabile,** USCG (Ret.)

For further information on the symposium, including registration, contact: Capt. **Erick N. Swenson,** USN (Ret.), 2073 Smokewood Avenue, Fullerton, Calif. 92631, or telephone: (714) 732-4168.

**TECHNICAL PROGRAM**

**Thursday, February 18**

**Opening Session**

**9 a.m.**—Call to order, Rear Adm. **E.J. Otth,** USN (Ret.)

"Welcome address," Dr. **Alfred Skolnick,** president, ASNE.

"Keynote address," Vice Adm. **William H. Rowden,** USN, Commander, Naval Sea Systems Command.

**Session I**
**Personal Perspectives**
San Diego Section

**Introduction: Del J. Herbert**

**Moderator:** Rear Adm. **Frederick C. Johnson,** USN (Ret.)

**10 a.m.**—"The Naval Reserve and Naval Engineering," by Comdr. **Watson W. Lunt,** USNR (Ret.), Solar Turbines Inc.

**10:40 a.m.**—"The Future of Women in Naval Engineering," by **Susan M. Lee Bales,** Executive Panel for Chief of Naval Operations.

**11:20 a.m.**—"The Naval Engineer at Sea—Challenges & Opportunities," by Capt. **Charles Wasson,** USN, Supervisor of Shipbuilding, Newport News, Va.

**12:15 p.m.**—Lunch

"Introduction," Capt. **Charles S. Niederman,** USCG (Ret.)

**Speaker:** Vice Adm. **Benedict L. Stabile,** USCG (Ret.), president, Webb Institute of Naval Architecture, will present "Naval Engineering—Is the Past Prologue?"

**Session II**
**Man's Relation To**
**Combat System Technology**
Channel Islands Section

"Introduction," Comdr. **George C. Garden, USN.**

**Moderator:** Rear Adm. **John D. Beecher,** USN (Ret.)

**2:30 p.m.**—"Automated Technical Information—Supporting System Readiness," by Dr. **Robert J. Smillie,** Naval Personnel R&D Center, San Diego.

**3:10 p.m.**—"Integrating Smart Machines and Smart People—The Engineering Challenge of AI," by **John R. Gersh,** Johns Hopkins University, Applied Physics Laboratory.

**3:50 p.m.**—"Operational Training—Where Tactics and Engineering Mix," by **Robert Hynes,** Vitro Corporation, Oxnard Division.

**7 p.m.**—Reception

**8 p.m.**—"Introduction," Rear Adm. **E.J. Otth,** USN (Ret.)

**Speaker:** To be announced.

**10 p.m.**—Dancing

**Friday, February 19**

**8:30 a.m.**—"Introduction," Capt. **James B. Acton,** USNR (Ret.)

**Opening address:** Dr. **Robert M. Hillyer,** technical director, Naval Ocean Systems Center, will present "The Role of the Naval Laboratory in Making Naval Engineers."

**Session III**
**Meeting the Technological**
**& Human Challenges**
Long Beach/Greater L.A. Section

"Introduction," **Michael R. Donovan**

**Moderator:** Capt. **Clark Graham,** USN, Commanding Officer, David Taylor Research Center.

**9:15 a.m.**—A brief 10-minute presentation by each panel member.

**Panel Members**

Rear Adm. **John D. Beecher,** USN (Ret.), NKF Industries

(2) Capt. **H.V. Habermeyer Jr.,** USN, commandant of midshipmen, U.S. Naval Academy

(3) **Lester Rosenblatt,** M. Rosenblatt & Son

(4) **Arnold P. Moore,** Director of design engineering, Ingalls Shipbuilding

(5) Vice Adm. **George W. Davis,** USN, Commander, Naval Surface Forces–U.S. Pacific Fleet

(6) **Ronald K. Kiss,** Director of Shipbuilding, Office of Ass't Secretary of the Navy (Shipbuilding and Logistics)

**10:45 a.m.**—Audience/Panel Discussion

**Noon**—Adjournment

## Navy Plans To Develop ASW Minisubmarine Fleet At Cost Of $5 Billion

The U.S. Navy and five military contractors are reportedly developing a $5-billion fleet of robotic minisubmarines for a number of important Antisubmarine Warfare (ASW), underwater intelligence and military missions.

According to a recent report, the Navy is planning to develop and build a fleet of 379 unmanned miniature submarines at a cost of $5 billion for a wide range of missions including: minelaying; leading manned vessels through mine fields; decoying enemy warships; and underwater intelligence-gathering missions. Additionally, Antisubmarine Warfare experts contend that the minisubs could be used to close the gap between the Soviet Union and the U.S. in the number of active submarines. Presently, the Soviet fleet stands at 342 submarines, while the U.S. fields only 136.

The design of the autonomous underwater vehicle (AUV), as proposed by Martin Marietta's Aero and Naval Systems Division, Baltimore, Md., calls for a 30-foot-long, battery-powered vehicle. The AUV would be fitted with sophisticated electronics, cameras and sensors to gather intelligence and perform surveillance. The prototype is expected to be operational in 1989.

Other companies working prototypes are: the Oceanics Division of Westinghouse Electric; the Underseas Systems Division of Honeywell; Lockheed Corporation's Marine Systems Group; and Rockwell International's Marine Systems Division.

At present, the Navy plans to invest about $500,000 annually on the AUV's development until the end of this decade. By the mid-1990s, the government expects to invest about $500 million annually on the program.

Under the contract, Anadec, a professional services firm specializing in logistics, program and financial management systems for the government and industry, will perform program-level resource planning, program planning and evaluation, and contract monitoring associated with the Navy's acquisition of the AN/BSY-1 submarine combat system.

## General Dynamics Forms Undersea Warfare Center

General Dynamics Corporation recently announced the formation of an Undersea Warfare Center in Washington, D.C. The center will be headed by **Gerald A. Cann,** staff vice president-Undersea Warfare Center.

The new company group will pursue emerging business opportunities in advanced submarine sensor systems and antisubmarine warfare concepts/technologies.

For further information on the new Undersea Warfare Center,

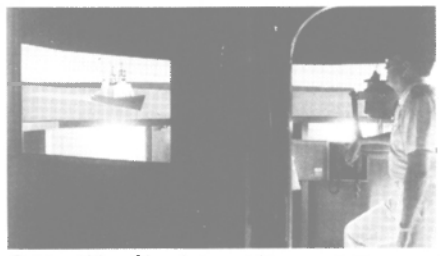
## Navy Shiphandling Simulator Training Expanded

January marked the one-year anniversary of shiphandling training courses at Newport, R.I., for PCO/PXO's and department heads attending the Surface Warfare Officers School. Over 850 naval officers have attended either the 20- or the 40-hour course at the simulator complex. Over 20,000 hours of at-sea experience ashore!

Throughout the past year over a dozen flag officers have witnessed demos of the training underway. Among the comments registered by them in the visitors log are: "Best trainer in the Surface Navy." "Wish we had this facility when I was a junior officer."

The shiphandling courses are designed to provide the officers with an opportunity to practice and sharpen their "seamen's eye" without risk to their ship or crew. The training facility operated under Navy contract by MarineSafety International Inc. utilizes four ship simulators including a unique bridge wing simulator for docking and close-up shiphandling exercises.

Whenever possible officers receive training on the type of ship to which they will be assigned. Currently, the handling characteristics of the following ship types are simulated: FFG-7, DD-963, FF-1052, AFS, LST, AOR, AO-177 ARS-50, DDG-2 and MCM. MarineSafety plans to make additional ship types and operational areas available this year.



Bridge Wing Simulator at Newport. Perspective is key to judgment, so MSI utilizes the world's first wing simulator with 45-degree vertical in Navy training.

In addition to increasing the types of ships and geographic areas available, the shiphandling training will be available to non-pipeline personnel from the Fleet, reserve officers and entire ships navigation teams. Also, surface shiphandling training for submarine officers will be offered.

Each simulator exercise requires a number of computer data bases that produce the visual scene, ship response characteristics, radar display, and depth, bank and current effects. All of the data bases in use at Newport can eventually be used to bring hands-on training to deck officers at Fleet bases while their ships are in port.

For more information and free literature from MarineSafety International,

**Circle 19 on Reader Service Card**

## $25-Million Navy Order For Caterpillar Generators Announced By H.O. Penn

Caterpillar, Inc. and H.O. Penn Machinery recently announced the sale of twenty 3608 diesel generator sets to the U.S. Navy. The generators will provide on-board electrical power in new Fast Combat Support ships, currently under construction in San Diego by the National Steel and Shipbuilding Company.

Delivery of the first five generator sets, valued at $6.5 million, will be completed by early 1989. The remaining 15 engines will be delivered through 1993, pending Congressional defense funding. Total value of the sale is expected to exceed $25 million, including associated parts.

The 48,500-ton ships are designed to provide rapid redistribution of ammunition, petroleum products, provisions, and stores from shuttle ships to carrier battle groups under way. Five Cat 3608 diesel generator sets on each vessel will provide 2,500 kw each totaling 12,500 kw.

The generator sets will undergo shock testing this summer. Shock testing duplicates combat conditions.

H.O. Penn's Power Generation Division is experienced in fulfilling all of their customer's power needs, including marine and industrial standby and prime electrical generator sets, cogeneration systems, and peak power shaving systems, as well as a wide range of diesel engines for marine propulsion, and industrial applications.

H.O. Penn Machinery Company, Inc. was named the Caterpillar construction and engine dealer for Connecticut and lower New York State in 1933, and now maintains six established branches.

For more information on the Caterpillar marine generator sets, or for other quality Caterpillar equipment, parts, and service,

**Circle 38 on Reader Service Card**

## NKF Awarded $2.8-Million Contract For ASW Support Work

NKF Engineering, Inc., Reston, Va., was recently awarded a three-year, $2.84-million contract by the Naval Ocean Systems Center (NOSC) to provide technical support for the FF-1052 Antisubmarine Warfare (ASW) suite upgrade project.

NKF, a research and engineering firm, will support systems analysis, engineering, design, integration, test and fleet introduction of the ASW sensor and weapon control elements with all other shipboard systems in the NOSC Antisubmarine Warfare Surface Ship Improvement Program.

# MAJOR NAVY CONTRACTS

The following special section features the latest U.S. Navy contract awards for shipbuilding, ship repair, electronics, communications and weapons. This special section covers major Navy contracts awarded between September 23 and December 23, 1987. For contract awards prior to these dates, refer to the Naval Technology & Shipbuilding Supplement in the December issue of MR/EN.

**September 23**

**Raytheon Company,** Wayland, Mass., was awarded a **$11,370,000** modification to a previously awarded fixed-price contract for NATO Seasparrow missile system improvement for LHD-2 and NATO navies. Work will be performed in Wayland and is expected to be completed in October 1990. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-5609).

**AT&T Technologies Incorporated,** Greensboro, N.C., was awarded a **$33,576,770** cost-plus-fixed-fee contract for an enhanced modular signal processor for updating the Surveillance Towed Array Ship System (SURTASS) and the Submarine Advanced Combat System (SUBACS). Work will be performed in Burlington, N.C. (3.4 percent); Greensboro, N.C. (42.7 percent); and Whippany, N.J. (53.9 percent) and is expected to be completed in December 1988. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-81-C-7318).

**The Texas Parks and Wildlife Department,** Austin, Texas, was awarded a **$5,080,000** grant for restoration of the battleship Texas. The grant is Congressionally mandated under Public Law 99-591. The work will be performed in Austin and the funds will expire at the end of the current fiscal year. The Office of Naval Research, Washington, D.C., is the awarding activity (N00014-87-G-0051).

**September 24**

**Sperry Corporation,** Great Neck, N.Y., was awarded a **$13,977,027** modification to a previously awarded cost-plus-award-fee contract for restoration of USS Stark's (FFG-31) combat system. Work will be performed in Great Neck and is expected to be completed in September 1988. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-83-C-7126).

**Pennsylvania Shipyard Company,** Chester, Pa., was awarded a **$5,492,937** firm-fixed-price contract for Drydocking Planned Restricted Availability for Sustain (AFDM-7). Work will be performed in Chester and is expected to be completed February 9, 1988. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-85-H-8200).

**Mine Safety Appliances,** Murrysville, Pa., was awarded a **$6,829,200** order to furnish 9,756 oxygen breathing apparatus units. Work will be performed in Evans City, Pa. and is expected to be completed in August 1988. The Navy Ships Parts Control Center, Mechanicsburg, Pa., is the contracting activity (N00104-85-G-0368).

**September 25**

**AT&T Technologies Incorporated,** Greensboro, N.C., was awarded a **$20,451,000** firm-fixed-price contract for oceanographic equipment. Work will be performed in Burlington, N.C. (52 percent); Greensboro, N.C. (41 percent); and Whippany, N.J. (7 percent) and is expected to be completed in November 1990. The Space and Naval Warfare Systems Command, Washington, D.C., is the contracting activity (N00039-87-C-0023).

**Gould Defense Systems Incorporated,** Cleveland, Ohio, was awarded a **$32,491,462** firm-fixed-price contract for depot/factory test equipment and in-service support equipment for MK 48 torpedo Advanced Capability (ADCAP). Work will be performed in Cleveland and is expected to be completed in March 1992. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-6437).

**General Dynamics Corporation, Electric Boat Division,** Groton, Conn., was awarded a **$3,931,896** modification to a previously awarded cost-plus-fixed-fee contract for planning yard support for SSBN class operational submarines. Work will be performed in Groton and is expected to be completed September 30, 1988. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-86-C-2003).

**Service Engineering Company,** San Francisco, Calif., was awarded a **$3,921,562** firm-fixed-price contract for repairs and alterations for messing and berthing barge APL-4. Work will be performed in San Francisco and is expected to be completed February 24, 1988. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-85-H-8717).

**Hughes Aircraft Company,** Fullerton, Calif., was awarded a **$16,566,477** firm-fixed-price contract for UYQ-21 displays for DDG-51 and DDG-52; LHD-2; NIPS. Work will be performed in Fullerton and is expected to be completed in August 1991. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-5250).

**Raytheon Service Company,** Virginia Beach, Va., is being awarded a **$10,743,096** cost-plus-fixed-fee contract for a new threat upgrade installation kit for CG-26 class ships. Work will be performed in Ventura, Calif. and is expected to be completed in September 1988. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-2288).

**September 29**

**Raytheon Company,** Wayland, Mass., was awarded a **$20,529,616** firm-fixed-price contract for MK 74 Ordnance Alterations (ORDALTS) for the Tartar Program. Work will be performed in Wayland and is expected to be completed in September 1991. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-5342).

**Hughes Aircraft Company,** Fullerton, Calif., was awarded a **$21,638,982** modification definitizing a previously awarded firm-fixed-price contract for combat control system MK 1 and fire control system MK 117 for SSN-594, 637 and 688 class submarines. Work will be performed in Fullerton and is expected to be completed in June 1990. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-6064).

**September 30**

**Motorola Incorporated,** Scottsdale, Ariz., was awarded a **$36,380,595** firm-fixed-price contract for the MK 45 Mod 5 target detecting device/shroud assembly. Work will be performed in Scottsdale and is expected to be completed in April 1990. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-5347).

**Portsmouth Naval Shipyard,** Portsmouth, N.H., was the successful offeror in a competitive program between public and private shipyards for the Selected Restricted Availabilities for SSN-706 and SSN-690. The value of this effort is **$11,416,336.** Work will be performed in Groton, Conn. and is expected to be completed November 1, 1988. The Naval Sea Systems Command, Washington, D.C., is the requiring activity

**Textron Marine Systems,** New Orleans, La., was awarded a **$9,900,000** cost-plus-fixed-fee contract for contractor interim support services for the Landing Craft Air Cushion (LCAC) Program. Work will be performed in Panama City, Fla. and is expected to be completed March 31, 1988. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-2263).

**Sperry Corporation,** St. Paul, Minn., was awarded a **$29,692,754** modification definitizing a previously awarded firm-fixed-price contract for the AN/USQ-69(V) data terminal set and OL-267(V)/UYK data terminal group for various ships including LHD-2, CG-64, CG-65, CG-66, CG-67, CG-68, BB-64, CVN-73, FFG-31, DDG-52, DDG-53 and DDG-54. Work will be performed in Clearwater, Fla. and is expected to be completed in June 1989. This contract combines purchases for the U.S. Navy (99 percent) and Spain (1 percent) under the Foreign Military Sales Program. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-86-C-5288).

**Hughes Aircraft Company,** Fullerton, Calif., was awarded a **$28,937,000** fixed-price contract for AN/UYA-4 display equipment for various U.S. and Australian ships. Work will be performed in Fullerton and is expected to be completed December 30, 1989. This contract combines purchases for the U.S. Navy (99.3 percent) and Australia (.7 percent) under the Foreign Military Sales program. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-5260).

# Navy Secretary Webb Guest Speaker At Joint Meeting Of Propeller Club-U.S.M.M.A. Alumni

The Secretary of the Navy, **James H. Webb Jr.** was the guest speaker at a recent joint meeting of the Propeller Club of New York and the Port of New York Chapter of the United States Merchant Marine Academy Alumni Association held at the Roosevelt Hotel in New York City. Also in attendance was the Honorable **John Gaughan,** Maritime Administrator.

With more than 600 in attendance, Secretary **Webb** discussed the role of U.S. defense forces and how their obligations might expand after the recent signing of the INF Treaty. The secretary questioned how the Navy would meet its ever-widening worldwide obligations in the face of recent budget cuts.

"We may have to examine the military utility of our force structure in an area of limited resources," he said.

"I worry that with the INF Treaty just signed," he continued, "and with renewed emphasis on conventional defenses in the NATO sector, that we may be doing ourselves a strategic disservice by putting more funds in conventional resources into Central Europe at the expense of our other interests around the world.

"This is going to be an intense debate. The future structure of the Defense Department and in particular the Navy will be at the center of that debate."

Secretary of the Navy **James H. Webb Jr.**

The secretary also cited the recent report submitted by the Commission on Merchant Marine and Defense, which warns the President of a growing threat to the national security resulting from the decline of the nation's maritime industry.

Secretary **Webb** said that the nation's shipbuilding problems would be brought before Congress at hearings this year.

Other activities at the joint session included the presentation of the Port of N.Y. Chapter/-USMMAA's annual award to Capt. **Robert E. Hart,** president, Marine Index Bureau. The award, which is for leadership in the maritime community and dedication to the marine industry, was presented by **Peter Clark,** president of the alumni association.


Attendees at the joint meeting of the Propeller Club, Port of N.Y. and U.S. Merchant Marine Academy Alumni Association are (L to R): **Peter D. Clark,** president, N.Y. Chapter-USMMAA; Hon. **John Gaughan,** Maritime Administrator, Dep't of Transportation; **Charles Cushing,** national president-USMMAAA; **James H. Webb,** Secretary of Navy and guest speaker; **Jerome E. Joseph,** president, Port of N.Y. Propeller Club; and Capt. **Robert E. Hart,** president, Marine Index Bureau and award recipient.

**Bell Aerospace Textron,** Wheatfield, N.Y., was awarded a **$9,308,346** contract to definitize a previously awarded letter contract for three AN/SPN-46(V) Automatic Carrier Landing Systems for shipboard use. Work will be performed in Niagara Falls, N.Y. and is expected to be completed in August 1988. The Space and Naval Warfare Systems Command, Washington, D.C., is the contracting activity (N00039-86-C-0126).

**October 1**

**General Electric Company,** Syracuse, N.Y., was awarded a **$81,575,261** fixed-price contract for supplies and services for AN/SQS-53C sonar ranging-detecting sets. Work will be performed in Syracuse and is expected to be completed in July 1991. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-85-C-6116).

**International Business Machines Corporation, Federal Systems Division,** Manasas, Va., was awarded a **$31,441,056** long lead letter contract for detailed design, engineering and software tasks for the AN/BSY-1(V) Team Trainer (TT) and the Weapons Launch System Operational Trainer (WLSOT). Work will be performed in Manassas and is expected to be completed in January 1988. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-6078).

**International Business Machines Corporation, Federal Systems Division,** Manasas, Va., was awarded a **$68,200,000** modification to a previously awarded firm-fixed-price contract for BQQ-5 sonar conversion kits for SSN-594, 637 and 688 class submarines. Work will be performed in Manassas, Va. (69 percent) and Owego, N.Y. (31 percent) and is expected to be completed in June 1990. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-6025).

**Rockwell International,** Anaheim, Calif., was awarded a **$10,210,000** modification to a previously awarded fixed-price-incentive contract for long lead materials and labor for AN/USQ-82(V) data multiplex systems. Work will be performed in Anaheim and is expected to be completed in February 1988. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-85-C-7130).

**Tacoma Boatbuilding Company,** Tacoma, Wash., was awarded a **$18,590,001** firm-fixed-price contract for construction of two Ocean Surveillance Ships (T-AGOS 11 and 12). Work will be performed in Tacoma and is expected to be completed October 1, 1989. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-2045).

**October 2**

**United Technologies Corporation, Hamilton Standard Division,** Windsor Locks, Conn., was awarded a **$50,000,000** letter contract for materials for submarines. Work will be performed in Windsor Locks and is expected to be completed in March 1992. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-4581).

**Raytheon Corporation,** Wayland, Mass., was awarded a **$35,163,292** firm-fixed-price contract for AN/SPS-49 radars for CG's and Aegis ships. Work will be performed in Wayland and is expected to be completed in November 1990. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-5236).

**Admiral Towing and Barge Corporation of Ohio,** Cleveland, Ohio, was awarded a **$5,461,232** firm-fixed-price contract for harbor service for Pensacola, Fa. Service will be performed utilizing four U.S.-flag tugs: Michigan, New Mexico, Maryland and Tennessee. The contract performance is 15 months with three additional 12 month options. The Military Sealift Command, Washington, D.C., is the contracting activity (N00033-88-C-1200).

**October 5**

**Ingalls Shipbuilding Incorporated,** Pascagoula, Miss., was awarded a **$57,768,446** modification to a previously awarded cost-plus-award-fee letter contract for class standard equipment for CG-47 class cruisers. Work will be performed in Pascagoula and is expected to be completed in January 1992. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-2165).

**October 6**

**Analysis and Technology Incorporated,** Arlington, Va., was awarded a **$14,822,176** cost-plus-fixed-fee contract for technical services for Undersea Warfare Operating guidelines. Work will be performed in Arlington and is expected to be completed September 30, 1991. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-6022).

**October 7**

**Gould Defense Systems Incorporated,** Cleveland, Ohio, was awarded a **$54,788,848** modification to a previously awarded fixed-price-incentive contract for pilot production for MK 48 torpedo Advanced Capability (ADCAP). Work will be performed in Cleveland and is expected to be completed in December 1992. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-86-C-6162).

**Rockwell International Corporation,** Anaheim Calif., was awarded a **$34,373,737** modification to a previously awarded contract for 21 electrically suspended gyronavigators plus support. Work will be performed in Anaheim (85 percent) and El Paso, Texas (15 percent) and is expected to be completed in November 1989. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-86-C-4095).

**October 14**

**Rockwell-Marconi JVT,** Richardson, Texas, was awarded a **$14,017,000** firm-fixed-price contract for the full scale engineering development of the High Frequency, Anti-Jam communications system and Link 11 improvements for ship, submarine, shore and air use. Work will be performed in Richardson, Texas (40 percent); Cedar Rapids, Iowa (30 percent); and Chelmesford, England (30 percent), and is expected to be completed in December 1988. The Space and Naval Warfare Systems Command, Washington, D.C., is the contracting activity (N00039-87-C-0282).

**October 16**

**Newport News Shipbuilding and Dry Dock Company,** Newport News, Va., was awarded a **$5,444,224** modification to a previously awarded fixed-price-incentive contract for surface ship support barge alteration work. Work will be performed in Newport News and is expected to be completed by July 14, 1989. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-86-C-2078).

**Arowel Corporation,** San Diego, Calif.,

## PRC Acquires Stealth Coating Technology From McDonnell Douglas

**Dean M. Willard,** president and chief operating officer of the Products Research & Chemical (PRC) Corporation, Glendale, Calif., recently announced that his firm had acquired from McDonnell Douglas Corporation, St. Louis, Mo., exclusive license rights to McDonnell Douglas's "Magnetic RAM" (radar absorbing material) coating technology.

"The related coating materials are intended for use in low-observable applications to attenuate radar and are based on proprietary PRC resin systems," said Mr. **Willard.**

"The McDonnell Aircraft Division of McDonnell Douglas Corporation and PRC have, accordingly, formed a joint marketing effort to make this technology available to the U.S. defense industry," he said.

This type of coating technology is used in Stealth applications.

PRC is an international manufacturer and marketer of specialty chemical polymers, coatings, sealants and adhesives for the aerospace, marine, defense, energy conservation and telecommunication industries.

For free literature on the products offered by PRC,

**Circle 35 on Reader Service Card**

## Newport News Awarded $21.9 Million By Navy For Sub Repairs

Newport News Shipbuilding & Drydock Co., Newport News, Va., recently was awarded U.S. Navy contracts worth $21.9 million for ballistic-missile submarine repairs and modifications.

# Ingalls Awarded Navy Contract Worth $378.7 Million To Build Third LHD Ship

The Ingalls Shipbuilding Division of Litton Industries, Pascagoula, Miss., was recently awarded a $378.7-million contract by the U.S. Navy to construct the third ship of the Wasp Class of amphibious assault ships, LHD-3, and to commence preliminary work on a fourth LHD.

At present, Ingalls is constructing the LHD-1 Wasp, which was recently christened, and securing material for the LHD-2 Essex. The LHD-1 is expected to be delivered in the spring of 1989, while construction on the LHD-2 will begin this summer.

This new award, $26 million of which is for advanced procurement of material for LHD-4, is a modification of a September 1986 contract, which included construction funding for LHD-2 and options for LHD-3 and -4.

Construction of the LHD-3, which has been tentatively named Kearsage, is expected to commence in 1989. The construction contract for the LHD-4 is expected to be awarded in December of this year.

Amphibious assault ships have an overall length of 844 feet and a beam of 106 feet. The displacement is 40,500 tons. The primary mission of the Wasp Class vessels is the embarkation, deployment, landing and support of U.S. Marine forces.

## Major Navy Contracts

(continued)

was awarded a **$3,318,868** firm-fixed-price contract for Selected Restricted Availability (SRA) for USS Constellation (CV-64). Work will be performed in San Diego and is expected to be completed February 28, 1988. The Supervisor of Shipbuilding, Conversion and Repair, San Diego, Calif., is the contracting activity (N00024-85-H-8107).

**October 20**

**Atlantic Dry Dock Corporation,** Fort George Island, Fla., was awarded a **$6,950,000** firm-fixed-price contract for the Drydocking Selected Restricted Availability (DSRA) for USS Aubrey Fitch (FFG-34). Work will be performed in Fort George Island and is expected to be completed March 15, 1988. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-85-H-8111).

**Southwest Marine Incorporated,** Terminal Island, Calif., was awarded a **$6,749,238** modification to a previously awarded firm-fixed-price contract for Drydocking Selected Restricted Availability (DSRA) for USS Ogden (LPD-5). Work will be performed in Terminal Island. The Supervisor of Shipbuilding, Conversion and Repair, Long Beach, Calif., is the contracting activity (N00024-85-H-8222).

**VSE Corporation,** Alexandria, Va., was awarded a **$3,605,275** cost-plus-firm-fixed-fee contract for vehicle design support of the Assault Amphibious Vehicle (AAV-7A1). Work will be performed in Alexandria and is expected to be completed October 22, 1992. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-88-C-2037).

**October 21**

**Bender Shipbuilding and Repair Company Incorporated,** Mobile, Ala., was awarded a **$6,428,920** firm-fixed-price contract for the drydocking and overhaul of USNS Sirius, a Military Sealift Command combat stores ship. Work will be performed in Mobile. The Military Sealift Command, Atlantic, is the contracting activity (N62381-88-C-0200).

**November 2**

**Ingalls Shipbuilding Inc.,** Pascagoula, Miss., was awarded a **$28,700,000** modification to a previously awarded cost-plus-award-fee contract for the production phase of the restoration of the USS Stark (FFG-31). The work is expected to be completed August 31, 1988. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-8522).

**November 4**

**Westinghouse Electric Corporation, Bettis Atomic Power Laboratory,** Wilkins Township, Pa., was awarded a **$194,400,000** modification to a previously awarded cost-plus-fixed-fee contract for naval nuclear propulsion research and development. The work is expected to be completed in September 1988. NAVSEA is the contracting activity (N00024-79-C-4027).

**General Electric Company, Knolls Atomic Power Laboratory,** Schenectady, N.Y., was awarded a **$114,600,000** modification to a previously awarded cost-plus-fixed-fee contract for naval nuclear propulsion research and development. The work is expected to be completed in September 1988. NAVSEA is the contracting activity (N00024-79-C-4027).

**November 5**

**General Dynamics, Electric Boat Division,** Groton, Conn., was awarded a **$102,300,000** modification to a previously awarded cost-plus-fixed-fee contract for steam and electric plant development for the Seawolf (SSN-21). The work is expected to be completed November 30, 1994. NAVSEA is the contracting activity (N00024-87-C-4086).

**Newport News Shipbuilding and Dry Dock Co.,** Newport News, Va., was awarded a **$7-million** firm-fixed-price contract for Selected Restricted Availability (SRA) for USS Pittsburgh (SSN-720). Work is expected to be completed in July 1988. The contract was awarded by the Naval Sea Systems Command, Washington (N00024-88-C-2022).

**November 6**

**Norfolk Shipbuilding and Drydock Corp.,** Norfolk, Va., was awarded a **$3.4-million** firm-fixed-price contract for Drydocking Selected Restricted Availability (DSRA) for USS Fulton (AS-11). Work is expected to be completed in March 1988. The contract was awarded by the Supervisor of Shipbuilding, Conversion and Repair, Groton, Conn. (N00024-85-H-8195).

**November 13**

**Newport News Shipbuilding and Dry Dock Co.,** Newport News, Va., was awarded a **$34.3-million** modification to a previously awarded cost-plus-fixed-fee contract for the Complex Overhaul of USS Enterprise (CVN-65). Work is expected to be completed in September 1988. The contract was awarded by the Naval Sea Systems Command, Washington (N00024-86-C-2078).

**Newport News Shipbuilding and Dry Dock Co.,** Newport News, Va., was awarded a **$3.1-million** modification to a previously awarded cost-plus-fixed-fee contract for planning yard services for nuclear powered submarines. Work is expected to be completed in September 1988. The contract was awarded by the Naval Sea Systems Command, Washington (N00024-85-C-4020).

**November 18**

**General Dynamics Corp., Electric Boat Division,** Groton, Conn., is being awarded a **$17.5-million** cost-plus-fixed-fee contract for engineering services for the SSN-21 Seawolf class submarine. Work is expected to be completed Sept. 30, 1988. The contract was awarded by the Naval Sea Systems Command, Washington (N00024-87-C-2011).

**November 20**

**Ocean Systems Engineering Inc.,** Houston, is being awarded a **$3 million** firm-fixed-price-contract to manufacture one unmanned tethered work submersible for cable operation. Work is expected to be completed in 1988. The contract was awarded by the Naval Supply Center, Norfolk, Va. (N00189-88-C-0069).

**Continental Maritime,** San Francisco, Calif., is being awarded a **$10 million** firm-fixed-price contract with performance incentive for Drydocking Phased Maintenance Availability for USS Mars (AFS-1). Work is expected to be completed May 10, 1988. The contract was awarded by the Naval Sea Systems Command, Washington (N00024-85-H-8218).

**Boston Whaler Inc.,** Rockland, Mass., is being awarded a **$4.8 million** letter contract for 122 rigid raiding craft. Work is expected to be completed in September 1988. The contract was awarded by the U.S. Marine Corps, Washington (M00027-88-C-0015).

**November 24**

**AT&T Technologies,** Greensboro, N.C., is being awarded a **$15 million** cost-plus-fixed-fee contract for oceanographic research and engineering. Work is expected to be completed Sept. 30, 1988. The contract was awarded by the Space and Naval Warfare Systems Command, Washington (N00039-88-C-0069).

**December 2**

**Rockwell International,** Anaheim, Calif., was awarded a **$8,475,391** cost-plus-fixed-fee contract for maintenance and repair of navigation subsystems for the Trident Missile Program. Work will be performed in Anaheim, California, and is expected to be completed June 30, 1990. The Strategic Systems Program Office, Washington, D.C., is the contracting activity (N00030-88-C-0044).

**December 8**

**ANADAC Incorporated,** Arlington, Va., was awarded a **$9,434,936** cost-plus-fixed-fee contract for program management support services for the AN/BSY-1 Submarine Combat System. Work will be performed in Arlington and is expected to be completed September 30, 1991. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-88-C-6090).

**EG&G Washington Analytical Services Center Incorporated,** Rockville, Md., was awarded a **$22,477,739** cost-plus-fixed-fee contract for system engineering and integrated logistic support services for the AN/BSY-1 Submarine Combat System. Work will be performed in Arlington and is expected to be completed September 30, 1991. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-88-C-6089).

**General Electric Company,** Pittsfield, Mass., was issued a **$42,767,493** modification to a previously awarded cost-plus-incentive-fee contract for design, development and production of fire control systems for the Trident Missile Programs. Work will be performed in Pittsfield and is expected to be completed December 31, 1989. The Strategic Systems Program Office, Washington, D.C., is the contracting activity (N00030-84-C-0022).

**December 10**

**Norfolk Naval Shipyard,** Portsmouth, Va., is the successful offeror in a competitive program between public and private sector shipyards for the Selected Restricted Availability (SRA) of USS Baton Rouge (SSN-689). Norfolk Naval Shipyard was assigned the SRA on a firm-fixed-price basis. The price for this effort is **$5,462,494.** Work will be performed in Norfolk, Va., and is expected to be completed October 12, 1988. The Naval Sea Systems Command, Washington, D.C., is the requiring activity.

**December 16**

**The Singer Company,** Little Falls, N.J., was awarded a **$11,413,416** cost-plus-fixed-fee contract for engineering services for the Trident Missile Program. Work will be performed in Wayne, N.J., and is expected to be completed September 30, 1988. The Strategic Systems Program Office, Washington, D.C., is the contracting activity (N00030-88-C-0008).

**December 17**

**Westinghouse Electric Corp.,** Marine Division, Sunnyvale, Calif., received a **$58-million** contract for main propulsion complexes for SSN-688 class submarines. Work is expected to be completed in September 1990. The contract was awarded by the Naval Sea Systems Command, Washington (N00024-88-C-4181).

**December 18**

**Newport News Shipbuilding and Dry Dock Co.,** Newport News, Va., received a **$38-million** contract for post availability for USS Key West (SSN 722). Work is expected to be completed in December 1988. The contract was awarded by the Supervisor of Shipbuilding, Conversion and Repair, Virginia (N00024-86-H-8002).

**General Electric Co., Government Electronics Systems Division,** Syracuse, N.Y., received a **$99.8-million** contract for AN/SQR-19 Sonar for DDG and CG ships. Work is expected to be completed July 31, 1991. The contract was awarded by the Naval Sea Systems Command, Washington (N00024-85-C-6012).

**Monark Boat Co.,** Monticello, Ark., received a **$3.6-million** contract for the construction of ten 41-foot Patrol Boats. Work is expected to be completed in March 1989. The contract was awarded by the Naval Sea Systems Command (N00024-88-C-2072).

**December 23**

**Raytheon Co.,** Wayland, Mass., received a **$3-million** contract for the relocatable over-the-horizon Radar system for shore use. Work is expected to be completed by July 31, 1988. The contract was awarded by the Space and Naval Warfare Systems Command, Washington, D.C. (N00039-84-C-0049).

**Lockheed Missiles and Space Co. Inc.,** Sunnyvale, Calif., received a **$240.9-million** contract for development and production of Trident II (D-5) missiles for the Trident missile program. Work is expected to be completed in March 1990. The contract was awarded by the Strategic Systems Program Office, Washington, D.C. (N00030-84-C-0100).

**AT&T Technologies,** Greensboro, N.C., received a **$10.6-million** contract for oceanographic research. Work is expected to be completed by June 30, 1989. The contract was awarded by the Space and Naval Warfare Systems Command, Washington (N00039-88-C-0115).

**Norfolk Shipbuilding and Drydock Corp.,** Norfolk, Va., received a **$4.8-million** contract for drydocking selected restricted availability for USS Vulcan (AR-5). Work is expected to be completed by May 7, 1988. The contract was awarded by the Naval Sea Systems Command, Washington (N00024-85-H-8195).

**CORRECTION**—The headline of a news item in the December 1987 issue on a contract awarded to George G. Sharp reported its worth as $4.8 million. The actual figure was $483,862 as reported in the body copy of the same item.

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*Nuclear submarine equipped with Maxim desalinator.*
General Dynamics Photo

**RILEY-BEAIRD, INC.**

Circle 324 on Reader Service Card

## Ingalls Awarded Navy Overhaul Contract Worth $28.8 Million

The U.S. Navy has announced that Ingalls Shipbuilding division of Litton has been awarded a $28,780,830 contract for the regular overhaul of the guided missile cruiser USS Richmond K. Turner (CG-20).

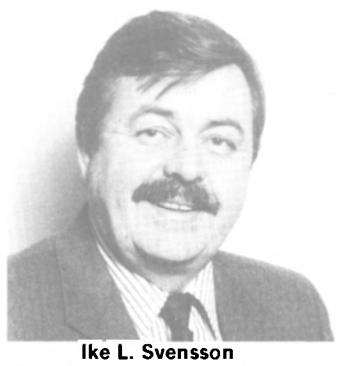
The Turner is scheduled to arrive at Ingalls Shipbuilding division, Pascagoula, Miss., in June 1988 for a 13-month overhaul. Work includes extensive upgrades to the ship's combat weapons systems, work on propulsion systems, and drydocking maintenance. During peak work periods, the overhaul will involve approximately 500 employees from within Ingalls' existing work force.

"The award of this contract will add significantly to our shipyard's backlog of business in the important area of surface ship overhaul and modernization," said Ingalls president, **Jerry St. Pe'**. "The combined work associated with this new overhaul contract and the work now in progress on the battleship Wisconsin and the USS Stark will contribute to stabilizing the work force at Ingalls."

For free literature on the shipbuilding and ship-repairing services offered by Ingalls Shipbuilding,

**Circle 43 on Reader Service Card**

## Bird-Johnson Promotes Ike L. Svensson To GM-Seattle Operations



**Ike L. Svensson**

The Bird-Johnson Company of Walpole, Mass., recently announced the promotion of **Ike L. Svensson** to the position of general manager for their Seattle RDH and Coolidge Propeller facilities. Mr. **Svensson** replaces **Robert DenHerder** who retired in late 1987.

Mr. **Svensson** spent twenty years in the U.S. Navy where he served with commendation in several ship's propulsion equipment maintenance and engineering capacities. In 1981, following his retirement from the Navy, he joined Bird-Johnson as their Pacific Northwest service representative. He was appointed plant manager of the RDH small propeller repair and distribution facility in early 1987. In his new position, Mr. **Svensson** will oversee the daily management of all Bird-Johnson's sales, manufacturing, distribution and repair operations in Seattle.

Bird-Johnson Company is the leading U.S. manufacturer of controllable and fixed pitch propellers for commercial and naval application with facilities in Walpole, Mass., Pascagoula, Miss., and Seattle, Wash. Their Seattle Operations' capabilities include foundry and finishing for bronze and stainless steel fixed pitch propellers up to 12 feet in diameter as well as repair of CP and FP propellers up to 30 feet in diameter, shafting and U.S. Navy torpedo propellers. They also distribute several lines of off-the-shelf FP propellers for smaller craft.

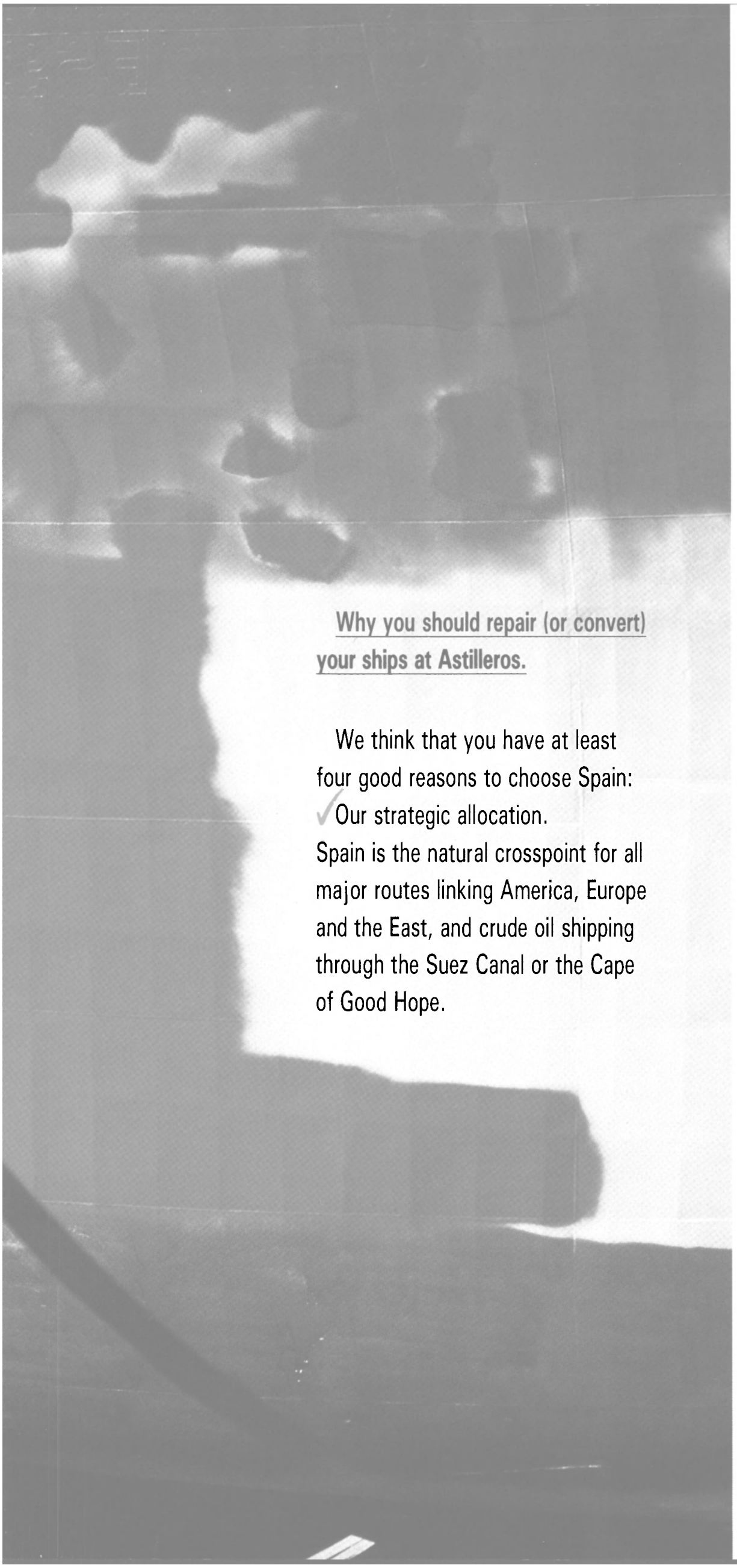
## Construction Firm To Build Maintenance Facility At N.Y. Homeport

Crow Construction Company of New York City has recently been awarded a contract by the U.S. Navy to construct a Shore Intermediate Maintenance Activity (SIMA) building at Naval Station New York on Staten Island.

The $24.6-million contract provides for the construction of a building that will serve as a maintenance facility for the Battleship Iowa and six other vessels.

The 600-foot-by-200-foot building, scheduled for completion in August 1989, will be constructed on pile foundations and will feature a structural steel frame with masonry facade and metal siding and roofing. Serving as architects for the project is The Grad Partnership of Newark; the consulting engineers are Sverdrup and Parcel of New York.

# The Shipbuilders of Spain



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## MAN GHH Merges Crane Subsidiaries —Literature Offered

MAN Gutehoffnungshütte (MAN GHH) has merged and restructured its crane manufacturing subsidiaries to form the MAN GHH Krantechnik GmbH headquartered in Heilbronn. The new company is a complete subsidiary of MAN GHH GmbH.

The three crane subsidiaries involved in the merge were MAN Wolffkran GmbH, Heilbronn; MAN SWF Elektrozug GmbH, Feldkirchen; and the crane division of MAN GHH GmbH in Nuremberg.

The production and service programs of MAN Krantechnik GmbH will concentrate on the manufacture and service of systemized product series, comprising Wolff tower cranes, standard cranes, SWF lifting tackle and modular jib and gantry cranes.

With the combined sales, engineering and development resources of the three subsidiaries, MAN GHH Krantechnik is able to offer complete crane systems.

For free literature fully detailing the crane systems available from MAN GHH Krantechnik,

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## Bob Bazzini Forms New Sales Company

Robert J. Bazzini

**Robert J. Bazzini,** a professional engineer, recently announced the formation of R.J. Bazzini Associates, a company that will specialize in the application and sale of engineered equipment and systems, with offices in Ridgewood, N.J.

Mr. **Bazzini** brings to his new company over 35 years of hands-on sales and sales management experience, ranging from sales engineer to national sales manager, with one of the leading U.S. manufacturers of marine and industrial machinery.

Mr. **Bazzini** is active in the Society of Naval Architects and Marine Engineers, the Institute of Marine Engineers and the American Society of Mechanical Engineers. He is a registered professional engineer in the states of New Jersey, New York and Pennsylvania.

For details on the new company,

**Circle 103 on Reader Service Card**

## Downing Named President Of Rainbow Navigation

Capt. **Henry A. Downing** was recently elected president of Rainbow Navigation, Inc., succeeding **Mark Yonge.** Rainbow operates the S/S Rainbow Hope, a U.S.-flag vessel, primarily between Norfolk and Iceland.

Captain **Downing** has over 40 years of maritime experience and is currently president of and a director of American Heavy Lift Shipping, a company in Houston, Texas. He was previously general manager, marine operation, with Gulf Oil Corporation and executive vice president with Marine Transport Lines. Captain **Downing** will continue as president of American Heavy Lift.

## Avondale Forms New Boat Division —Literature Offered

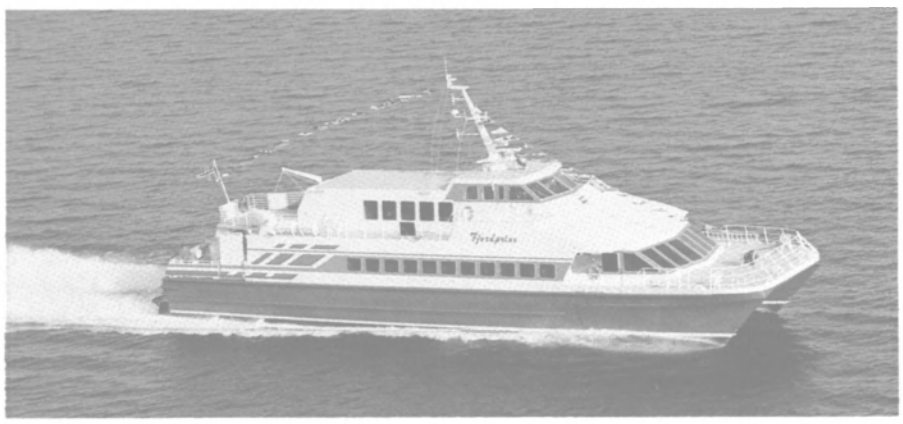
Avondale Industries, Inc., has formed a Boat Division and hired **Barry Heaps** as its manager.

Boats will be constructed both at the Avondale Mississippi River site and at the Avondale Harvey Canal site. The division will construct all types of boats.

For free literature containing additional details about Avondale's new Boat Division,

**Circle 37 on Reader Service Card**

# ELECTRONICS UPDATE



The high-speed catamaran Fjordprins is propelled by two KaMeWa waterjets. Her main engines are MTU and reduction gears, ZF. She can reach 38 knots.

## Fjellstrand Delivers New Design, High-Speed 200-Passenger Ferry

Norwegian shipbuilder Fjellstrand of Omastrand recently delivered the first of a new generation of high-speed, low-noise level passenger ferries.

Christened the M/S Fjordprins, the 127-foot catamaran is the result of an extensive program of tests carried out by Fjellstrand in cooperation with Det norske Veritas in order to reduce cabin noise levels.

The results of this program have been excellent. At a speed of 38 knots, the noise level in the wheelhouse is a mere 58 db, in the upper saloon 62 db and amidship in the lower saloon 68 db.

The very low noise level, limited motion in seaways and high speed combined with modern design provides space for a range of activities, while ensuring maximum passenger comfort.

With a breadth of about 31 feet and loaded draft of 5 feet, the Fjordprins is powered by two MTU 16V396TB84 main diesel engines, which have a maximum continuous rating of 2,040 kw at 1,940 rpm. The propulsion systems comprise two ZF marinegears and two KaMeWa 63S62/6 waterjets. Her auxiliary engines are a pair of Mercedes-Benz OM 352A with Stamford MSC 234C generators, which produce a combined 76 kw.

Facilities aboard the 201-passenger catamaran include: TV/video saloon, reclining chairs, panoramic windows, recreational areas for children, refreshment services from carts and bar and telephone and audio entertainment systems. Stereo headphone outlets are provided for 149 of the ferry's 201 seats.

The operator of the Fjordprins, Fylkesbaatane i Sogn og Fjordane of Norway, will operate the vessel between Bergen and several destinations in the Sogn og Fjordane region.

For free literature containing detailed information on the shipbuilding services of Fjellstrand,

**Circle 27 on Reader Service Card**

**FJORDPRINS**
**Equipment List**

| | |
|---|---|
| Main engines (2) | MTU |
| Reduction gears | ZF |
| Waterjets | KaMeWa |
| Auxiliary engines | Mercedes-Benz |
| Generators | Stamford |
| VHF radiotelephones | Sailor |
| Mobile telephone | Ericson |
| Radars | Decca |
| Gyrocompass | Robertson |
| Log | Ben |
| Autopilot | Robertson |
| Navigation lights | Tranberg |
| PA/intercom and audio entertainment system | NTW |

## Alsthom Yard Awarded $150-Million Contract To Build Cruise Liner

Admiral Holding Inc., a subsidiary of Gotaas-Larsen, has placed a $150-million order for a 2,000-passenger luxury cruise liner with the Alsthom Chantiers de l'Atlantique yard, St. Nazaire, France.

The 44,300-grt ship is expected to be delivered in the first half of 1990.

## Si-Tex Offers Budget Radiotelephone; Reintroduces EZ-7 Loran-C Receiver

Si-Tex, Clearwater, Fla., recently introduced the budget-priced 950 VHF/FM radiotelephone and reintroduced, by popular demand, the EZ-7 fisherman's Loran.

The 950 VHF/FM radiotelephone transmits on 49 channels and receives on 59, including nine weather channels. Electronic up-down controls offer convenient fingertip channel selection.

The 950 also features automatic all-channel scanning at the rate of two channels per second and a hold time of four seconds on active channels.

Other features include: channel 16 priority, touch-key HI/LOW (25/1W) power selection and output for additional speaker.

Brought back by popular demand, the Si-Tex EZ-7 fisherman's Loran lets the customer cruise bigwater with confidence or return directly to a favorite fishing hotspot anytime.

The instant-position memory of the EZ-7 can fix your present position and store it in memory. When you want to go back to that hotspot later, simply recall the position from memory and return to it by the most direct course from your present location. You can go back today, tomorrow, next week, next year, and you can do it day or night, in any kind of weather. The EZ-7 also gets you home again when you're ready. Up to nine locations can be stored indefinitely or changed as desired.

The instant-position memory can also be quite valuable in emergency situations such as a man overboard.

Four notch filters eliminate most local interference to maximize the quality of Loran signal received.

Microprocessor circuitry of the EZ-7 gives precise digital readouts of position in time differences (TDs) or latitude and longitude coordinates. Touch a few keys and a built-in course computer steers you straight to your destination with three simultaneous displays of course navigation data. Data includes cross track error, time to go, bearing to steer, vessel's heading, distance to go, speed, velocity made good (VMG) and course made good (CMG). An arrival alarm sounds within one-half mile of your destination.

For more information and free literature on the Si-Tex 950 VHF/FM radiotelephone,

**Circle 14 on Reader Service Card**

For further information and free literature on the EZ-7 Loran-C receiver recently reintroduced by Si-Tex,

**Circle 15 on Reader Service Card**

# American Bureau Of Shipping— A 'Class Act' For Over 125 Years

In 1860, John D. Jones, president of the Atlantic Mutual Insurance Company, led a group of New York City marine insurance companies in forming a not-for-profit, benevolent purpose society to promote the safety of life at sea. This evolved into the American Bureau of Shipping which developed the procedure of rating the structural and mechanical fitness of ships called classification.

The promotion of the safety of life and property through classification has remained the central focus of ABS ever since. While this focus is unchanged, the knowledge, experience and resources of ABS have grown. In recognition of this advancement, the activities of ABS have evolved from strictly ship classification into related areas. Today, ABS and its subsidiaries of the ABS Group of Companies, Inc. provide certification, inspection, analysis, quality assurance, and ship classification service to marine, offshore, government and industrial sectors on a worldwide basis.

The first ABS rules, those for *Building and Classing Wooden Vessels,* were published in 1870. Since that time, ABS rules have kept pace with the developments in the shipbuilding industry, with *Rules for Building and Classing Iron Vessels* published in 1877; and *Rules for Building and Classing Steel Vessels* in 1890. These latter standards have been updated and published annually ever since.

The first half of the 1940s was a time of unprecedented growth for ABS. From the start of World War II through 1945, a total of 5,171 Liberty Ships, Victory Ships, T-2 tankers and various other type vessels were built to ABS classification as part of the Maritime Commission's Wartime Shipbuilding Program. This set the stage for ABS's emergence as an international organization. Following the war, ABS representation expanded throughout the world, as the government sold hundreds of ABS class surplus vessels to allies who had lost a large portion of their fleets. Today, ABS has nearly 850 exclusive surveyors and engineers stationed in 168 locations around the world, on call 24-hours-a-day.

The late 1950s and early 1960s marked a significant transition period for ABS and for the shipbuilding industry—a technological transition. Up until that time, the primary criterion by which a ship could be classed was by comparison with similar ships proven successful in service. However, advancements in marine design made it evident that a means for analyzing innovative structures was needed.

ABS responded in 1965 by participating with the University of Arizona and Chevron Shipping Company in a research project to develop a finite element system of programs, known as DAISY, for a computer-aided analysis of any type of vessel structure.

By the early 1970s, computer-aided finite element analysis enabled ABS to class a number of innovative ship types—large self-propelled LNG carriers, pure container and barge carriers, very large crude carriers, floating industrial units, rigidly integrated tug-barge combinations, and mobile offshore drilling units.

Also, with the innovations of the 1960s, there arose a need for classification standards for application to special purpose vessels whose unique structural or mechanical features were not comprehensively covered by the ABS rules for steel vessels. Therefore, ABS published guides covering the construction and classification of nuclear ships, underwater systems and vehicles and mobile drilling units. As the years went on, ABS special rules and guides have been published to fit the needs of the marine and offshore industry, and in 1987, its 125th year, ABS published 21 different guides, including the *Guide for Building and Classing Offshore Racing Yachts,* and 16 different rules.

In 1970, ABS Worldwide Technical Services, Inc. (ABSTECH) was formed as a wholly owned subsidiary of ABS to provide certification, inspection, analysis and quality assurance services to the marine sector for functions above and beyond those traditionally performed and also to related nonclassification services in the industrial sector.

In 1978, ABS commenced classification and certification services with site specific structures of various types including single point moorings, hydrocarbon production and processing structures, floating production storage offloading units, and steel and concrete caisson drilling units and concrete islands.

As the 1970s moved on to the 1980s, ABS activity with all types of vessels continued to increase, but its work with the offshore sector grew the fastest. ABS had been involved with mobile offshore drilling units (MODUs) since their inception in the Gulf of Mexico some 25 years earlier. About two-thirds of the world's MODUs are ABS classed.

Late in 1981 and early 1982, the U.S. Coast Guard signed a two-year Memorandum of Understanding with ABS under the terms which the Coast Guard agreed to accept ABS plan review and inspection of various hull and machinery items for construction of U.S.-flag vessels built to ABS class and USCG certification requirements. As extensions of this Memorandum in early 1982 the Coast Guard also agreed to accept ABS admeasurement and tonnage certification of their behalf.

The 1980s saw the continued expansion of their services. ABS services encompassed such areas as marine hydrodynamics, seakeeping, stability, mooring analysis, finite element structural mechanics and structural dynamics, vibration and noise prediction and prevention, and fatigue analysis. In another area survey methods were developed by ABS during this time to replace traditional ones. Typical of this is the comprehensive preventive maintenance program based on condition monitoring using such techniques as vibration analysis, lubrication oil analysis, and other more sophisticated techniques to determine the operational conditions of a particular machinery item.

During the same period, ABS also developed synchronized surveys in order to help owners time various classification surveys and those required by international marine safety conventions so that they would coincide to the maximum extent possible. Other survey procedures were offered such as underwater inspection, voyage surveys, and tailshaft monitoring in lieu of withdrawal. During this period, ABS developed its quality assurance system of programs for individual, batch, and mass produced products, as well as manufacturing processes. These services have become well accepted and by the beginning of 1986, almost 1,000 manufacturers were enrolled in the various ABS quality assurance and related programs.

In 1983, a new division of ABSTECH, called ABS Boiler Marine and Insurance Company, was formed to carry out examinations of boilers, pressure vessels and pressure-related equipment according to ASME code. Additionally, that same year a second ABSTECH division, ABS Oil Testing Services, Inc., was formed to complete tests of bunker fuels and lubricating oils used in main onboard propulsion and machinery systems and power generation and industrial plants.

To better fit everyday use of the ABS rules with computer technology, in 1985 ABS instituted the EAGLE system of computer programs. This system is available to shipyards, designers and other outside users as well as ABS and has great potential benefit to all by affording substantial time and cost saving by accelerating the ABS plan review process in addition to eliminating duplication of effort. By the end of 1986, EAGLE contained several of the ABS rules and the aim is to include all of the computer programs for ABS rules in its vocabulary and also computer programs for a wide spectrum of related functions such as hull girder strength, ship hydrostatics, structural frame analysis and stability.

The 125th year of ABS, celebrated last year, saw the enactment of an important new business approach. ABS intensified its activities in nonmarine and nonclassification work as well as concentrated on its basic classification business. For this purpose the ABS organization was reorganized into three groups—the American Bureau of Shipping, which will continue classification and statutory work; ABS Worldwide Technical Services, Inc. (ABSTECH), which will continue and intensify marine and industrial advisory services; and ABS Government Services Business Unit (GSBU), which will provide nonclassification marine services to government agencies worldwide.

For free literature containing detailed information on the full range

Photos (L to R): The general cargo ship Madang Coast was the first ship built to ABS Class in the People's Republic of China; the world's largest mobile offshore unit, the ABS-classed McDermott Derrick Barge No. 102, is a twin-hull, column stabilized-type with a length of 625 feet; and the 105-foot tugboat Bergantin was built in Venezuela to ABS class.

of classification and nonclassification marine services offered by the ABS and its subsidiaries,

**Circle 21 on Reader Service Card**

## Penn Ship Names Willaim T. Gallagher To Executive Post

William T. Gallagher

**William T. Gallagher** has been named executive vice president and general manager of Pennsylvania Shipbuilding of Chester, Pa., by the company president, **Ronald J. Stevens.**

As chief operating officer, Mr. **Gallagher** will be responsible for all divisions within the company, except for finance and marketing which will continue to report directly to the president.

Mr. **Gallagher** has 25 years of experience in marine engineering operations. Most recently, he was general manager at Hoboken Shipyards in northern New Jersey.

## Port Of Portland Names Roberts Marine Public Information Specialist

The Port of Portland has named **Doug Roberts** as the new public information specialist for its marine department.

Mr. **Roberts** will handle information for the port's marine terminals and operations. He previously served as a public information officer for Clackamas College and the Oregon Department of Transportation.

## Electric Boat Awarded $644-Million Contract To Build Trident Sub

The Electric Boat Division of General Dynamics Corporation, Groton, Conn., was recently awarded a $644-million contract from the U.S. Navy to build a Trident ballistic-missile nuclear-powered submarine.

Under the fixed-price contract, Electric Boat will deliver the Ohio Class submarine in July 1994.

Electric Boat was selected over Newport News Shipbuilding, Newport News, Va., which had been encouraged by the Navy to bid on the contract. The Navy is seeking to promote competition in the bidding for the construction of the massive 560-foot, 18,700-ton vessels. The Electric Boat Division has been the sole builder of Tridents since the program's inception 13 years ago.

It was reported that Newport News included an extra $85 million in their bid to cover the retooling needed at their yard to build the Tridents.

At present, Newport News, as well as Electric Boat, builds the smaller Los Angeles Class attack submarines.

**Circle 234 on Reader Service Card**

## Southwest Marine Leases Larger Yard Facilities

Southwest Marine Inc. has leased from the Port of San Francisco the former Todd Shipyard facilities on San Francisco's southern waterfront.

Southwest had moved to the 50-acre facility, which not only provides the ship-repair firm with a much larger yard to perform commercial work, but also gives them two drydocks, including one of the largest on the West Coast.

Southwest's first work at the yard was on the American Envoy. She is one of three ships recently acquired by Sea Land that Southwest Marine is preparing for the shipping company's U.S. West Coast-Hawaii-Guam-Taiwan service.

For free literature on Southwest Marine's ship-repairing services and facilities,

**Circle 39 on Reader Service Card**

# ELECTRONICS UPDATE

## Raytheon Introduces New R61 Rasterscan Radar

Developments in the Raytheon R61 Rasterscan Radar's Interference Rejection, and Rain/Sea Clutter technology have led to even greater reduction of interference from weather and other radars. R61's advanced video processing circuitry further improves the bright, sharp picture Raytheon radars are known for.

Ideal of workboats, fish boats and other similar vessels, the new 64-mile R61 is described as "a workhorse radar with thoroughbred technology." The unit features super-sturdy, reliable construction.

At the same time, the R61 provides an impressive array of capabilities.

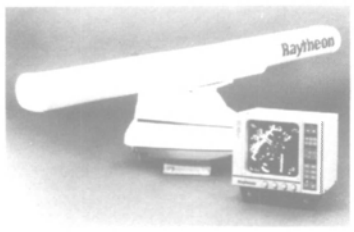
Using touch controls, an R61 operator gets alphanumeric readouts of vital information. For example, the Electronic Bearing Line (EBL) and Variable Range Marker (VRM) provide fast, accurate bearing and distance information.

Another important feature, Sea-Guard, warns of collision danger, marks points of intrusion into user-selected guard zones, and sounds an alarm.

Raytheon's unique on-screen tuning bar enables the operator to tune the radar simply and quickly.

A "Target Expander" enhances weak signals.

The R61 has a 12-inch diagonal, 512-line high-resolution screen. It comes with a 6-foot or 4-foot antenna, with 1.2-degree or 1.9-degree horizontal beamwidths, respectively.



Raytheon's R61 Rasterscan Radar.

Raytheon offers a two-year limited parts warranty with one year free labor by any of its U.S. dealers and worldwide service network.

For literature containing full information and prices on the new, professional R61 Rasterscan Radar from Raytheon,

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## NAVSEA Awards Anadec $9.5-Million Contract

Anadec, Inc., Arlington, Va., was recently awarded a four-year, $9.5-million contract by the Naval Sea Systems Command to support the acquisition of the U.S. Navy's AN/BSY-1 combat system.

# PROPULSION UPDATE

## Cummins-Powered 'Traktor Jet' Gives Workboats Unprecedented Thrust

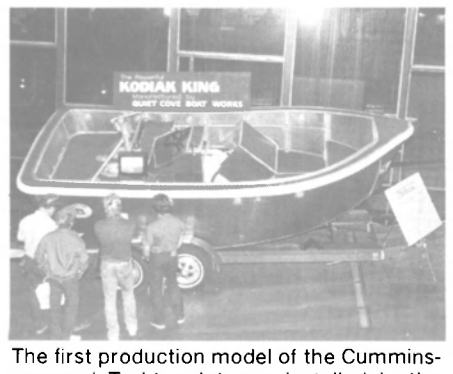
Shallow-draft workboat operations are beginning to be revolutionized with the introduction by North American Marine Jet Inc. of Benton, Ark., of a new diesel-powered waterjet propulsion unit that produces more than 3,000 pounds of static thrust at 150 horsepower. Tradenamed the "Traktor Jet" because of its pulling power, the unit is powered by a Cummins 4BT3.9-M diesel engine developing 150 horsepower at 2,800 rpm.

The Traktor is ideal for fishing boats and workboats where thrust is more important than speed. Other waterjet propulsion units are more suited for high-speed boats than for vessels needing maximum thrust at low speeds. The 18-inch axial flow jet propulsion unit can pump six (55-gallon) barrels of water per second.

Following extensive research, North American determined that Cummins was best for the propulsion unit's power source. Among the Cummins 4BT advantages were the engine's high horsepower (150) to weight (860 pounds) ratio, its low fuel consumption (7.6 gallons per hour at rated speed), competitive purchase price, and the fact that the engine is manufactured in the U.S.

**Leonard Hill,** president of North American Marine, said he prefers to have all-American components in the Traktor package because of the availability of parts and service. He noted that Cummins has set up special service centers, which


**Leonard Hill,** president of North American Marine Jet Inc., points out the features of the Traktor Jet Skid Pack unit.



The first production model of the Cummins-powered Traktor Jet was installed in the completed seine skiff Kodiak King.

are essential for operations in remote locations such as in Alaska.

The entire package of the Traktor is factory assembled on an aluminum "Skid Pak," an integral base section that can be welded directly into a boat, becoming the middle section of the boat's bottom.

The Hurth transmission is a HBW 450 equipped with a positively driven, mechanically operated helical gearing system. The 3:1 gear box allows the Traktor to operate at 600-rpm shaft speed for midrange performance. The HBW also permits direct reversing for back flushing the jet drive.

The Traktor's cartridge-type thrust bearing package is designed to have life of more than 10,000 hours and can be replaced in less than 30 minutes—in the water—with no special tools. And the 11 impeller blades can be replaced individually. Damaged blades can be replaced with minimal downtime.

Quiet Cove Enterprises of Anacortes, Wash., has built the first production model of the Cummins-powered Traktor, the Kodiak King, which will operate in the Kodiak area salmon and herring fisheries. Quiet Cove has orders for four more Cummins-powered Traktor-propelled skiffs, all for the Southeast Alaska salmon fisher.

Besides commercial fishing, Mr. **Hill** sees potential applications for the Cummins-powered Traktor Jet in other types of vessels, such as shallow-draft tour.

For free literature on the North American "Traktor Jet,"

**Circle 16 on Reader Service Card**

For more information and free literature on Cummins Engines,

**Circle 17 on Reader Service Card**

## Cummins Announces Availability Of New 'A' Series Diesel Engines

### —Literature Available—

Cummins Engine Co., Inc., which acquired majority ownership of Onan Corporation in early 1986, recently announced an agreement with Hawker-Siddeley and Onan Corporation whereby Cummins will assume responsibility for the Onan L series diesel engines. Under this agreement, which covers only the L series diesel engines and not the gasoline models, the engine will be designated the Cummins A series.

With the addition of the A series, Cummins power range will be expanded to 41 horsepower on the low end. This enables Cummins to offer diesel power for a wide variety of applications requiring from 41 to 9,000 horsepower.

The A series is strategically important to Cummins in three areas: 1) *Automotive:* Since the A series has a small package size and the capability to run at 3,600 rpm, it provides an excellent alternative for customers who have traditionally used gasoline engines, but who want the fuel savings and durability of diesel. In essence, the A combines the strengths of both the gasoline and diesel engines. 2) *Industrial:* Cummins is encouraging the worldwide industrial OEM's to standardize on Cummins throughout their product range, but to date have not been able to offer a cost-effective engine at the low end. The A series fills this void. 3) *New markets:* The A series also provides entry into several new markets: ground support, welders, lift trucks, and mobile refrigeration. Cummins thinks this engine will be particularly strong in the U.S. mobile refrigeration market.

The Cummins A series engine family consists of three-, four-, and six-cylinder naturally aspirated models, as well as a six-cylinder turbocharged model. Plans are also in place to develop a four-cylinder turbocharged model. These engines, which are smaller than the Cummins B series, offer a wide power range of 41 to 120 hp at 3,600 rpm (compared to the B series automotive rating of 105 to 186 hp at 2,800). The A is designed as an in-line, four-stroke, water-cooled engine and employs an indirect injection system.

This new engine family, which began production in September 1981, was designed to provide optimum application flexibility, in order to serve various markets. It was released in 1987 by General Motors as a special equipment option in the P-40 stripped chassis, and began production in the Ford E350 stripped chassis in Venezuela in January 1988, and will begin in the U.S. in March 1988. It is also used in generator sets, marine auxiliary propulsion, small industrial equipment, and automotive repower applications.

The Cummins A engine will continue to be manufactured at Onan's Huntsville, Ala., manufacturing facility. Product development will remain in Fridley, Minn. Marketing and aftermarket support will be transferred to Cummins marketing, parts and service groups in Columbus.

For further information and specification details on the Cummins A series diesels,

**Circle 25 on Reader Service Card**

## Westmark Completes Acquisition Of Tracor

The completion of Westmark Systems' acquisition of Tracor, Inc., with all merger documentation filed with the State of Delaware where both companies are incorporated, was recently announced by Adm. **Bobby R. Inman,** chairman, president and chief executive officer of Westmark, together with **Frank W. McBee Jr.,** chairman and chief executive officer of Tracor.

Westmark Systems, Inc. is a privately held corporation headquartered in Austin, Texas. It was established in 1986 as a holding company for the purpose of acquiring technology companies. Tracor, Inc., an international technological products and services company, is Westmark's first acquisition.

Tracor, located in 18 states and five foreign countries, conducts business through aerospace, flight systems, applied sciences, components, and instruments group operations which serve international defense and commercial markets.

# ELECTRONICS UPDATE

## Furuno Introduces New High Resolution Color Radar

The new FR-2010 high resolution color radar from Furuno, designed primarily for commercial deepsea shipping, offers price and performance features that make it equally at home on commercial workboats, fishboats and the most prestigious yachts.

The bright 20-inch diagonal raster scan CRT, equivalent to older 12-inch round analog radars, shows targets in high contrast yellow-orange against a dark background that is an operator-selectable blue for daytime operation or black for use at night. Legends, markers and other on-screen data are shown in other colors.

Target detection on the FR-2010 is enhanced through the use of echo stretch and averaging plus highly sophisticated computer techniques. Electronic aids such as calculation of CPA, TCPA, target course, echo plotting, speed/range/bearing to selected target and easily defined guard zone give operators the ability to assess dangerous situations quickly and accurately. Additional performance features include built-in dual VRM's, dual EBL's, audible and visual target alarm, and Furuno's multi-level quantization (MLQ) of incoming radar returns, using 8 level to produce the most accurate representation of targets possible.

FR-2010 color radar from Furuno.

The FR-2010 fully meets exacting IMO rules for mandatory fitting on vessels less than 10,000 grt. It uses a combination of sensibly arranged, backlit tactile keypads, rotary knobs and a joystick to make operation easy and intuitive.

For more information and free literature from Furuno,

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## McDermott Joint Venture Awarded Contract Worth More Than $100 Million

Morecambe Bay Contractors, a joint venture between Press Offshore and McDermott International, Inc., has been awarded a contract valued at more than $100 million for two drilling platforms for the Morecambe Bay gas field by Hydrocarbons Great Britain Limited.

The project, which will begin immediately, includes the fabrication, installation, hookup and commissioning of the two platforms. It is scheduled for completion in May 1989.

Each platform will comprise a 12-pile jacket weighing approximately 2,000 metric tons, and an integrated deck weighing approximately 3,600 metric tons. The platforms will be installed in approximately 100 feet of water in the Irish Sea, about 20 miles west of Blackpool, England.

The joint venture brings together two of Britain's leading offshore contractors. Press Offshore, part of khe AMEC group, will build the decks at its Wallsend yards on Tyneside, England, and McDermott will fabricate the jackets and piles at its Ardersier base in Scotland. At its peak, the project will employ approximately 650 people in the Wallsend and Ardersier areas.

McDermott's semisubmersible derrick barge DB 102 will install the platforms, and Press will carry out subsequent hookup and commissioning from a support base at Heysham, England.

## New Container Liner Bags Cut Liquid Carriage Costs —Brochure Offered

The Rukka 2-in-1 Softank System has been developed jointly by Johnson Line AB, (Stockholm) and the Finnish manufacturer Rukka Oy. It is designed for transportation of a wide range of non-hazardous liquids, including juices and concentrates, wines and harmless chemicals, utilizing standard 20-foot containers.

The Softank System consists of a reuseable outer bag of durable PVC-coated fabric, fittings for inflation and filling, including a pressure relief valve, and a disposable, sterile inner liner. Both the outer bag and inner liner materials meet the requirements of the F.D.A. and the B.G.A. for the transport of food products. The Softank is available in either 12,000- or 16,000-liter capacities, and may also be used for products requiring refrigeration as well as for limited storage.

By eliminating many of the operations required when transporting in drums, tank trucks, tank vessels or tank containers, the Softank System reduces handling costs and minimizes contamination risks.

In use, the outer bag is unrolled on the floor of a 20-foot container at the supplier's facility, a new liner is inserted and the unit is inflated with air. If required, sterilized air or inert gas may be used. The product is then pumped into the unit, the valves are closed, the container doors sealed, and the unit is ready


The new Rukka container liner bag offers a cost-effective solution to containerized transport of non-hazardous liquids.

for shipment. It occupies about one-half the height of the container, and due to its unique design requires no securing within the container.

At the final destination, air or inert gas is again introduced as the product is pumped out, so the unit will retain its shape. It may also be emptied by gravity. After discharging is completed, the inner liner is removed and discarded, and the fittings are cleaned. The outer bag is then folded together with the fittings into its flexible shipment container for return to the shipper, or to a different supplier for use with a different product. The empty Softank, with fittings, occupies only 8.5 cubic feet, and weighs less than 200 lbs. Because of its unique inner liner design, the unit does not require sophisticated cleaning procedures between uses. With careful handling, the outer bag should last 25 shipments.

For a free eight-page color brochure detailing the features of the new cost-effective Rukka Softank System,

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## Myreng Joins Skuld As Claims Adjuster

**Capt. G.K. Myreng**

Capt **Gustav K. Myreng** recently joined Assuranceforeningen Skuld, Oslo, Norway—The Scandinavian P & I Club—as a claims adjuster/consultant in the tanker section. Captain **Myreng** has 10 years' experience as a deck officer with the Stolt-Nielsen Inc. chemical fleet.

## Bender Posts Successful Recovery From Chapter 11

The plan for the reorganization of Bender Shipbuilding & Repair Company, Inc., Mobile, Ala., was confirmed recently by the U.S. Bankruptcy Court for the Southern District of Alabama. The plan marks the end of Chapter 11 protection for Bender after just nine months.

Since January 1987, Bender has delivered five converted vessels to the Pacific Northwest fishery service. These deliveries included a 180-foot tender/trawler, 190-foot trawler and two 210-foot factory trawlers. Bender also completed a number of major overhauls for the U.S. Navy and Military Sealift Command as well as several commercial vessel repair jobs.

"In terms of operating revenues, the company has had one of the best years it has had in the 80s," stated **Tom Bender,** Bender Shipbuilding's president and chief executive officer. He expressed gratitude to the company's customers, employees and vendors for their support.

Bender was recently awarded a $6.4-million contract for work on the USNS Sirius and has four conversions in its yards, including two crabber-processors for Alaska. Bender also has a backlog of commercial repair work on its orderbook.

For free literature fully describing Bender Shipbuilding's ship-repair facilities and services,

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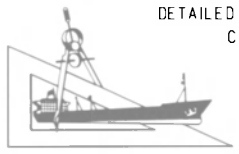

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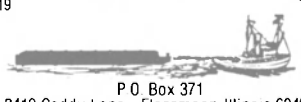

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Marine Surveyors; Project Specifications and Designs; Energy Efficient Concepts
Owner Representation Services; Machinery Casualty Investigations;
Practical Engineering Economics Analyses
11405 MAIN ST., ROSCOE, IL 61073 815-623-6760

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**MPA**
MARINE POWER ASSOCIATES
MARINE ENGINEERS
THE PROFESSIONALS
Maintenance, Repair & Retrofit Specialists
1010 Turquoise St., Ste. 217, P.O. Box 99546
San Diego, CA 92109, (619) 488-7703

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**MARITIME DESIGN, INC.**
NAVAL ARCHITECTS MARINE CONSULTING MARINE DESIGN
MARINE ENGINEERS COMPUTER PROCESSING MARINE SURVEYS
2955 HARTLEY RD • JACKSONVILLE, FL 32217 • (904) 268-9137

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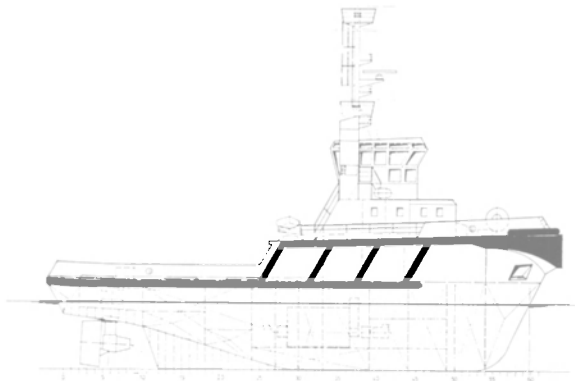
**PILOTAGE CONSULTANTS, INC.**
Capt. Jim Stillwaggon
516-742-2467
P.O. Box 2046
New Hyde Park, NY 11040

## Wijsmuller Wins Design Contract For Four 50-Ton-Bollard-Pull Coastal/Terminal Tugs



The design of the 108-foot by 32-foot tugs for Norwegian shipowners Johannes Ostensjo incorporates on the hook, on the bow, alongside, and push-pull towing capabilities. Towing winches are installed both forward and aft, and the vessels are equipped with an all-around heavy rubber fendering.

Wijsmuller Engineering, consultants to the marine industry, have been awarded a contract to provide a complete design package for four new 108-foot, 50-ton-bollard-pull coastal/terminal tugs for Norwegian shipowners Johannes Ostensjo.

The tugs will be of the stern drive type with extensive firefighting and oil pollution control capabilities. They will be used at the Sture/Mongstand terminals for the handling of tankers of 300,000 dwt under adverse weather conditions.

Building will take place at Batservice Verft A/S, Mandal, Norway. Delivery of the first two tugs is scheduled for May and June 1988.

For free literature containing full information on Wijsmuller Engineering,

**Circle 61 on Reader Service Card**

## Miniature Regulators From Circle Seal Are Ideal For Dead End And Low Pressure Applications

The new MR10 Series Miniature Regulators, introduced by Circle Seal Controls, feature a soft KEL-F seat making them ideal for dead end and low pressure applications.

Downstream pressure of corrosive and non-corrosive liquids and gases can be regulated with the MR10 Series in ranges of 0 to 100, 0 to 250 or 0 to 500 psig. A sensitive neoprene diaphragm (on brass versions) or Teflon coated neoprene diaphragm (on stainless steel versions) assure precise regulation. They also utilize an unbalanced poppet design for dead tight sealing of inlet pressure up to 3,600 psig.

The MR10 Series is only 4½ inches in length, and in its standard configuration is ready for panel mounting with locking nuts. They can also be equipped with optional pressure gauges, CGA inlet fitting and downstream safety valve for direct use on gas cylinders.

Operating temperature can range from −40 F to +160 F. Flow coefficient ($C_v$) = 0.18. Bodies are available made of brass or 303 stainless steel with ¼-inch female NPT inlet and outlet ports.

For more information and free literature from Circle Seal Controls,

**Circle 58 on Reader Service Card**

## West German Yard Receives Moller Contract For Two Gas Tankers

Thyssen Nordseewerke GmbH, a West German shipyard, recently received a contract from the Danish shipowner A.P. Moller to construct two 14,500-dwt gas-chemical tankers.

The first vessel is scheduled to be delivered in the spring of 1989, with the second to follow in the fall.

The amount of the contract was not revealed, but it was reported to contain options for two additional vessels.

## Newport News Awarded $38-Million Navy Contract

Newport News Shipbuilding & Drydock Co., Newport News, Va., recently was awarded a $38-million U.S. Navy contract for submarine maintenance.

## Kenyon Named President Of Greitzer, Inc.

Greitzer, Inc. of Riverdale, N.J., specialists in Power-Paks, energy management systems, conveyors, and ventilation systems, recently announced the promotion of **Wade Kenyon** to president of the company. **Robert W. Greitzer,** previously president of Greitzer, Inc., assumed the responsibilities of chairman of the board, thus filling the vacancy created by the untimely death of his father, **Harry Greitzer.**

## FCS Inc. Named Marketing Agents For Turbine Components Corporation

Turbine Components Corporation of Branford, Conn., has named FCS Inc. of Centerbrook, Conn., as its marketing agents for their ceramic thermal barrier coatings.

The Turbine Components Corporation ceramic coating system is presently installed aboard operating tugs and demonstrating reduced fuel consumption, reduced ignition delay, and smoother, cleaner combustion.

FCS Inc. has been in business for 11 years and will concentrate its efforts in marketing performance, improving reliability, and safety packaged systems to the industry.

Turbine Components Corporation was established in 1970 to provide gas turbine engine users with specialized repair and coating of turbine blades, vanes, and other components.

The Turbine Components Corporation ceramic coating was also certified by the American Bureau of Shipping (A.B.S.) Certificate No. 87-NY 3075-X for application on marine diesel engine components.

For more information and free literature on Turbine Components Corporation,

**Circle 101 on Reader Service Card**

## Spar Associates Awarded Systems Contract By Halifax-Dartmouth

Spar Associates, Inc. of Annapolis, Md., was recently awarded a contract by Halifax-Dartmouth Industries, Ltd. of Halifax, Nova Scotia. Under the contract, Spar will supply Perception™, their shipyard planning and cost/schedule control system, which will be used to plan and manage HDI's $60-million refit work on the Canadian icebreaker Louis St. Laurent.

With this contract, 10 North American shipyards are now using Perception.

The system addresses the various issues of production planning and control over labor, material, subcontractors, and change orders.

Perception produces many management reports designed for early detection of most problems before they become critical. The system also automates government reports required for US DoDI 7000.2, the Candian DSS C/SCS requirements and the U.S. Navy ship repair Spec Item 009-60.

For more information and free literature from Spar,

**Circle 42 on Reader Service Card**

# FOR MORE INFORMATION
## ON
## EQUIPMENT AND SERVICES ADVERTISED IN THIS ISSUE

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The listings above are an editorial service provided for the convenience of our readers.

## Unitor Strengthens Its Engagement In Marine Chemical Market

Norwegian-based Unitor Ships Service AS, recently signed a contract with Sybron Chemicals Inc. of Birmingham, N.J., to acquire their Gamlen Marine Chemicals activity.

Gamlen Marine Chemicals, which is one of Unitor's competitors, has a worldwide network for the distribution and sale of marine chemicals and services. The acquisition of Gamlen Marine is expected to contribute to further improvement of Unitor's results during 1988.

Unitor already possesses a strong marine chemical activity through its Perolin Marine operation. Together with Gamlen Marine, this operation will now be integrated into Unitor Marine Chemicals as a separate division. Its headquarters will continue to be located at Rickmansworth outside London. The product lines of both Perolin and Gamlen Marine will be integrated into one common line containing the best products from both ranges.

For more information and free literature,

**Circle 50 on Reader Service Card**

## Free Brochure On Marine Technical Services Offered By Clyde Leavitt, Inc.

Clyde Leavitt, Inc. (CLI) of Ocean Springs, Miss., which specializes in marine surveys, marine consulting and naval architecture, is offering a free brochure titled "CLI Marine Technical Services."

The publication lists such CLI marine technical services as: accident reconstruction, certification, consultation, grain ship stability, inspection, legal assistance, models, naval architecture, owners representation, professional engineering, salvage, surveys, technical writing, testing, and vessel and cargo damage and analysis.

Each of the above headings is accompanied by a brief explanatory test.

Also listed are the following facilities available in-house or for hire from Clyde Leavitt: blueprinting, chartered or scheduled aircraft computers, diving, drafting, engineering, metal and woodworking, metrology, model testing, photocopying, physical testing, printing, secretarial, and technical library.

For more information on Clyde Leavitt and a free copy of the brochure,

**Circle 45 on Reader Service Card**

## EES Corporation Offers Brochure On 'Omnipure' Sewage Treatment Plants

EES Corporation of Sugar Land, Texas, has published a six-page brochure titled "OMNIPURE Sewage Treatment Plants," which is being offered free.

The brochure discusses the three basic categories of marine santitation devices manufactured by EES Corporation for its Omnipure product line: the standard or commercial unit, the engineered unit, and the military unit. EES Corporation can offer a hybrid of the three categories if desired. The basic differences between them are highlighted in the brochure, along with photographs of each.

The basic theory of operation for all Omnipure systems is explained with a flow chart showing the various components.

Also included is a listing of standard unit design specifications.

Units designed by Omnipure are certified by the USCG, IMO, and the United Kingdom Department of transportation.

For further information and free copy of the brochure from EES Corporation,

**Circle 70 on Reader Service Card**

## Northwest Marine Receives $5.5-Million Contract To Overhaul MSC Ship

Northwest Marine Iron Works, Portland, Ore., was recently awarded a $5,498,890 firm-fixed-price contract by the U.S. Navy for the drydocking and overhaul of the USNS Observation Island, a Military Sealift Command (MSC) missile range instrumentation ship. The work is expected to be completed February 28, 1988.

## J.G. Systems, Inc., New Company, Specializes In Air Blast Equipment

J.G. Systems, Inc., a new company specializing in air blast equipment, was recently formed by **Jim Giese Sr.** and **Bob Jellerson** in Auburn, Wash.

J.G. Systems, Inc. offers a complete product line to satisfy specific equipment requirements, which include: steel grit blasting and recovery systems; bulk abrasive blast units and vacuum recovery systems; enclosed blasting facilities; spare parts for major manufacturers equipment; and project consulting services.

For additional information and free literature from J.G. Systems,

**Circle 78 on Reader Service Card**

## Derecktor Awarded $16-Million Contract To Build Army Tugs

The Rhode Island yard of Robert E. Derecktor Shipyards recently received a $16-million contract to build two 128-foot U.S. Army tugs.

The contract contains an option for the construction of eight similar tugs over the next four years. The exercising of the option depends on future Army funding availability.

## Parker Halts Acquisition of Gull

Parker Hannifin Corporation reported that it has notified Gull Inc. that Parker will not complete its acquisition transaction with Gull, which was previously scheduled for December 23, 1987.

Gull and Parker signed an acquisition agreement in late October which called for Gull to meet certain financial conditions. Parker president and chief executive officer **Paul G. Schloemer** said, "Since not all of the requirements were met, Parker's board of directors voted not to waive the conditions and not to proceed with the December 23 closing."

# 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.**

**ACCOMMODATION SYSTEMS—MODULAR UNITS**
The Waugh Company, 5111-6 Baymeadows Road, Suite 394, Jacksonville FL 32217
**AIR COMPRESSORS**
Marketec, Inc., 27 Bowers Lane, Chatham NJ 07928
**AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION**
Bailey Refrigeration Co., Inc, 2323 Randolph Avenue, Avenel, NJ 07001
**ANODES—Cathodic Protection**
Electrocatalytic Inc., 2 Milltown Ct., Union NJ 07083
Kaiser Chemicals, 7311 E. 41st St., Tulsa OK 74147
**BALLAST**
Genstar Stone Products, Executive Plaza IV, Hunt Valley, MD 21031
**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
Lucian Q. Moffitt, Inc., P.O. Box 1415, Akron, OH 44309
Thomson-Gordon Limited, 3225 Mainway, Burlington, Ontario, Canada L7M 1A6
Waukesha Bearings Corp., P.O. Box 798, Waukesha, WI 53186
**BOILERS**
Combustion Engineering, Inc., Windsor, CT 06095
Marketec, Inc., 27 Bowers Lane, Chatham NJ 07928
**BOILER CLEANING**
Asea Stal, 50 Chestnut Ridge Rd., Montvail N.J. 07645
Infrasonik AB (an ASEA Stal Co.). S-612 20 Finspong, SWEDEN
**BROKERS**
Capt. Astad Company, Inc., P.O. Box 53434, New Orleans, LA 70153
Bergeron & Associates, P.O. Box 726, Chalmette LA 70044
ECO Inc., 1036 Cape St. Claire Center, Annapolis, MD 21401
Jack Faulkner Inc., 2419 Caddy Lane, P.O. Box 371, Flossmoor IL 60422
R.J. Keough Co., 39 Mill Rd., Eastchester, NY 10709
Mowbray's Tug & Barge Sales Corp., 35 De Hart St., Morristown NJ 07960
**BUMPERS (Crane)**
M.E.K. Equipment, P. O. Box 2357, Newport News VA 23602
**CARGO ACCESS EQUIPMENT**
Morgan Crane Co., Inc. (Hiab SeaCranes and QMC Trident, Ferrari, Fassi marine cranes), 1009 E. Chestnut Ave., Santa Ana CA 92701
**CASTINGS/FORGINGS**
NKS Industria Pesada, Grupo Industrial, Reforma 404, 14th floor, Mexico D.F. 06600 MEXICO
Sandusky Foundry & Machine Co., C N 5012, Sandusky OH 44871
**CHOCKING COMPOUND**
Philadelphia Resins Corp., 20 Commerce St., Montgomeryville, PA 18936
**COMPUTERIZED INFORMATION SYSTEMS**
TIMSCO, P. O. Box 91360, Mobile AL 36691
**COMPUTERS—Training**
Logical Operations, 240 East Avenue, Rochester, NY 14604
**CONDENSERS/SEPARATORS**
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130
Wright Austin Co., 3245 Wight St., Detroit MI 48207
**CONTAINER SECURING SYSTEMS**
Spanset Marine AB, Box 14112, S-16114 Bromma/Stockholm, SWEDEN
**CONTROL SYSTEMS—Monitoring**
ASEA, Inc., 4 New King St., White Plains, NY 10604
Bailey Controls, 29801 Euclid Avenue, Wickliffe, OH 44092
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
Teleflex Inc., 771 First Ave., King of Prussia, PA 19406
Valmet Automation A.S., P.O. Box 130, N-3430, Spikkestad, Norway
S.S. White Industrial Products, 151 Old New Brunswick Rd., Piscataway, NJ 08854
**CRANES—HOISTS—DERRICKS—WHIRLEYS**
ASEA-Hagglunds Inc., 1 O'Dell Terrace, Yonkers NY 10701
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
Manitex, Inc., 2203 Timberlock Place, Suite 130, The Woodlands, TX 77380
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
**DESIGN SERVICES**
VSE Corporation, 2550 Huntington Ave., Alexandria VA 22303
**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
General Thermodynamics Corporation, 210 South Meadow Road, P.O. Box 1105, Plymouth, MA 02360
**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
Chrome Locomotives, P.O. Box 197, Silvis IL 61282
Colt Industries Inc. Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511
Cummins Engine Co., Inc., Mail Code 40642, Box 3005 Columbus, IN 47202-3005
Markisches Werk GmbH, P.O. Box 1442, D-5884 Halver 1, Federal Republic of Germany
Sulzer Brothers Inc., 200 Park Ave., New York, N.Y. 10166
Volvo Penta of America, P.O. Box 927, Rockleigh, NJ 07647
**DIVING & SALVAGE**
Muldoon Marine Services, P.O. Box 3221, Terminal Island, CA 90731
**ELECTRICAL EQUIPMENT**
Eldec Corporation, 16700 13th Ave West, P.O. Box 100, Lynwood WA 98036
Lima Electric Co., P.O. Box 918, Lima OH 45802
SPD Technologies, 13500 Roosevelt Blvd, Philadelphia PA 19116
Ward Leonard Electric, 31 South St., Mt. Vernon, NY 10550
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, OR 97201
**ELECTRONIC INFORMATION SYSTEMS**
Inventory Locator Service Inc., 3820 Premier Ave., Memphis TN 38118
**ELECTRONIC SYSTEMS**
Hull Electronics Company, 7563 Convot Ct, San Diego CA 92111
Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 TX: 125327
Marine Safe Electronics Ltd., 37 Staffen Drive, Concord (Toronto), Ontario CANADA L4K 2X2
**ENGINE TEST EQUIPMENT**
General Thermodynamics Corp., P.O. Box 1105, 210 S. Meadow Road, Plymouth, MA 02360
**EQUIPMENT—Marine**
Atlas Copco Rental, 70 Demarest Dr., Wayne, NJ 07470
Band-It Division, Houdaille Industries, Inc., P.O. Box 16307, Denver, CO 80216
Beaver Tool Co., 1525 SE 29th St., Box 94717, Oklahoma City, OK 73143
Thomas Coudon Associates, 6655 Amberton Dr., Baltimore, MD 21227
Kearfott Marine Products, 550 South Fulton Ave., Mount Vernon, NY 10550
Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302
**EVAPORATORS**
Atlas-Danmark Desalination Systems A/S, Stamholmen 93, 2650 Hvidovre (Copenhagen), Denmark
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
Serck GmbH, Tilsiter Str 90, D-2000 Hamburg 70, WEST GERMANY
**FANS—VENTILATORS—BLOWERS**
Carling Turbine Blower Company, 10 Nebraska St., P.O. Box 88, Worcester MA 01613
Jon M. Liss Associates, Inc., 411 Borel Ave., P. O. Box 5554, San Mateo, CA 94402
Robinson Industries, P.O. Box 100, Zelienople, PA 16063
**FASTENERS**
Action Threaded Products Inc., 7440 W. 100th Place, Bridgeview IL 60455
Non-Ferrous Bolt & Mfg Co., Inc., 3650 W. Russell Rd., Las Vegas NV 89118
**FENDERING SYSTEMS—Dock & Vessel**
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Kohlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Schuyler Manufacturing, 16901 Woodinville-Redmond Rd, Woodinville WA 98072
Seaward International, Inc., Clearbrook Industrial Park, P.O. Box 98, Clearbrook VA 22624
**FILTERS**
Dahl, J.A. Baldwin Mfg., Co., P.O. Box 610, Kearney, NB 68848
Marketec, Inc., 27 Bowers Lane, Chatham NJ 07928
Parker Filter Division, 16810 Fulton County Rd., #2, Metamora, OH 43540
**FUEL ADDITIVE**
Drew Ameroid Marine, One Drew Chemical Plaza, Boonton NJ 07005
U.S. Borax, Industrial Chemicals, 3075 Wilshire Blvd., Los Angeles CA 90010
**FURNITURE**
Bailey, Carpenter & Insulation Co., 2323 Randolph Avenue, Avenel, NJ 07001
**GALLEY EQUIPMENT**
Gaylord Industries, P.O. Box 558, Wilsonville OR 97070
Greitzer, Inc., 101 Riverdale Rd., Riverdale NJ 07457
**GANGWAYS, LADDERS**
American Mason Safety Tread Company, 153 Essex St., Haverhill MA 01830
Rampmaster Inc., 9825 Osceola Blvd., Vero Beach, FL 32960
Wooster Products Inc., 1000 Spruce St., P.O. Box 896, Wooster, OH 44691
**HATCH & DECK COVERS—Chain Pipe**
American Mason Safety Tread Company, 153 Essex St., Haverhill MA 01830
**HEAT EXCHANGERS**
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
Serck GmbH, Tilsiter Str 90, D-2000 Hamburg 70, WEST GERMANY
**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
Titeflex Corporation, P.O. Box 54, Springfield, MA 01109
**INSULATION—Cloth, Fiberglass**
Bailey, Carpenter & Insulation Co., 2323 Randolph Avenue, Avenel, NJ 07001
The Claremont Company, 174 State Street, P. O. Box 952, Meriden CT 06450
Duracote Corp., 350 North Diamond St., Ravenna, Ohio 44266
Soundcoat, One Burt Drive, Deer Park NY 11729
**JOINER—Watertight Doors—Paneling—Ceiling Systems**
Advanced Structures Corp., 235 W. Industry Ct., Deer Park, NY 11729
Astech, 3030 S. Red Hill Ave., Santa Ana, CA 92711
Bailey Distributors, Inc., 2323 Randolph Avenue, Avenel, NJ 07001
Dampa Inc., The Gatehouse at North Park, Suite 106-108, Hunt Valley MD 21030
Simpson Timber Co., Third & Franklin, Shelton WA 98584
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
Kohlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
The Walter Machine Co., Inc., 84-98 Cambridge Avenue, Jersey City, NJ 07307
**LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights**
Phoenix Products Company, Inc., 4769 North 27th Street, Milwaukee, WI 53209
**LINE BLINDS**
American Piping Products Inc., Box 1056, New Hyde Park, NY 11040
**LUBE-OIL CENTRIFUGES**
Keith Dixon Warehouse Supplier, Authorized distributor for Spinner II, 650 Whitehead Rd., Lawrenceville NJ 08648
Spinner II Products Div., T.F. Hudgins Inc., P.O. Box 920946, Houston, TX 77292
**MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING**
Del Gavio, 207 W. Central Ave., Maywood, NJ 07607. Telex: 132610 DELMARINE
Goltens, 160 Van Brunt St., Brooklyn, NY 11231
**METAL MARKER**
J. P. Nissen Company, P.O. Box 188, Glenside PA 19038
**NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS**
Advanced Combat Systems Engineering & Analysis Corp., 19240 Nordhoff St., Ste 206, P.O. Box 47, Northridge, CA 91324
Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Hwy., Arlington, VA 22202
Aero Nov Laboratories, Inc., 14-29 112 St., College Point, NY 11356
American Systems Engineering Corp., P.O. Box 8988, Virginia Beach, VA 23452
Amirikian Engineering Co., Chevy Chase Center Bldg., Suite 505, 35 Wisconsin Circle, Chevy Chase, MD 20015
B.C. Research, 3650 Wesbrook Mall, Vancouver, B.C. Canada V6S 2L2
Del Breit Inc., 326 Picayune Place (Suite 201), New Orleans, LA 70130
CDI Marine Co., 900 Regency Square Blvd., Suite 203, Jacksonville, FL 32211
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## SNAME Hampton Roads Section Discusses 'Industrial Photogrammetry'

The Hampton Roads Section of The Society of Naval Architects and Marine Engineers recently held a meeting at Fisherman's Wharf in Hampton, Va. After a social hour and dinner, a paper titled "Industrial Photogrammetry" was presented by authors **Michael J. Gunn** and **Ronald S. Hicks,** both of Newport News Shipbuilding.

Photogrammetry is the science of acquiring and interpreting three-dimensional coordinate data of physical objects by measuring and analyzing their images on photographic plates. The development of this technology since the 1970s has increased its credibility for application to industrial and shipbuilding use. Analytical photogrammetry is presently routinely employed in shipbuilding for tasks as diverse as predicting the fit of structural steel assemblies prior to their erection onboard ship, verifying the circularity or sphericity of submarine hulls or tanks, and checking the alignment of catapult trough components on aircraft carriers.

Measurement to accuracies of thousandths of an inch are now obtainable allowing photogrammetry to be used for measuring machinery bases and foundations to determine liner sizes for machining. Pipe connections on existing as-built equipment can now accurately be measured, thereby eliminating the conventional use of templates insuring precise fitting of fabricated pipe connections.

The authors addressed the practical applications of photogrammetric technology, and identified the reliability, versatility and productivity of photogrammetric surveying when applied to shipbuilding. Several applications in shipbuilding were described including aircraft carrier catapult alignment, submarine hull circularity measurement, and submarine machinery installation.

Principals pictured above during the SNAME Hampton Roads Section meeting are, left to right: **Samuel E. Bevins,** executive committee; **Michael J. Gunn,** author; **Ronald S. Hicks,** author; **T.K. Lawrence,** chairman of the Hampton Roads Section; and **William C. Ward Jr.,** vice chairman.

The authors responded to a written discussion provided by **William H. Felton** of Newport News Shipbuilding.

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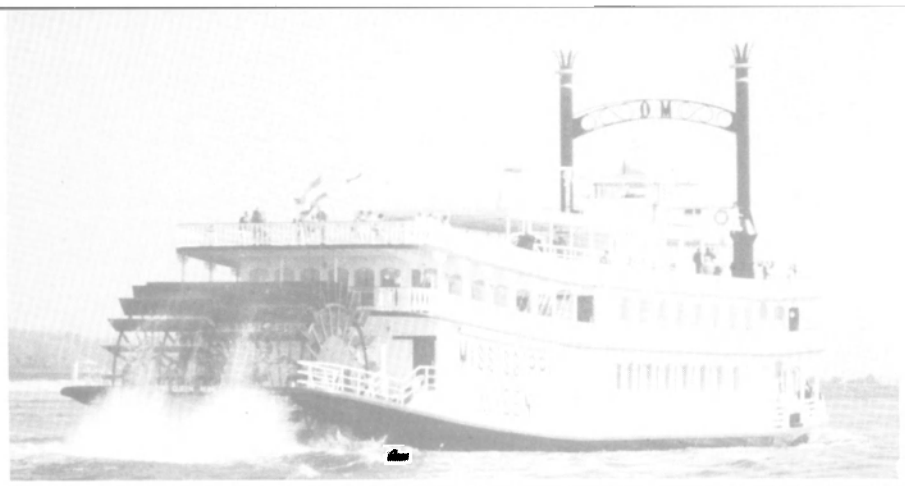

The Mississippi Queen is Europe's first newbuilding based on the famous Mississippi paddle steamers. With a length of 203½ feet and a beam of 37½ feet the vessel can hold up to 1,000 passengers. The paddlewheel, 23 feet in diameter and 26 feet wide, has a hydrostatic drive. Power is delivered by two Deutz MWM 234 series engines arranged in the forebody.

## Successful Deutz 628 Series Engines Gaining In Popularity

Among the most successful engine series of the Deutz MWM trademark is the 628, for which contracts for more than 1,000 were placed up to mid-1987. The 1,000th engine was delivered in August of last year.

Around 60 percent of the 628 series engines delivered thus far operate as ship main propulsion units or in marine sets, with workshops accounting for the largest share. The successful engine series is gaining in popularity for propulsion use aboard excursion vessels.

Recently, the Katalina was to her delivery shipowner in Hamburg. Built at Ross Industrie, the vessel displaces 1,131 tons, is about 207 feet long, has a beam of 34½ feet, and a depth of 14 feet. Propulsion consists of two 12-cylinder Deutz 628 series engines rated for 2,200 kw at a speed of 1,000 rpm. The Katalina is capable of reaching a speed of 17.5 knots. Power supply on board is provided by two sets, each rated for 249 kw and driven by 8-cylinder engines of the Deutz MWM 234 series. The auxiliary set for port service, rated for 97 kw, is also fitted with a 234 series engine.

The Cacique, recently delivered in the Netherlands, is powered by two 6-cylinder in-line engines of the Deutz MWM 628 series, each rated for around 1,100 kw. The Cacique displaces 694 tons and reaches a speed of 16.7 knots. Her three generator sets are driven by Deutz MWM engines of the 816 series.

Another example of the application of Deutz MWM engines of the 628 series in yachts is the Il Vagabondo, recently delivered in Italy. Two 12-cylinder engines deliver 2,414 kw each, bringing the 1,050-ton vessel to a maximum speed of 18.5 knots.

Two more vessels of this type, fitted with main engines of the 628 series, are in the process of construction at Italian shipyards.

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## Hyundai Offers Advanced Rig Design

It is generally believed that the positive factors currently evolving in the offshore industry will soon lead to an upward trend in the demand for semisubmersibles and offshore platforms. At present, one giant semisubmersible drilling rig laid at the Ulsan shipyard of Hyundai Heavy Industries (HHI) is attracting growing attention from many of the world's leading offshore contractors for her outstanding features.

The advanced drilling rig, the Norjarl, is said to be one of the most sophisticated and best-equipped drilling units ever built. Like the Transocean No. 8 rig recently delivered by HHI to its American owner, Transocean Drilling Co., Ltd., the Norjarl is built to the Aker H-4.2 design and custom-fitted to meet the specific requirements of the new generation of drilling units.

The semisubmersible, mobile offshore drilling rig Norjarl has full dynamic positioning with a total deck payload of 4,350 tons, as well as special winterization measures for efficient year-round operation in the North Sea and sub-Arctic regions.

With dimensions of about 361 feet in length, 240 feet in breadth and 130 feet in upper deck height, the Norjarl will be operated in water depth of 1,968½ feet to drill to about 25,000 feet. Operating draft is 77 feet.

Maneuverability of the Norjarl is provided by eight controllable-pitch thrusters, each of 3,800 hp. Power is provided by eight Nohab turbocharged and intercooled diesel engines, each with an output of 4,726 bhp. At full thrust operation in the open ocean, the rig will reach a top speed of 5-6 knots.

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***ALBERT S'* Hydraulic Dredge,** including: Ellicott 14"x12" Dredge Pump, w/EMD (GM) diesel; starting compressor; cooling pump; Delco 100KW generator w/EMD (GM) diesel; 50 hp cutter drive motor w/reducer; Spud/Swing Winch; light plant, on 65'x30'x5' barge, w/(4) external 18" spud wells, w/(2) spuds; 43' hinged dredge boom. Plus discharge pipe & floats. Built by Stender in 1950 & converted into a dredge in 1962.

***CAPAMA S'* Tugboat,** 55'8"x12'4"x5'6", SN 126787, including: EMD (GM) diesel electric starting compressor; single screw; 54" propeller; GM 2-51 diesel generator set; electric bilge pump, electric/hydraulic steering pump; fully equipped crew quarters; pilothouse above. Built 1891 & refitted in 1954-55 by present owners. Well maintained.

***'ALABAMA'* Cargo Barge,** 250'x45'6"x15'8", including: Northwest 95 Crane, w/Murphy diesel, 3-drum deck winch; (3) mooring winches, fully equipped crew's quarters. Built as a passenger vessel in 1910 & converted to a barge in 1964-65.

***'HELEN'* Deck Barge,** 175'x38'x9', SN 169573, including Northwest 8C Crane, w/Cummins diesel, 75' boom, 4-drum deck winch; crew quarters below deck; deckhouse. Built in 1926 & converted to a deck barge in 1957.

(2) EMD (GM) V-16 Diesel Engines, Model 567B.

MASSEY-FERGUSON 203 Loader-Backhoe, SN 659001769, w/Perkins diesel.

VULCAN 2000 Pile Hammer, w/55' leads.

(2) 3-Yard & 1¼-Yard Dragline Buckets; (2) 3-Yard & 1¼-Yard Clamshell Buckets.

INGERSOLL-RAND 600 cfm Compressor, w/GM diesel.

**For More Information and Prices on Request, Please Contact:**

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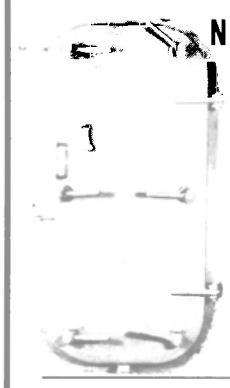

### NEW WATERTIGHT DOORS

**6 Dog**

6-Dog right and left hand hinged doors with frames. ¼" panel and 5/16" frame meet ABS Specs.

SIZES
26"x48" 26"x66"
26"x60" 30"x60"
EACH DOOR

### IMMEDIATE DELIVERY

**ALSO QUICK ACTING**
6-Dog wheel operated doors
5/16" frame-¼" door panel.
26x60 R.H. & L.H. 26x48 R.H.
30x60 R.H. 30x54 L.H.

### NEW 7" RADIUS PANAMA CHOCKS

(MEET PANAMA REGULATIONS)
14" x 10" CLEAR OPENING
With extended legs for welding to deck. 14" Wide on base—length 28"—height 27¼". IMMEDIATE DELIVERY FROM STOCK.

### CAPSTANS

**With Explosion-Proof motors & controls**

Suitable for oil barge, shipboard, terminal, etc use. Four available: (2) 7½ HP 220/440/3/60—7500 lbs @ 45 FPM—(2) 5 HP 220/440/3/60—6000 lbs @ 45 FPM. All units totally enclosed, explosion-proof. Barrel of capstan 8" diameter—15" high.

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# PROPULSION UPDATE

## Wartsila Diesel Presents A New Auxiliary Engine, The Vasa 22/26

The recent introduction of Wartsila Diesel's Vasa 46 engine is now being followed by a new auxiliary engine, the Wartsila Vasa 22/26. According to the analysis made before the Vasa 46 project, a really reliable medium-speed engine is the optimum choice as the prime mover for virtually any ship type.

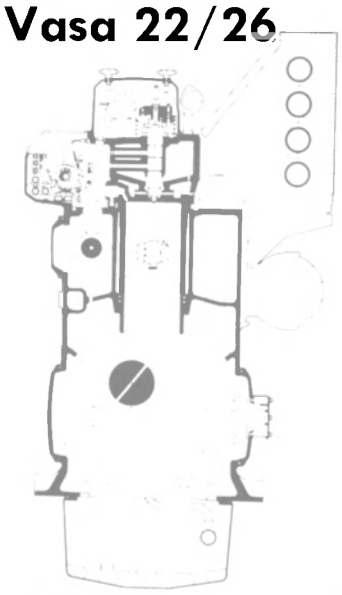
The output chart for the Vasa 22/26 shows that the four-, six- and eight-cylinder engines comply with the generally accepted output figures for auxiliary engines in general cargo vessels. The engine also meets with most specifications with respect to speed range.

Wartsila Diesel has carried out intensive studies on the stroke/bore ratio and found that the ratio 26/22 is optimum for thermal efficiency in engines of this size as well as for reaching a compression ratio high enough to cope with even the next generation of heavy fuels.

A compression ratio of 13:1 in combination with Wartsila Diesel's load dependent cooling system ensures high compression temperatures at all loads. Reliable combustion is the result.

The following are the main factors ensuring a reliable combustion in the Vasa 22/26: high compression temperatures at all loads, good atomization of the fuel oil and sufficient oxygen supply at all loads.

The engine block of the Vasa 22/26 is cast in one piece from nodular cast iron. Rigidity is the main design criterion. The fastening of the cylinder head screws and the main bearing screws into the engine block allows for optimum load distribu-



The Vasa 22/26 is Wartsila Diesel's new modern auxiliary engine, designed for safe and reliable operation.

tion. This results in negligible changes in the circularity of the main bearing bore and the cylilnder liner spacing, even at peak combustion pressures exceeding 200 bar.

The crankshaft of the Vasa 22/26 is forged in one piece with boled-on counterweights on each web. This ensures optimum balancing with superb features for an even and high oil film thickness in all bearings.

The connecting rod is drop forged with an H-profile and hydraulically tensioned screws for fastening the bearing cup. Several thousand connection rods of this type are now in operation in Wartsila Diesel's engines and not a single one with ovalization of the big end bore or defects in the mating surface has been reported.

The piston of the Vasa 22/26 consists of a steel crown and a nodular cast iron skirt. The use of two compression rings in combination with one oil scraper ring is possible thanks to the patented pressurized lubrication of the piston skirt and the piston design.

A centrifugal casting honed and treated to optimal surface finish and hardness makes for long life. An absolute prerequisite for good cylinder performance is an optimized cylinder wall temperature. This is a question of balancing the cooling water temperature, the water flow and the cylinder liner wall thickness in order to prevent the acid attacks which occur at wall temperatures or, the opposite, when excessive temperatures burn the lube oil off from the cylinder wall.

Here again, the load-dependent cooling system plays an important role. It allows optimum cylinder temperatures and operational reliability at all loads.

Nodular cast iron with high tensile strength in combination with a reliable design allows peak combustion pressures exceeding 200 bar without significant deformation of the flame plate. By minimizing deformation—both mechanical and thermal—the risk of deviation between the center line of the valve and seat is avoided. This results in reliable valve-seat function.

The designer of the Vasa 22/26, Wartsila Diesel, is one of the world's leading designers and manufacturers of diesel engines. Besides production plants located in Finland, Sweden, Norway, France, Spain and Singapore, the company also has several licensees and a worldwide network of sales and service facilities.

For free literature giving complete information on Wartsila Diesel's new auxiliary engine Vasa 22/26,

**Circle 32 on Reader Service Card**

## Raymond J. Rockwell Named General Manager At Advanced Marine

Raymond J. Rockwell

The appointment of **Raymond J. Rockwell** as general manager of Northeast Operations, Systems Management Division of Advanced Marine Enterprises was announced recently by division president **Charles H. Piersall Jr.**

Mr. **Rockwell** has over 28 years' experience in shipbuilding, manufacturing, production and program management. During his past 20 years in acquisition programs he has provided support to 10 Navy program management offices. He has had direct participation in over 30 shipbuilding programs at 25 shipbuilders.

Mr. **Rockwell's** main office is located in Cherry Hill, N.J.

## Donald E. Kadlac Joins Vessel Charters, Inc.

Vessel Charters, Inc. of New York, N.Y. has announced that **Donald E. Kadlac** recently joined the firm as superintendent engineer.

Mr. **Kadlac's** responsibilities include maintenance and repair of the company's American-flag vessels, vessel seaworthiness and certification, and supervision of all engineering personnel.

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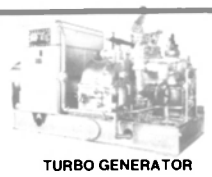

**TURBO GENERATOR**

**750 KW A.C. TURBO GENERATORS**
Ex-USN — GEI-16846 — type FN3-FN24 — seven stage — 10033 RPM — typical serial #49351 or 61718. Single helix reduction gear — 10033/1200 RPM — type S-187. GENERATOR: 750 KW — 6-pole 0.8 P.F. — 450/3/60/1200. EXCITER: 10KW — 120 volts. Steam inlet flange 2½" — exhaust 17⅞" x 25⅞" rectangular. Overload 25% 2 hours. Units can be upgraded to 1250 KW for USN applications. Complete with throttles, etc. 8 Available

**L.P. 450 KW A.C. TURBO GENERATORS**
Suitable for waste heat turbo generators on motor ships. 175 PSIG — D&S — 27½" vacuum. GENERATOR: Westinghouse 450KW — 563KVA — 450/3/60—1200 RPM. GEAR: 6097/1200 RPM. TURBINE: 175 lbs/D&S—27½" vacuum. Other pressures — temps: 250# @ 40°C—27½" vacuum. Turbine serial #7801-7802. OAL 13' 1-3/16"—OAH 5'—OAW 5'⅜" Total dry wt . 17,100 lbs. Plans on request.

**1500 KW TURGO GENERATOR SET**
11-Stage turbine — FN4 — 8145 RPM — 3½" steam — 525# — 825°TT. GEARS: 195-8145-1200 RPM. GENERATOR: 1500KW — 450/3/60/3600 RPM — 2405 amps —0.8 P.F. EXCITATION 13.2 KW — 120 volts DC. Weight 36,000 lbs — exhaust flange 18" x 38"

**TURBINE HIGH PRESSURE**
(2) High pressure 25,000hp General Electric Steam Turbines, manufactured 1980, 1400# inlet pressure 950°, 85# discharge pressure 6900 rpm. Brand New. New Cost $1,000,000 each. Make an offer.

**GENERAL ELECTRIC TURBINE ROTORS**
We have the largest stock of main turbine and auxiliary turbine rotos in the United States: including:
32,000 HP
30,000 HP
28,500 HP
19,500 HP
9,300 HP
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6-stage 750 KW
6-stage 600 KW
5-stage 500 KW
3-stage 500 KW
FOR THE CARGO PUMPS OR AUXILIARY TURBINE ROTORS WE HAVE:
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## NEW GR3 STEEL CHAIN

We are authorized distributors for a major steel chain company. We stock in our Jersey City warehouse, the following lengths of new GR3 chain:

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| (12) Shots - 2½" | (12) Shots - 3-5/15" |
| (12) Shots - 2⅝" | (12) Shots - 3⅞" |
| (12) Shots - 2¾" | (3) Shots - 4¼" |
| (12) Shots - 3-1/16" | (1) Shots - 4⅜" |

**WE ALSO HAVE ANCHORS WITH ABS CERTIFICATES FROM 5,000# TO 44,000#**

All above material available for immediate delivery. Call us for your chain and anchor requirements.

## TWO (2) NEW PACKAGE TYPE DUNHAM BUSH REFRIGERATION UNITS

Complete with condenser, receiver and panel mounted on common frame, manufactured 1981.
Original Cost: $10,000 each.

OUR PRICE: $2,500 each

## TWO (2) NEW VERTICAL WORTHINGTON 6LRV16 SALT WATER SERVICE PUMPS

800 gallons at 100#. Requires 75hp motor. New Price: $35,000 each.

OUR PRICE: $7,500 each

## 100,000 LB. ALMON JOHNSON Constant Tension Mooring Winches

In very good condition. Series 232 mooring & anchoring winches. Automatic self-tensioning. Wide range from 100,000 lb. line pull @ 10 FPM to 26,000 lbs. @ 400 FPM. Gypsy line pull @ 12,000 lbs. @ 25 FPM. Drum declutchable through spiral jaw clutch for free spooling. Driven by 50 HP 230 VDC motors — Westinghouse CK — 575 RPM — ½ hour — 75°C rise — stab shunt — 181 amps. Max. RPM 1900 — Cutler Hammer brake — 18" type NM. Complete with magnetic control panel, resistor banks & remote control pedestal and mounted master switch

**LARGE STEAM TOWING ENGINE**
**9x10 TWIN ENGINE DRIVE**
Air or Steam — 125/250 PSI Heavy duty Clyde with 36" diam x 51" Face single drum. Flanges 68". CAPACITY: up to 2800' of 2" wire rope. Normal line pull 40,000 lbs @ 50 FPM. Steam or air pressure required 125 to 250 PSI. Can be adapted to electric drive or increased steam or air pressure to a capacity of 82,000 lbs @ 20 FPM. Pawl holds 270,000 lb pull from any layer. Equipped with level sind device. Approx wt 300,000 lbs. DIMENSIONS: 12'6" wide — 6'6" high. Write for details
ALSO AVAILABLE: Large towing ring — 36" diameter

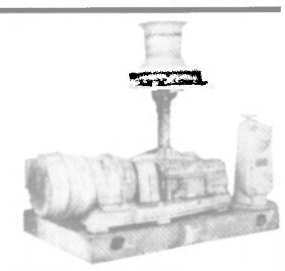
**UNUSED STEAM WINCH FOR MOORING & CARGO SERVICES**
Lidgerwod 10x12 — with Morse controls. 10,000 lb line pull — declutchable gypsy — hand compression brake.

**DOUBLE GYPSY BOAT WINCH**
mfg. by Lakeshore duty; 2500 LBS @ 125 FPM - 15 HP — 230 VDC — 1780 RPM
**$2250**

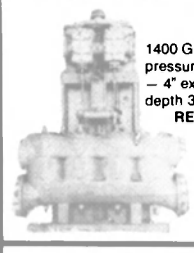
**3-YORK MODEL MTC59 150 TON AIR CONDITIONING UNITS**
Motor - Serial #2761385, Mod - LAYD, 3-phase, 440 Volts Frequency - 60, Full load amp 171, Locked Rotor Amps 528
Refreigerating Condenser - Serial #23012 (Std Navy Stk) Contract #N140-131-74042BX 11 - Refrigerant Condensing Side - Test press - 30 PSIG Shell Dia. - 16 Tube Length -7-6 No. Passes - 2
Waterside - Test Press -225 PSIG Water Velocity - 64 Ft/Sec at 425 GPM Cooling Surface Sq. Ft. - 730 No. of passes -2
Refregerating Water Cooler - Serial #23012 Contract #N140-131-74042BX Refrigerant side - 11 Test press - 30 PSIG. Water Side Test press - 225 PSIG
Refrigerating Water Cooler - No. of passes - 3 Water Velocity - 8.1 Ft/Sec at 360 GPM Cooling Surface - 725 Sq. Ft.

## 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 P 36/24 amps. 4 Available
5000 CFM — A5A4W6 — 23¼" ID — 29½" high — 4 HP P 1150/1750 RPM Mfg by Joy.



**30 HP — 440/3/60 — 2-SPEED A.C. MOTOR-DRIVEN CAPSTAN**
8500 lbs @ 90 FPM or 4250 lbs @ 180 FPM. Barrel size 15". Below-deck mounted motor — 31 HP — 440/3/60 — 42/38 amps — 820/1200 RPM. Squirrel cage — totally enclosed — watertight. Half hour duty 65°C. temp. rise. Base OAL 6'4". With magnetic brake, 2-speed control and master switch.



**WORTHINGTON 16" x 14" x 18" VERTICAL DUPLEX STRIPPING PUM**
1400 GPM @ 110 PSI — suction lift 11.5 ft. — s pressure 15 lbs 14" Suction — 10" discharge — — 4" exhaust. Overall width 6'8" — overall heigl depth 3'9½". Wt. approx. 10,000 lbs.
**RECONDITIONED 1980 ABS — READY T**

**FAIRBANKS-MORSE 750 GPM — 125 PSI STAINLESS STEEL CENTRIFUGAL SEA WATER FIRE & FLUSHING PUMP**

NEW UNUSED

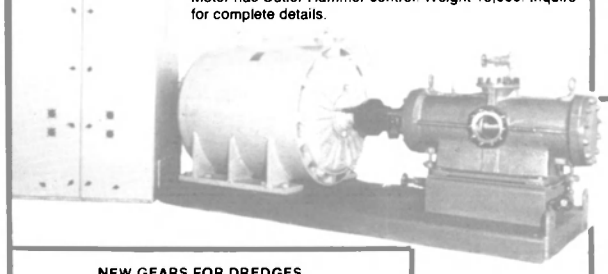
EX U.S.N.

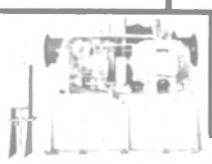
125 PSI (281 Ft.) total head. Suction lift none (flooded) 175 RPM. With Falk #8F coupling — flexible, all metal, enclos ed. MOTOR: Reliance type T — 100 HP — 1750 RPM — 34 amps — 230 volts DC — Frame 503AS. Pump has 5" suc tion — 4" discharge. Pump & Motor mounted on base 37¾ wide x 6'2¾" long x 3'0½" high. Total weight 3348 lbs.

**NEW HIGH PRESSURE VALVES AT 25% LIST**
1 Powell 4" Globe 16½ FF 600#, 1 Kerotest 5" Angle Globe 600#, 1 Edwards 3" Angle Lift Check 600#, 1 Crane 2½" Angle Globe 600#, 1 Powell 3" Angle Globe Reach Rod operated 1500#, 1 Powell 3" Globe butt weld 1500#, 1 Crane 4" Globe 16½ FF 600#, 2 Powell 3" Globe Stop Check 1500# 1 side fl. 1 side butt weld, 3 Yarway 3" Impulse Steam Traps 1500#, 3 Crane 3" Globe 13-⅝" FF 600#, 1 Edwards 3" Globe 14½" FF 900#
ALSO OTHER IN STOCK TO 28"

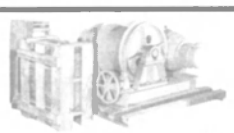
**NEW BUFFALO 100 GPM — 56 FT. PUMPS**
Bronze — 25 lbs or 56 ft head. 3½" Suction — 2½ discharge. Flanged. 3 HP 440 volt AC 3500 RP motor with magnetic starter.

700 G.P.M. @ 150 P.S.I.
**NEW — UNUSED — EX-U.S.N MOTOR DRIVEN ROTARY HORIZONTAL PUMPS**
WITH 4-SPEED 4440/3/60 MOTOR
Inlet 8" — outlet 6". Powered by 4-Speed 440/3/60 motor Motor is 100/75/50/37.5 HP — 1200/900/600/450 R.P.M Motor has Cutler-Hammer control. Weight 10,000. Inquire for complete details.





**50 HP VARIABLE SPEED ELECTRO-HYDRAULIC CARGO WINCH**
Made by Lakeshore DUTY: 7400 lbs SLP — 220 FPM — drum size 24" diameter — 15" wide. Complete with ratchet & pawl. CAPACITY: 600' of ¾" wire MOTOR: 50 HP — 440 volts — 66.3 amps — 3-phase 60 cycle — squirrel cage — 1200 RPM constant — Frame CC-445-N.



**GENERAL PURPOSE WINCH 3500 LBS AT 200 FPM**
New — Unused — Ex-USN A.C. Motor drive — 25/12.5 HP — GE 440/3/60 — 40°C AB — 1750 RPM — Type KR — full load amps 32. Motor drives winch through Falk reduction gear. Has compression hand brake.

**36" x 48" — 24" x 36" DECK HATCHES**
has 10 brass dogs — 18" coaming. Coaming is 12mm - top is 11mm

**CRUCIFORM BITTS**
19½" High - 18" across - 7" vertical pipe — 4¾" Horizontal caps - 8" tops - 9½" crossways. Bolted base 11½"x11½" 9¼ centers.

**NEW — UNUSED DAVIDSON BRONZE CIRCULATION PUMI**
Type AONSIE — distiller — fresh wate 347-3269. Single stage — close coupled — lbs — 3500 RPM — 1¼"x1 — Wt. 162 13⅞"x22¼".

**NEW GEARS FOR DREDGES**
**UNUSED FARRELL-BIRMINGHAM MAIN PROPULSION REDUCTION GEAR**
Single reduction 1.81:1. Will handle up to 3200 HP input at 402 RPM. Complete with hydraulic coupling.

**SMALL 4 x 6 WINCH**
STEAM OR AIR. DRUM: 20" Diameter x 23" width — 8" flange. Rated 2000#/90 FPM on 3rd layer of rope. 125# Steam or 3500 @ 90 FPM 150 PSI steam. 13,000 lb static load. Fitted with ratchet & pawl so drum can be locked in off and on position.

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**NEW BUTTERFLY VALVES AT 35% OF NEW COST**
Steel 36" Pratt Triton XL year 1981 Serial #7]05911-2 50# ubber Seat 134°F Body A-36 Seat A-240 W/316 edge service - PCP suction isolation 46" Flange 12" F/F 42-¾' B/C 2½" ange (32) 1-⅝" Bolts

*CTUATOR* - Limitorque Type H Size 2BC Order 3A3067B erial 318630 Rat-100.0 Valve B47257 Betchel 1.25 Pos A 3 HP 230/460V.

Bronze BIF wafer-type 28" Model 0652 Design 120# 150°F er #N-50919-3 1980 32½" Flange 8'⅛" F/F Limitorque Type MB Size-00 Order 3D1124A #310482 Valves 90635-13 at-94.0 Type H Size 3BC 460 volt.

24" Butterfly Bronze Wafer-type BIF Model 0652 Des 150# 50°F Serial #N-50902-5 1980 28" flange 7" F/F Limitorque MB Size-000 Rat-100.0 Order 3D1131A Valve 90642-13 erial #312777 460 volt.

**STEEL WATERTIGHT DOOR & HATCHES**

**SIZES**

26" x48"
26"x60"
26"x66"
30"x60"

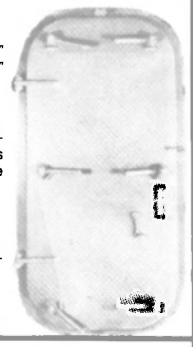
CLEAN OPENING

**6 STEEL DOGS**

6-Dog right and left hand hinged doors with frames. Constructed of ¼" steel plate and meet Coast Guard regulations for above deck as well as below deck use. All dogs are bronze bushed.

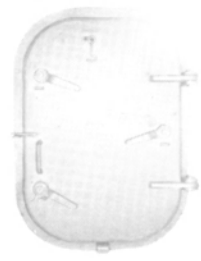
**A.B.S. CERTIFICATES AVAILABLE**
**Hose Tested at 5 P.S.I.**
at 1.5 to 3 meters from door. Doors are built according to approved drawings and technical requirements of A.B.S.

5/16" frame - ¼" door panel



**6-DOG WATERTIGHT DOORS**
32" x 54" Clear opening. 10" Deadlight. As carefully removed from Alcoa "Seaprobe."

**WATERTIGHT DOORS**
24" x 36" — 3-Dog Right & Left Hand



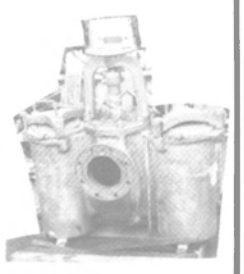
**NEW WORTHINGTON 300 GPM CENTRIFUGAL 150 LB HEAD FIRE PUMP**
No. 1223620 — 3550 RPM — 5½" suction — 4½" discharge. Impeller diam. 10½" — test pressure 225 lbs. MOTOR: G.E. model 115K1405Y — 60 HP — 400/60/3 — Frame 405 — Type K-72 — 3550 RPM.

**MARCH 1-84**
**WATERTIGHT DOORS**
**IN STOCK—IMMEDIATE DELIVERY**
**UNUSED WHEEL-OPERATED, QUICK ACTING**
**WATERTIGHT DOORS—RT &LH AVAILABLE**
IN STOCK
26x48 - Right Hand only
26x60 - 6 Right hand - 7 Left hand
26x66 - 1 Left hand
30x60 - 3 Right hand
30x54 - 2

**U.S. NAVY DOORS**
10 dog - 26x66 - LH
3 dog - 26x60 - RH
6 dog - 30x60 - LH
3 dog - 26x66 - LH

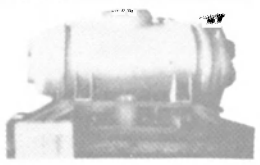
Two (2) New 8" Cast Steel Duplex Strainers.
New Price: $10,000 each.
OUR PRICE: $2,800 each.

Also, 3", 4", 5" and 6" Strainers in stock.

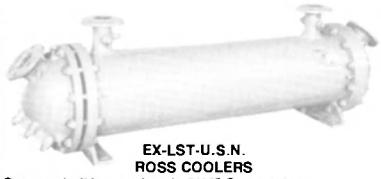


**TWO NEW UNUSED 275 LBW.P — PORT — VERTICAL SIMPLEX FEED PUMPS**
16x10x24 lb — WP 275 lbs Union — 200 GPM @ 350 PSI

**CONDENSERS — OIL COOLERS**



**UNUSED ALCO MARINE CONDENSER**
700 Sq. ft. — 2-pass — ⅝" CuNi tubes 0.049 (188WG) — 108" effective length — 476 tubes P shell & head hydro test 30 PSI. Empty weight 6350 lbs — 11,000 lbs filted with water — operating 7550 lbs — 2-Pass 9⅝" inlet & outlet — length of condenser 156" — about 78" from exhaust flange to bottom of hot well.

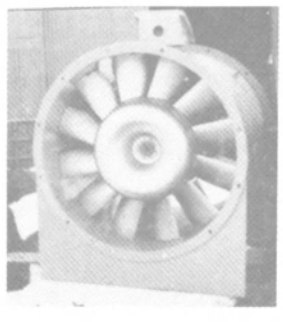


**EX-LST-U.S.N. ROSS COOLERS**
Copper shell-bronze heads-5/16" Cupro tubes.
• 1 Model 1566 - Lub & Oil

**12x10 ALLIS CHALMERS BRONZE CARGO OR BALLAST PUMPS**
6000 GPM — 180 ft head — 1225 RPM

**NEW EQUIPMENT AT 1/3 OR LESS OF NEW PRICE**
Hundreds of other new pumps, motors and other equipment at the same low prices. All located in our warehouse in Jersey City, New Jersey and available for your inspection and immediate shipment.

- (2) High pressure 25,000hp General Electic Steam Turbines, manufactured 1980, 1400# inlet pressure 950°, 85# discharge pressure 6900rpm. Brand New.
  New Cost: $1,000,000 each.
  Make an offer.
- (6)New Ingersoll Rand Boiler Feed Pumps, stainless steel A487; manufactured 1981
  Turbine: Turbo Dyne - Frame 284SWVK 1070hp #33530 #33535; Order #U-19964M 1370# 750°F 40# exhaust.
  Pump: Ingersoll Rand 3DM-4 700 gal. @ 4350' hydro - 2700# #0475-80.
  New Price: $250,000 each.
  OUR PRICE: $69,000 each.
- (3) New Forced Draft Fan Drives comlete with reduction to 1800 rpm.
  Turbodyne Frame 284SWVK *CCW* #33540 685hp 5133/1780. Gear: form D-3 1370# 750° 40# exhaust.
  New Price: $121,000 each.
  OUR PRICE: $19,000 each
  (This is less than the price of the turbine rotor).
- (2) New 100hp Buffalo Axial Flow Fans, stainless steel blades, 60" diameter, 120,000cfm at 3½"; driven by 100hp 440V Westinghouse explosion-proof motor; variable pitch blades. (shown below)
  New Cost: $89,000 each.
  OUR PRICE: $12,500 each.
- (10) New 15,000cfm at 3" Axial Flow Fans complete with 5-20hp 440V AC explosion-proof motors.
  New Price: $6,700 each.
  OUR PRICE: $1,500 each.
  New High Pressure Valves, 900#-1500# from 2" to 10", at 25% of List Prices.



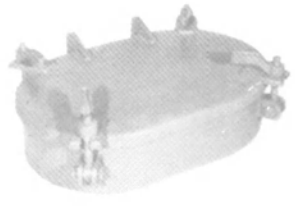
**(3) INGERSOL RAND AIR COMPRESSORS AT EXTREMELY LOW PRICES:**

(1) 600CFM at 120#, driven by 150hp 440V AC motor, Pac-Air package type. New Price: $37,000. OUR PRICE: $7,500.

(1) 1200CFM at 125#, driven by 250hp 440V AC motor, Pac-Air package type. New Price: $55,000. OUR PRICE: $12,000.

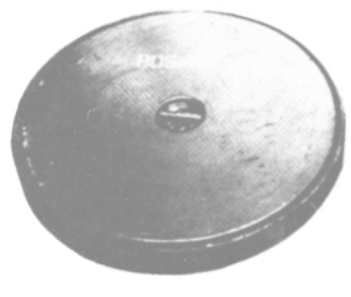
(1) 600CFM at 100# Gyroflo package Air Compressor, complete with 250ph 440V AC motor. New Price: $40,000. OUR PRICE: $6,500.

**QUICK-OPENING HATCH**
Handwheel top & bottom. 4 Dogs. 16" x 24" with 5" coaming. Drawing #60-40.



**GENERAL PURPOSE HATCH**

**15" x 23" x 5" WITH 4 STEEL DOGS**



**NEW 18" & 24" HATCH COVERS**
Flush mounting watertight hatch with machined steel mounting ring. T-Handle is recessed and hand tightens against a strongback across mounting ring. Approx. weights, including mounting ring: 18" 60 lbs — 24" 100 lbs.

**TANKER EXPANSION TRUNK**
36" Diameter — 26" coaming — 7-Dog drop-bolts. Drawing #36/26.

**SEAGOING BARGE QUICK ACTING 4-DOG HATCHES**
Heavily constructed. Handwheel operated, with handwheels top & bottom. Size B: 31" x 31" w/12". For ocean-going barges, etc.

**EQUAL-TO-NEW DIESEL FIRE PUMPS**

(4) Allis Chalmers type diesel engines—100 hp 1800 rpm driving all-bronze 1000 gmp at 280' 6x5 Gardner Denver type D horizontal centrifugal fire pumps. Replacement cost approximately $25,000. **Our price: $5750** each.

**OF MARINE EQUIPMENT FROM**
**ELLERS—ALL EQUIPMENT GUARANTEED**
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**USE—8th & Evergreen St., Jacksonville, Florida**

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**N STREET, JERSEY CITY, N.J. 07302 (201) 433-0870**

**EX: 620533 MARPOW**

(2) Used, in excellent condition, WORTHINGTON 125-TON AIR CONDITIONING CHILLER UNITS, complete with 125HP Worthington turbine, 440#. New Cost of these units approximately $125,000. Our Price: 6500 each.

Two (2) New 20-Ton Hose-Handling Cranes electrohydraulic rated 20-ton at 56', complete with all controls and motors, ABS and CG approved.
PRICE: 18,000 each

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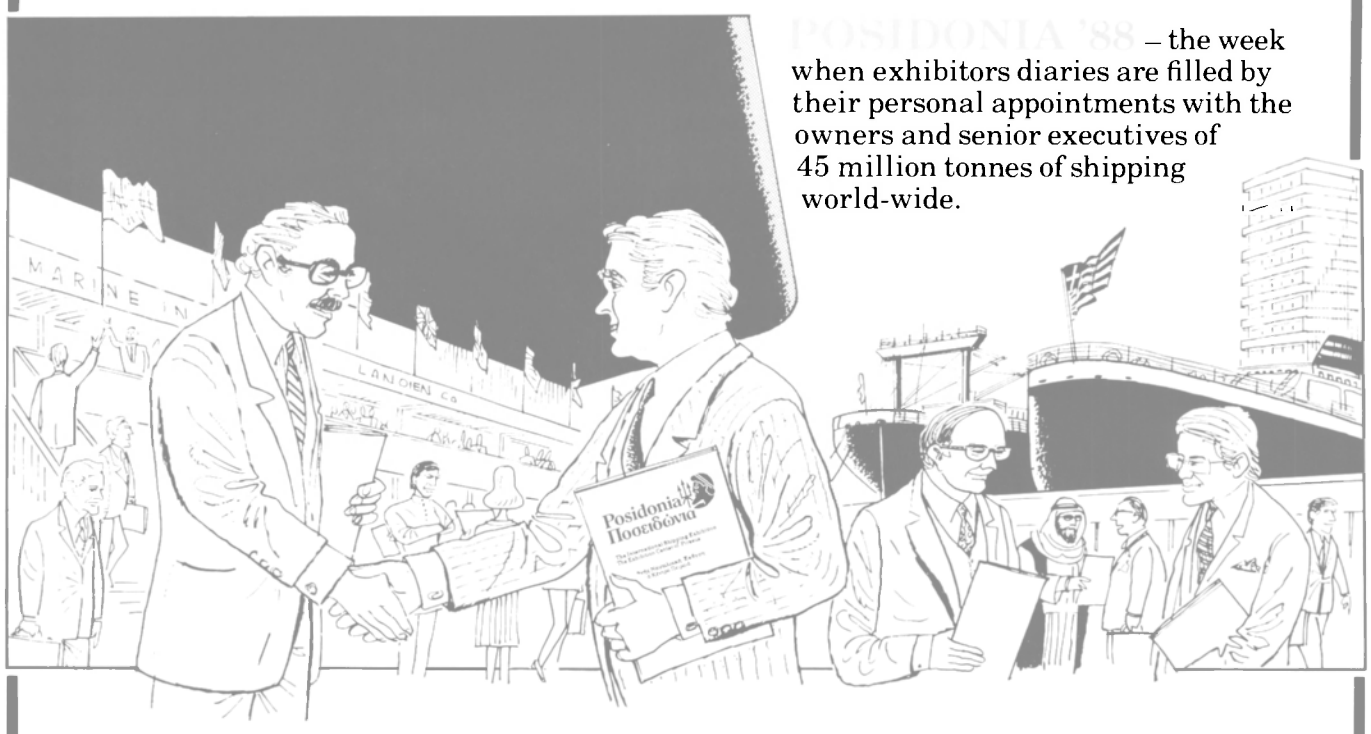
**The International Shipping Exhibition**
Piraeus Exhibition Centre, Greece
6th–11th June, 1988

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**The largest shiplift platform in the world – 655 ft. long by 106 ft. wide at Todd Pacific Shipyards Corporation, Los Angeles Division.**

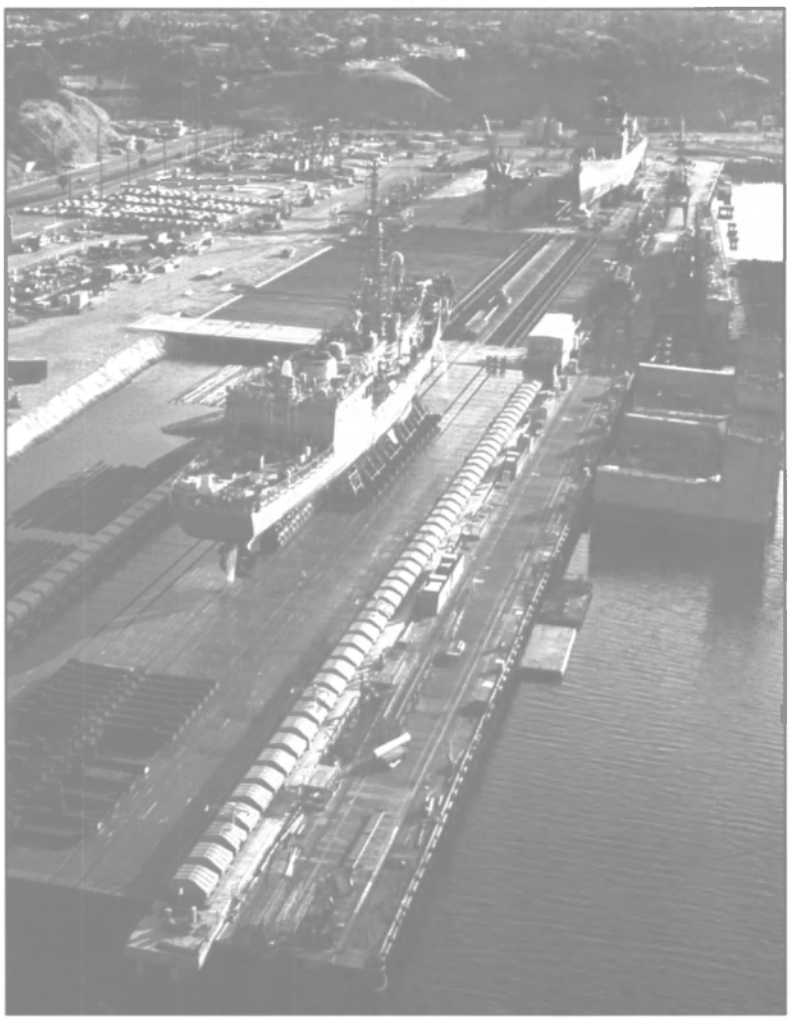
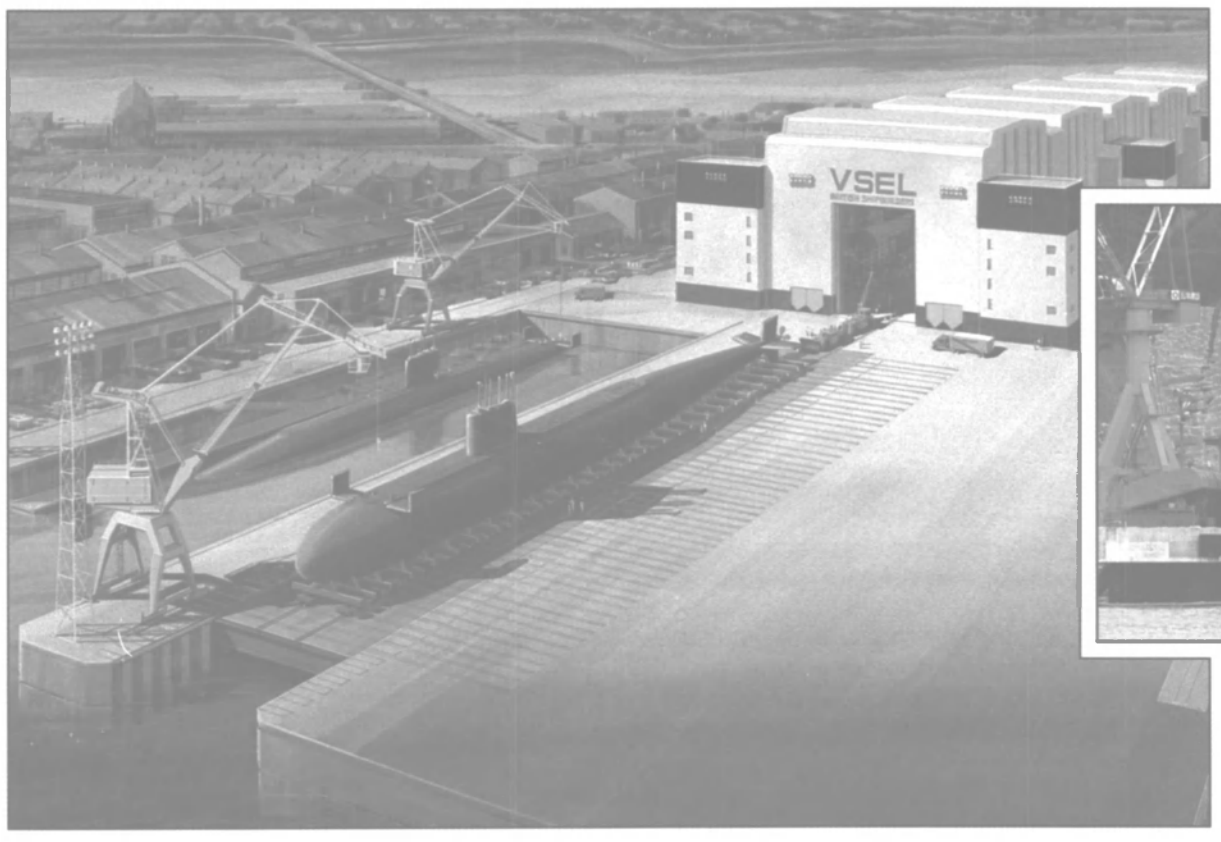


Photo by Joseph Ernest




**The highest capacity per metre shiplift in the world – 200 tons per metre for launching concrete caissons at Yunotsu, Japan.**

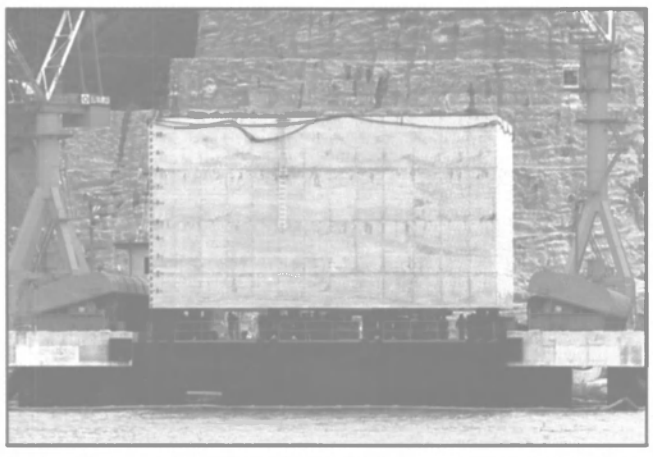


Photo by Penta-Ocean Construction Co., Ltd.

**The greatest lifting capacity shiplift in the world – 24,000 tons for nuclear submarines at Barrow-in-Furness, England.**

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