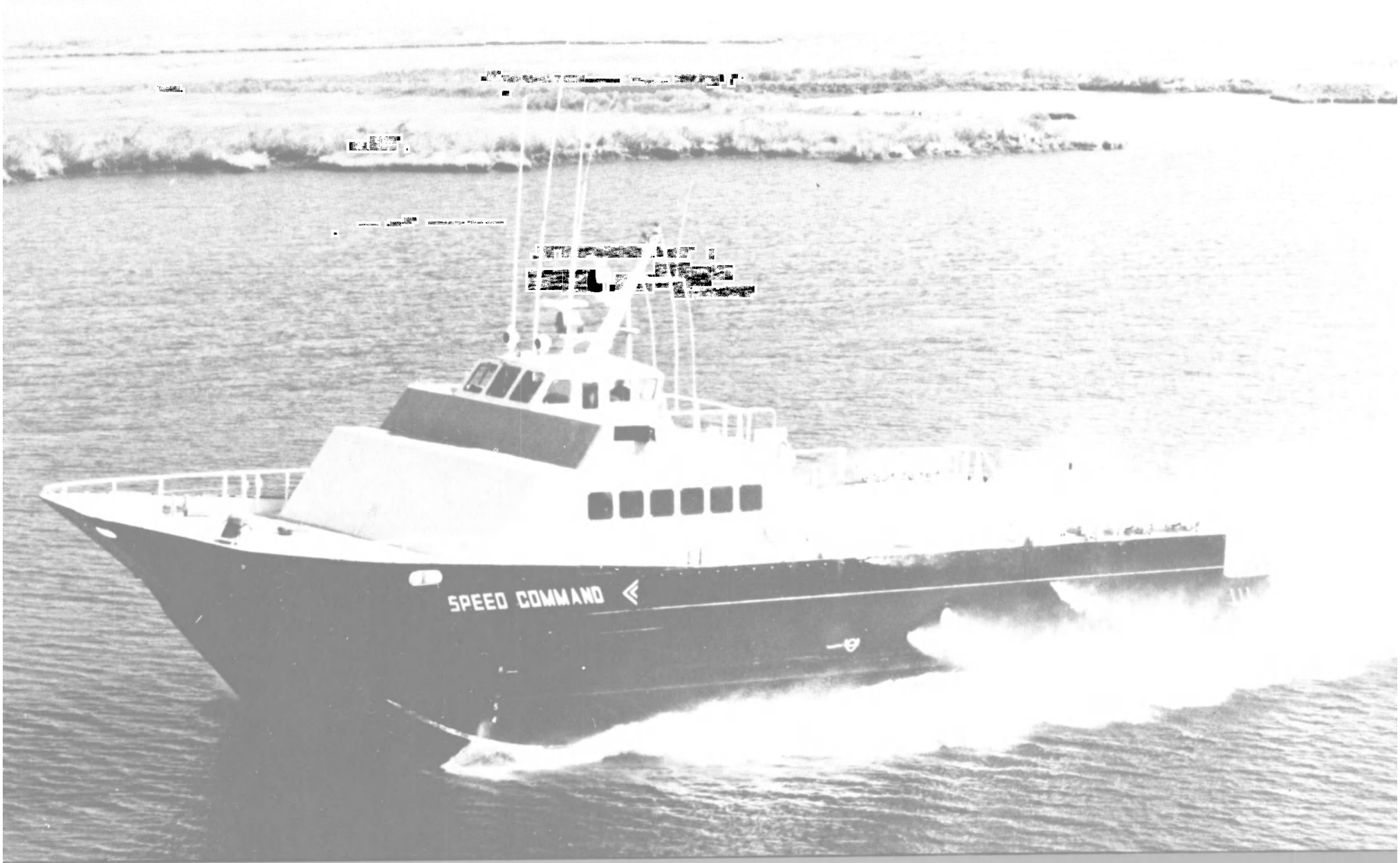
MARITIME REPORTER
AND
ENGINEERING NEWS



'Speed Command'

First In Commercial Service —Bell-Halter SES Delivered To Command Marine
(SEE PAGE 12)

—Previews—
Ice Tech '81
(SEE PAGE 36)
Portex '81
(SEE PAGE 6)

MAY 1, 1981

GOLAR
information

To:
Planners of ships for the 80s, 90s and into year 2000.
From:
Golar, the most experienced producers of Marine Incinerators in the Western World.

Today's regulations make waste disposal an important problem for ship operators.

Tomorrows regulations will not make it easier!

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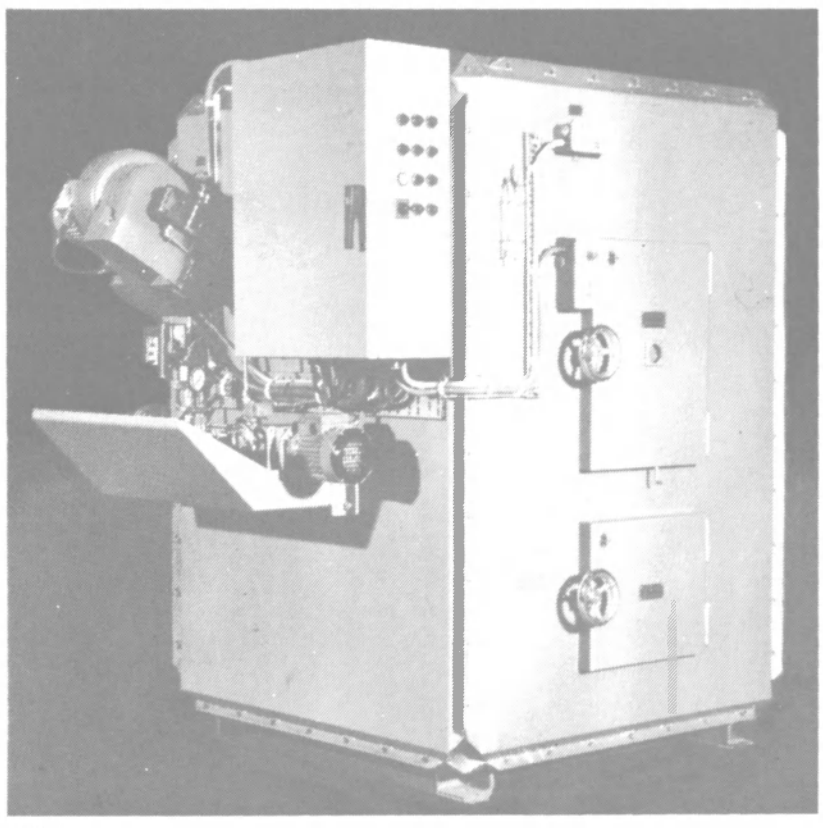

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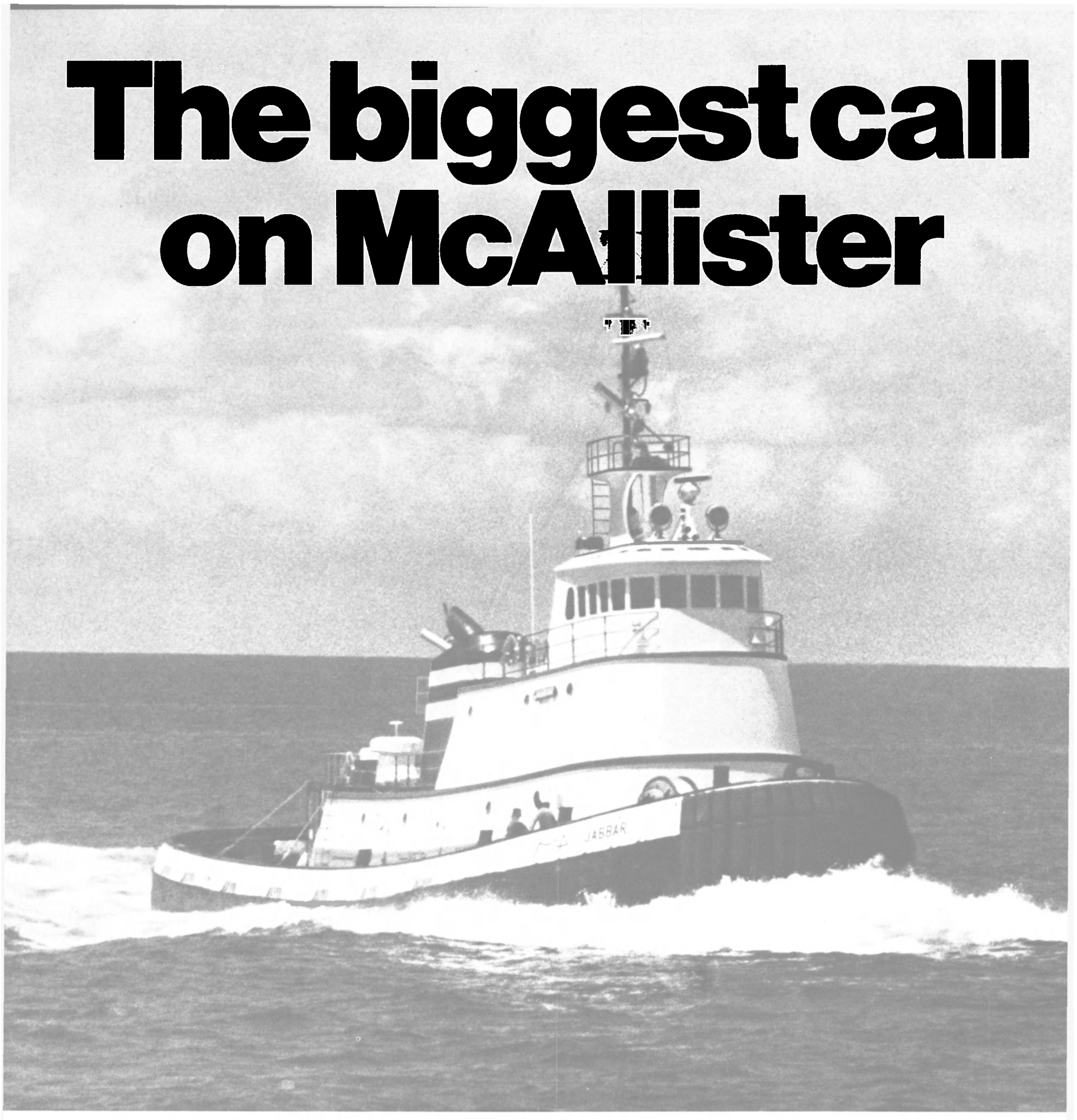
The biggest call on McAllister



The largest tanker terminal in the world located at Ras Tanura, Saudi Arabia, needed a new dimension in shiphandling. McAllister, through its joint venture company, Saudi Tug Services, provided the expertise in the tug JABBAR.

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Write **209** on Reader Service Card

Newport Ship Yard Opens New Addition

Newport Ship Yard, Inc., Newport, R.I., officials have announced the official opening of a new 12,000 - square - foot Administrative Production annex at the company's One Washington Street, Newport location. The new two-story wing provides space accommodating the company's electrical, pipefitting, and boiler shops on the first floor level, with the second floor housing corporate administrative and business offices.

Construction on the annex began in the late summer of 1980. Reconstruction of the firm's production and planning offices damaged by fire last October began in April, with reoccupancy scheduled for the fall of 1981. The announcement was made by **Neil C. Peirson**, president, and **Michael E. Collins Sr.**, vice president and treasurer of the shipyard.

Guidelines For Tanker Requirements Available From U.S. Coast Guard

The U.S. Coast Guard has just published guidelines for the enforcement of the equipment and construction standards mandated by the Port and Tanker Safety Act (PTSA) of 1978. These requirements include segregated ballast tanks, dedicated clean ballast tanks, crude oil washing systems, inert gas systems, improved steering gear standards, and navigation equipment for U.S. tank vessels and foreign-flag tank vessels that enter U.S. waters for commercial service after June 1, 1981.

Titled "Navigation and Vessel Inspection Circular No. 1-81, Guidance for Enforcement of the Requirements of the Port and Tanker Safety Act of 1978 (PTSA) Pertaining to SBT, CBT, COW, IGS, Steering Gear, and Navigation Equipment for Tank Vessels," the guidelines are intended to facilitate implementation of the PTSA requirements by providing both a uniform procedure for obtaining approval of these requirements and uniform policy regarding enforcement of these requirements.

Free copies may be obtained by requesting NVC 1-81; write: Commandant (G-MP-4/14), USCG, Washington, D.C. 20593.

Write **366A** on Reader Service Card

Write **266** on Reader Service Card

MARITIME REPORTER AND ENGINEERING NEWS

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ALL MATERIAL FOR EDITORIAL CONSIDERATION SHOULD BE ADDRESSED TO ROBERT WARE, EDITOR

Simrad designs and builds every piece of marine electronic equipment to meet the most stringent legal requirements not only of the U.S. Government but all over the world. Important? Yes. But not as important as the everyday safety of your boat and your crew. So Simrad goes beyond legal requirements to make sure that your electronics are accurate, reliable, tough and easy-to-use. Quality that you can depend on, and economical so that you can afford to have all the protection that you and your crew deserve.

Simrad can help you pass IMCO inspection...and much more!

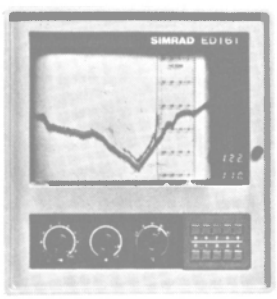
Simrad Loran C's are designed and manufactured to meet or exceed the U.S. Coast Guard endorsed RTCM Minimum Performance Standard (MPS).

TL-856 Loran C Navigator automatically computes and displays TD's, Lat/Long, course, ground speed, time and distance to any of ten waypoints, as well as cross-track error. It can acquire and track all Loran C masters and secondaries worldwide. Four tunable and two preset notch filters for professional performance even in high interference areas. *TL-856 makes it all simple.*

TL-838 Loran C Receiver simultaneously displays two lines of position from automatically acquired and tracked masters and all available Loran C secondaries. TL-838 has four tunable and two preset notch filters for outstanding performance, worldwide. It incorporates a three point memory, and *very fast acquisition and settling.*

2182 KHz Watch Alarm Receiver. Simrad's new, compact, FCC approved Watch Alarm Receiver, RW 105, fulfills all legal requirements of the new IMCO/SOLAS Regulations. The RW 105 also meets the specifications for most other maritime regulatory agencies. It can be set to receive all transmissions on the 2182 KHz distress frequency or automatically mute all but distress signals preceded by the two-tone alarm. An internal digital clock lifts the mute during radio silence periods. Connection for optional tape recorder or remote speaker, and built-in test generator are standard. *Easily fits into limited space.*

Loran C Coordinate Converter Model TC-28A adds total navigation functions to most Simrad Loran C Receivers. Converts TD's to Lat/Long, memorizes up to ten waypoints and calls up course and distance to any of them. Computes and displays on command time to destination and cross-track error. Installs directly on TL-838 or separately with other Simrad models. *Makes them all navigators.*



New Digital Recording Sounders. Simrad offers two economical navigation recording echosounders that meet IMCO recommendations for merchant vessels. In addition to showing a well defined bottom on recording paper, the systems have independent digital depth indicators and depth alarms. The Simrad ED-161 has four recording ranges from 0-25 to 0-550 fathoms. For navigating in shallower waters, the 200 KHz ED-162 has four ranges from 0-30 feet to 0-250 fathoms. The optional IR-201 Remote Digital Analog Indicator displays depth in feet, meters and fathoms. An optional transducer selector with alarm (TS-101) allows use of up to four transducers. Due to Simrad's special engineering, *some vessels can be retrofitted from inside the hull without having to drydock.* Contact Simrad for details.

Two IMCO approved automatic direction finders, the TD-A202B and the TD-C328HATS (shown), are now offered by Simrad. The TD-A202B has frequency ranges of 200-580 KHz beacon band and 1.5-2.8 MHz marine band. The TD-C328HATS has a range of 200 KHz to 13.5 MHz. Both are highly sensitive superheterodyne receivers. *They lock in fast.*

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A trusted name at sea.

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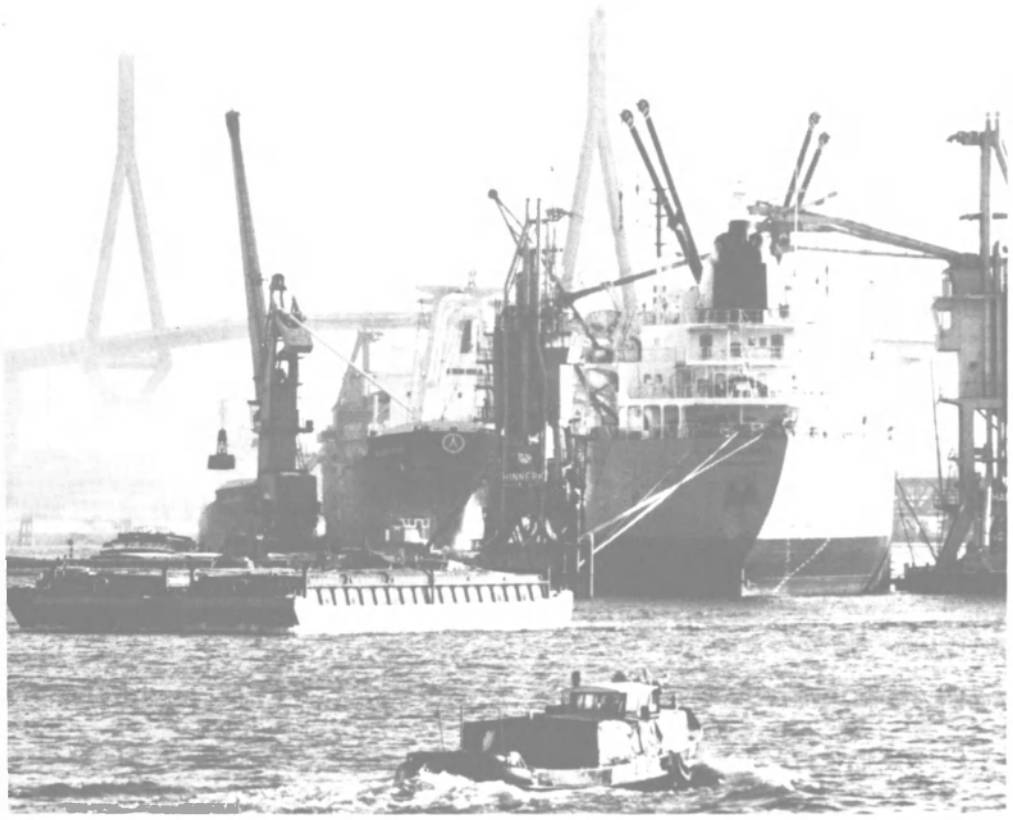


Port of Hamburg, Germany

PORTEX '81

Hamburg, Germany
May 26 - 30

With exhibitors registered from 18 countries, what is said to be the largest and most comprehensive international port exhibition and conference, Portex '81, is slated to open at the Hamburg Exhibition and Congress Center on May 26, 1981. Running through May 30, the five-day event will focus on harbor planning and construction, port equipment and operations, as well as handling, storage, and packaging. Portex '81 will also be the first gathering of this magnitude of port experts from around the world.

The congress and its corresponding seminar series is designed as a forum to encompass all areas of port technological development. The main thrust of the conference will deal with the theme "World Ports and International Trade" with experts speaking on scientific and technical aspects of port activity in both industrialized and Third World countries today.

Speakers will include authorities from Chile, Ethopia, France, Greece, Japan, Thailand, the United States, and Germany. The aim of the seven specialized seminars will be to discuss and demonstrate how trends, new equipment, and port systems can be implemented to insure growth and development.

Concurrently with the congress and exhibition, a Research and Development Information Exchange will be staged to bring the industry together with re-

PORTEX '81 EXHIBITORS

(As available at press time)

FEDERAL REPUBLIC OF GERMANY

Alten Geratebau
Ascon Group
Aumund-Foerderbau
H.D. Bauer
Bewachungsdienst Borchert GmbH
Bilfinger & Berger
Blohm + Voss
Gebr. v. Braucke GmbH
Buhler-Miag
Cefilac
CEMAN
Copsy Container Operation & Port Systems
Deutsche Bundeshahn
Dixi
Drehtainer
Eaton
Eurokai
Eurolift
Euroman
V.V. Fischer
Frei KG
Gantry
Ge-Ron
Gottwald
Paul Grimm & Co. KG
GTE
Gust & Co. KG
Habermann
Hafenschule
Hamburger Hafen und Lagerhaus
Hamburg Information
Port of Hamburg
Hamburg Port Consult
Interplan GmbH
Jetschke
Jungfalk
Kalmer
Klaus
Knaak
Ingenieurbureau P.P. Koerting
Fa. Wormaldt Kopperschmidt
Krupp Atlas
Krupp Industrie- und Stahlbau
Lager und Speditions Gesellschaft
Lassig
Leutz Nachrichtentecnik
Liebherr
Linde
Materialinformationzentrum Gesellschaft Fuer Logistik MBG
Port of Lueneburg
Mafi
Mannesmann-Demag
Maschinenfabrik Buckau-Wolf
Mitsui
Motorola GmbH
Karl-Heinz Mueller Baumaschinen
Orenstein & Koppel
Peiner Maschinen
Peters GmbH
Pfister GmbH
PFL Palletenfabrik Lueneburg
Wilhelm Qunante GmbH
Re Main
Fr. Sander GmbH
Schiffahrtsverlag Hansa
Schlegel
Scholtz EFS
Sperry Marine Systems
Still
Strabag
Tandem Computers Inc.
TCH
Thyssen Aufzuege AG
Thyssen Bausysteme
Thyssen Bergbautechnik und Waggon-Union
Thyssen Engineering AG
Thyssen Giesserei AG
Thyssen Industrie AG
Thyssen Nordseewerke
Thyssen -Umformtechnik
Thyssen-Henschel
Tiedemann
Transfracht
Transtherm
TTC Technology Transfer Consult
Uniconsult/Jordaberg
Unikai Hafenbetreib GmbH
Unimar Linienagentur Hamburg
Verkehrs-Verlag P. Fischer
Seehafen Verlag
Voith GmbH
Willbrandt
Zweiweg

UNITED KINGDOM

Antif Electronics
Association of Master Lightermen and Barge Owners
Birmingham Chamber of Industry & Commerce
British Overseas Trade Board
British Tug Owners Association
British Waterways Board
Cole Cranes Ltd.
Dover Harbour Board
Email
Fairplay International
Ferranti Engineering
C.J.R. Fyson & Son Ltd.
Gray Mackenzie & Company Ltd.
Howe International
The Inland Waterways Association
Intec Press Ltd.
Jones Cranes Ltd.
Lansing Ltd.
Lloyd's of London Press Ltd.
London Port Promotion Committee
Molyneux Rail Trucks Ltd.
Motor Barge Owners Association
National Association of Inland Waterway Carriers
National Waterways Transport Association
Racal-Decca Surveys Ltd.
Radler Conveyors Ltd.
Sperry Marine Systems
Transport on Water Association
City of Wakefield Metropolitan District Council

FRANCE

B.P.R.
Bsceon Consulting
Caillard
CFEM
Chantiers de Normandie
Container Equipment et Arrimage
Creuson-Loire
Delatre Levivier
Ecole Nationale des Traveaux Publics
Engylin
Fives Cail Babcock
Gem-Hersent
Joseph Geron
Port Authority of Le Havre
Port Authority of Marseille
MTPS Elektron Industrie
P.B.M.
Perrier
Polyvin
Potain

OTHER COUNTRIES

Port of Abidjan, Ivory Coast
Agum Metal Works, Israel
Auromo Oy, Finland
Auto Lux, Italy
H.P. Back, Switzerland
Port of Barcelona, Spain
Cameroon Shipping Lines, Cameroon
Port of Douala, Cameroon
Eromar, Italy
Eurolift, Sweden
Port of Genoa, Italy
I.B.I. Intergovernmental Bureau for Informatics, Italy
Industry Face Standard, Italy
Inka Lassila & Tikanoja Oy, Finland
Interfrigo, Switzerland
Jamaican Exhibitors Cooperative, Jamaica
Kone Oy, Finland
Limex AuBenhandelsbetrieb, East Berlin
Port of Lisbon, Portugal
Lisnave Shipyards Ltd., Portugal
Port of Lome, Togo.
Mitsubishi Heavy Industries Ltd., Japan
Port of Naples, Italy
Officine Reggiane, Italy
Port of Osaka, Japan
Seward International Ove Grau, Denmark
Siwertell, Sweden
Socamac S.A., Cameroon
Oy Suomen Autoteollisuus AB, Finland
Takraf, East Berlin
Trelenberg, Denmark
Port of Trieste, Italy
Valmet Oy, Finland
Port of Venice, Italy
Videoton, Hungary
Volan Elektronika, Hungary
Volvo Trucks Ltd., Sweden
Vredstein Ind. Prod., Netherlands
Port of Yokohama, Japan

search specialists and innovation consultants. Representatives from Hamburg's higher education institutions, private and publicly owned research establishments, and government officials will lead the exchange. This forum is intended to benefit medium-size and smaller concerns.

Among the topics included in the information exchange are subjects of interest to both tradesmen and industry as well as port services. Themes include weather forecasting, river sedimentation, packing technology, underwater welding, seawater desalination, and wind energy systems. One session will deal with how river silt and sediment can constructively be utilized. In addition, exhibitors will be given the opportunity to report on their experience in port development schemes and demonstrate new innovations in equipment on display.

The exhibition itself will be the largest display of information and products of interest to seaports ever assembled. Ten halls covering more than 320,000 square feet will house the exhibition, with the neighboring Congress Center serving as location of the conference and seminars.

Special display facilities will include open-air exhibition areas with railroad tracks for demonstration of shunting locomotives, special cars, cranes, and other rail-mounted equipment and rolling stock.

Organized by the Hamburg Exhibition and Congress Center and sponsored by Hamburg's Senate, Portex '81 will also give participants the opportunity to study port facilities in action. The Port of Hamburg, Germany's largest and one of the world's most developed, will serve as a working laboratory to demonstrate special facilities for handling bulk cargo. Grain silos, timber products terminals, tank facilities for liquid cargo, and container terminals will be in operation.

Among the countries registered to participate in Portex '81 are the United Kingdom, Germany, France, Belgium, Poland, Czechoslavakia, Hungary, Italy, Norway, Sweden, Japan, the United States, East Germany, and Switzerland.

PORTS AND TRADE CONGRESS

In conjunction with the Portex '81 Exhibition, the World Ports and World Trade Congress will be presenting modern know-how on cargo handling, port operation and organization, as well as the planning, design, and construction of seaports. The subjects of the congress and the choice of speakers should insure a top-quality congress and seminar program, as experts from all over the world are expected to attend.

International experts of high caliber will participate in the introductory program, which deals with the common problems faced by world ports and their general technological development. Prof. Dr. **Kuiler** from Erasmus University in Rotterdam is to speak on "The Development of World Transport at the End of the Twentieth Century," and **Georg Koopmann**, head of the research group International Trade Links at the HWWA Institute of Economic Research in Hamburg, has decided to talk on "The Development of International Maritime Trade and Its Influence on World Shipbuilding."

James B. Newman, ports commissioner at the World Bank in Washington, D.C., will speak on "Port Development and Problems in Third World Countries as Seen by an International Development Aid Organization," a topic that should attract considerable interest. **Ignacio Echeverria**, departmental head in the Chilean Ministry of Transport, will examine the problems confronting ports in Latin America, while **Tchouta Massa**, head of the Transport Department of the Economic Commission for Africa (Addis Ababa), will speak on the development of African ports and their problems.

Several well-known speakers will deal with regional aspects of

(continued on page 8)

Portex '81

(continued from page 7)

the development and design of ports throughout the world: Dr. **Hans Ludwig Beth,** from the Institute for Maritime Traffic in Bremen, on "World Trade Forecasts and World Port Capacity"; **Rey Beaudesson** and **Michel Bernard** from the Union Industrielle et d'Entreprise in Paris on "Port Construction Models and the Transfer of Know-how"; Prof. Dr.-Ing. **A.J. Rogan** from the National Technological University of Athens (Greek Ports); Prof. Dr. **Guiseppe Dagnino,** president of Genoa Port Authority (Southern European Ports and Their Importance for Transport in Central Europe); and **Daniel Morgenstern,** director of ports and shipping at the Ministry of Transport in Israel (The Effects of Political Developments on Ports in the Middle East).

The influence of energy policies on the relationship between European port planning and development on the one hand and the flow of transport and the function of intermodal transport technologies on the other hand will be examined by Prof. Dr.-Ing. **Erich Bahke** from the Institute for Conveyor Technology at the University of Karlsruhe. Prof. Dr. **Franz Malz** from Aachen College of Technology will discuss global ecological aspects of the construction and operation of seaports and port facilities. And **F.J. Grosser,** director of the Academia Cosmologica Nova in Munich, will speak on global ecological and economic problems in connection with infrastructural planning and the location of industry in ports.

SEMINAR PROGRAM

An extensive seminar program parallel to the congress has attracted the participation of Hamburg Port Consulting GmbH, the Hamburg Association of Offshore Technology and Marine Construction Engineers, Bilfinger + Berger (Mannheim), Uniconsult (Hamburg), and French, British, and Italian consulting firms. In the general area of port planning and design the following topics will be discussed: the principles of economic development and location of industry in ports; port planning and expansion in Bremen, particularly container terminals; communication of know-how, illustrated by the example of the Aqaba Port Training Centre in Jordan and the Socomac Model in Cameroon; planning of port construction models with the example of a modular container terminal system; port construction innovations for growth-oriented, rational port buildings; maximizing the efficiency of dredges and a description of the present dredging systems; corrosion protection and lamination systems in the planning of port facilities under water and on land.

The second part of the seminar will deal with port operation and equipment. Consulting firms from West Germany, Great Britain, Holland, Norway, and Hungary have agreed to participate. The main topics are as follows: efficient equipment in the service of shipping; a new fendering system; doubling of cargo-handling capacity of container terminals through utilization of new handling systems; the efficient utilization of conveyor and lifting gear in ports as illustrated by the multipurpose container terminal on Tin Can Island, Nigeria; control systems for mobile conveying and hoisting equipment; plant and machinery for port storage; crane construction; new ways of storing large containers in high-stack facilities and the development of the ConAir tank container.

The third part of the seminar will deal mainly with port organization, administration and service systems. Communication experts will discuss the utilization of minicomputers, closed-circuit monitoring and radio systems, the use of data processing in port data banks and cargo-handling, data processing monitor systems for containers and container repairs, training systems for port personnel, as well as fire and general safety precautions in ports.

The fourth part of the seminar

will deal with intermodal transport and communication systems between ports and inland centers. The following will be discussed: survey and control systems for port planning, combined sea/rail and sea/inland shipping transport via Hansaport (bulk cargo port); Norwegian shipping management systems and the role of goods distribution centers as hinterland links for integrated sea container traffic.

New Brochure Available On Marine Travelift Mobile Boat Hoists

Marine Travelift, Sturgeon Bay, Wis., has completed publication of a new four-page folder including pictures and specifications on its Model 150AMO boat hoist. The 150-ton-capacity unit is described as the world's largest mobile hoist in existence.

Special illustrations and pictures in the new folder describe advanced features such as two-speed hoisting capability, synchronized sling control, 90-degree pivot steering, and a special "cruise" control. Complete specifications and essential dimensions are also shown.

For a free copy of the brochure,
Write 70 on Reader Service Card

Dravo To Provide Training For Crews Of People's Republic's New Towboats

Dravo Corporation has announced the signing of a contract with the Chang Jiang Shipping Administration of the People's Republic of China to provide training for the operation of new river towboats. Financial terms of the contract were not disclosed. Dravo will train Chinese towboat officers aboard towboats operated by Dravo's subsidiary barge line, Dravo Mechling Corporation.

Dravo is currently near completion of a previously awarded contract to construct, at its Pittsburgh shipyard, four river towboats and 30 barges for the Chinese. As the new river transportation equipment is put into service in China, Dravo will provide on-site technical assistance.

Vander Laan Promoted To Vice President Of Soros Associates

Richard W. Vander Laan has been promoted to vice president of Soros Associates, New York City. Soros, an international consulting engineering firm, specializes in the planning, design and construction management of port facilities, offshore terminals, and bulk material handling systems.

Richard W. Vander Laan

Mr. **Vander Laan's** initial assignment in his new position will be as principal in charge of the Soros-sponsored Transcoal Terminal to be built at Marley Neck in Anne Arundel County, Maryland. He is well familiar with the Baltimore area, having been responsible for the Soros studies for the expansion of the Chessie's Curtis Bay shiploading facility, and the proposed rail-to-ship coal transfer terminal at the Canton Docks.

Mr. **Vander Laan** brings 32 years' experience in the development and engineering of bulk material handling systems to the Marley Neck Terminal project. Since joining Soros Associates, in 1972, he has been project manager for the engineering and construction of rail to barge coal transfer terminals on the Ohio River in West Virginia, Illinois, Indiana, and Kentucky, and the reconstruction of a petroleum coke shiploading facility in Houston. His overseas projects include a salt loading terminal in Kandla, India, and a bauxite/alumina port facility in Brazil.

Among those present at recent keel-laying at Bay Shipbuilding were (L to R): Comdr. **L. Murdock,** USCG; **R. Miller,** vice president, Engineering, BSC; **George R. Knight Jr.,** J.J. McMullen Associates; Lt. Comdr. **F. Owens,** USCG; **F. Kolbeck,** manager-contracts, BSC; **W. Shattuck,** owner; **K. Meyer,** owner; **A. Zuehlke,** president, BSC; **J. Notter,** owner; **H. Taylor,** ABS; **R. Hynds,** owner's representative; **G. Geiger,** vice president and general manager, BSC; and **R. Aiken,** operations manager, BSC.

BSC Lays Keel For Bulk Barge

The keel for Hull 729 was laid recently at Bay Shipbuilding Corporation (BSC), Sturgeon Bay, Wis. The oceangoing bulk cargo barge is being built for Universal American Barge Corporation, Greenwich, Conn. This will be the first vessel built for Universal American by BSC.

The 550-foot by 78-foot tug notch barge will be used as a bulk cargo carrier handling coal and other bulk cargoes. Cargo capacity will be 33,000 short tons of coal. The stern will be fitted with a deep notch to accommodate a tug of 7,200 bhp. Bay Shipbuilding has responsibility for vessel design, and will deliver the barge to Universal American Barge Corporation in August 1981.

Attending the ceremony were the owners and their representative and design agent, representatives of the American Bureau of Shipping and U.S. Coast Guard, and Bay Shipbuilding management personnel. This will be one of five oceangoing tug notch barges recently built or contracted by Bay Shipbuilding, a subsidiary of The Manitowoc Company, Inc.

Sperry Gets $7-Million Navy Award For Work On FFG Modifications

Sperry Corporation, Sperry Systems Management, Great Neck, N.Y., is being awarded a $7,014,498 modification to a previously awarded cost plus award fee contract for FFG-7 (guided-missile frigate) class ships characteristics changes. The Naval Sea Systems Command is the contracting activity. (N00024-80-C-7062)

New Hercules Brochure Describes Advantages Of Chlorinated Rubber

Hercules Incorporated, Wilmington, Del., offers a six-page brochure in color on the advantages of Parlon® chlorinated rubber as an important raw material in paint formulations to offset the effects of acids, alkalies, salts, fungi, fresh and salt water. Features of Parlon described in the brochure include chemical inertness, low moisture permeability, nontoxicity, nonsupport of fungus and mold growths, nonflammability, excellent adhesion to most substrates and primers, quick drying, and ease of application.

Paints based on Parlon are noted for their ability to combat corrosion in industrial equipment and facilities, the brochure points out. Multi-panel photographic evidence of extensive tests made on the principal generic types of maintenance finishes under exposure conditions illustrate the brochure. Pictured are applications where maintenance paints based on Parlon chlorinated rubber not only economically preserve and protect structures and equipment but also maintain their functions and improve their appearances.

For a free copy of "Corrosion Protection" with Parlon,

Write 86 on Reader Service Card

Linden Asks Title XI For $8.4-Million Tug/Supply Boat—McDermott To Build

Linden, Inc., Suite 201, Carondelet Street, New Orleans, La. 70130, has applied for a Title XI guarantee to aid in financing the construction of a 180-foot, 2,500-horsepower tug-supply vessel.

McDermott, Inc., New Iberia, La., is the proposed builder. The diesel-powered vessel would be operated in the Gulf of Mexico.

If approved, Title XI financing would cover $6,356,000 or 75 percent of the estimated actual cost of $8,475,436. No delivery date has been set.

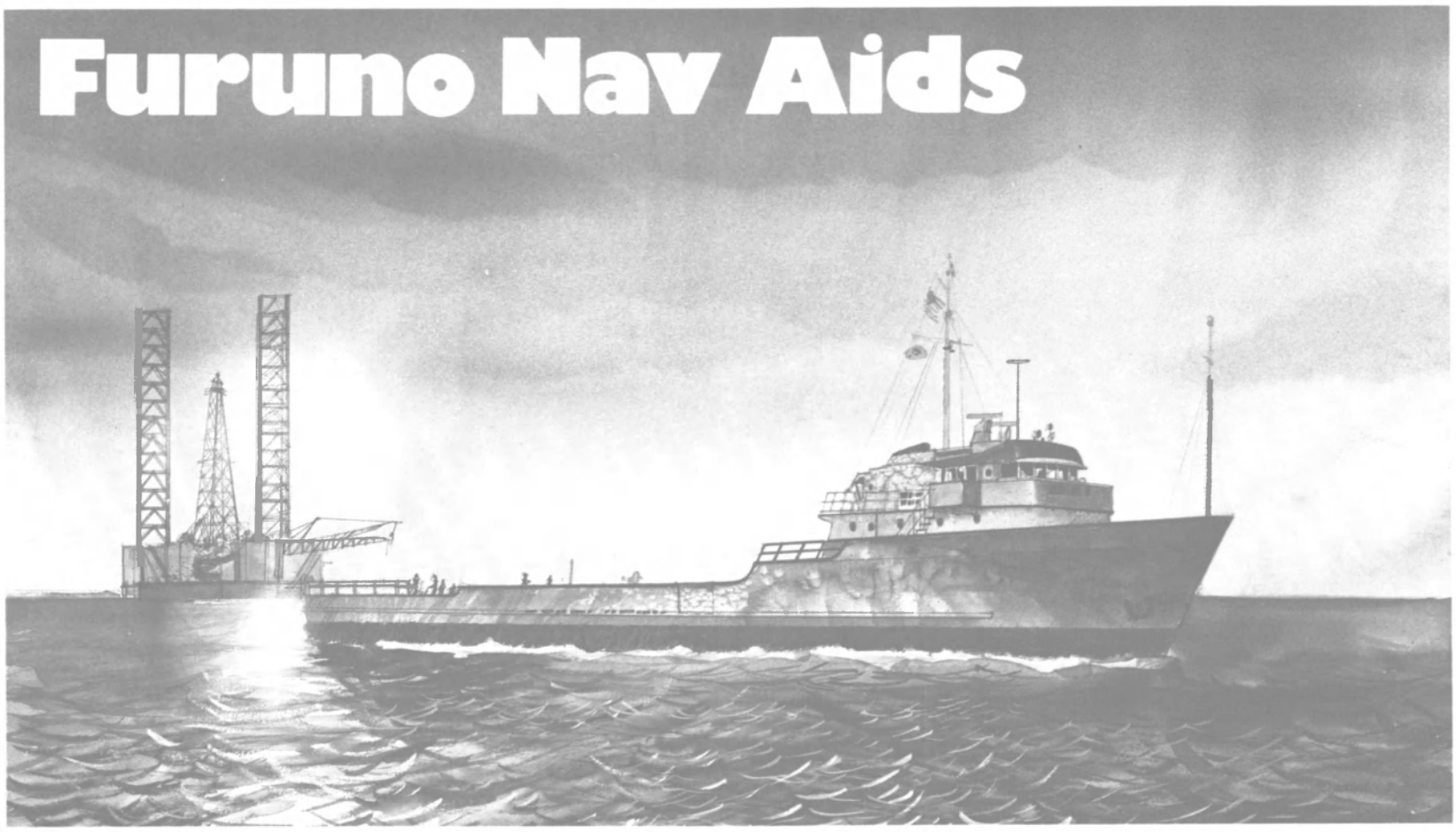
Johnson Named Manager Of Shipyard Systems For Hydranautics Hydraulic

John M. Johnson

John M. Johnson has been promoted to manager of shipyard systems for Hydranautics Hydraulic Systems, according to **Ed Krabacher,** executive vice president and general manager. In his new position, Mr. **Johnson** will be responsible for sales, product development, and customer service of Hydranautics shipyard and construction equipment, both foreign and domestic.

Mr. **Johnson** joined the firm in 1974 and was program manager for Hydranautics before being appointed to his new position. As program manager, he was responsible for the fulfillment of assigned contracts, including the supervision of installation and commissioning of shiplift, TransLift™, ship extrustion, and transfer systems around the world. His experience includes being program manager for the first hydraulic shiplift in Korea, and the world's largest hydraulic shiplift elevator (approximately 100 feet by 570 feet) for ships up to 30,000 dwt.

Prior to joining Hydranautics Hydraulic Systems, Mr. **Johnson** was responsible for program and schedule control for Aero Spacelines, Inc. His experience also includes being on the aerodynamics staff involved with wind tunnel work for Boeing.



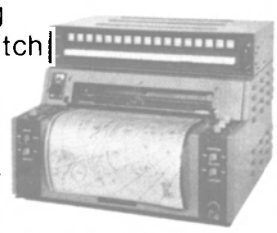
The Furuno navigators take you where you're going, then lead you home again. Precisely.

Radionavigation has come a long way since Furuno introduced its first loran receiver 20 years ago. Since then, we've developed loran C, sat nav, Omega, ADF's and FAX receivers.

Because no nav aid satisfies every need (sat nav is global but provides fixes hourly, loran covers coastal areas only), Furuno has taken the integrated "building block" approach. That is, you can purchase individual loran or sat nav, but just as easily purchase hybrid loran/sat nav or sat nav/Omega systems.

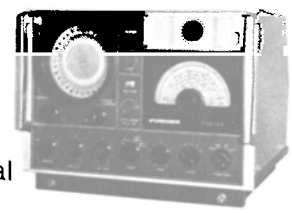
Position display, whether from loran or sat nav, is provided by the Furuno GD-102 electronic plotter. It displays present position, courseline and other data on a bright 12″ CRT. Area shown may be from 1.1 to over 10,000 miles² and grids are shown with digital lat/long readout. Up to 900 plotting points are addressable and 12 different event mark symbols displayed. The entire picture can be shifted in any direction. Digital readouts on the CRT show chart scale used and range/bearing to destination.

Loran C navigation employs the LC-200, a fully automatic receiver designed to exceed all USCG specs. It acquires and tracks master and all secondaries, displaying any two LOP's simultaneously. A memory switch freezes the display for position recording. Adding the LC-3000 processor/display unit converts loran TD's to direct lat/long readouts and gives distance & bearing to destination or 9 waypoints, course & speed, date and GMT.



Sat Nav/Omega global positioning is provided by the FSN-20B. It computes and displays heading/distance to destination and 9 waypoints, last 5 fixes, establishes shortest routes, monitors great circle or rhumb line navigation, alarms if off course, notifies arrival and, with ship's log and gyro inputs, continuously computes DR position.

Facsimile and ADF units are also available. FAXes with either 10 or 14″ dry aluminized paper don't require venting and copies are usually sharp and clear. Units operate with various high quality SSB receivers, including Furuno's.



Furuno ADF's come in two basic versions: the FD-171 3-band unit with digital frequency readout, and the FDK-24 5-band unit with high precision CRT display. Both provide for additional crystal controlled spot frequencies.

For complete information on Furuno's broad line of Nav Aids, visit one of our more than 200 authorized dealer outlets, or simply return the coupon below.

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Please send literature on the unit(s) marked below, plus the name of my nearest authorized Furuno dealer.

☐ Loran C ☐ Sat Nav/Omega ☐ Video Plotter
☐ Facsimile ☐ Direction Finders

Name _____

Address _____

City _____ State _____ Zip _____

Type of vessel owned _____

☐ *The illustration above is one in a series of 12 by artist Larry Winborg that are now being offered in three sets of 4 prints each, reproduced in brown sepia tone on 17″x22″ heavy white art stock suitable for framing. Order any one or all sets directly from Furuno U.S.A. Just mark your choice below and enclose $5.00 per set for postage and handling.*

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ON THE COVER

Bell-Halter Delivers First Commercial SES To Command Marine

The United States' first commercial surface effect ship (SES), the Speed Command (shown above) of Command Marine, Inc. of Lafayette, La., became operational recently and is exceeding design and performance expectations, according to **James Mello**, president of Command Marine. The new "dashboat" built by Bell-Halter, Inc., New Orleans, is now transporting supplies and personnel to rigs and platforms in the Campeche Sound under contract to Pemex, the Mexican state oil company.

"The dashboat has proven to be extremely reliable and has not experienced any downtime due to equipment problems or weather," said Mr. **Mello.** "In addition, she has demonstrated an ability to operate and maintain speed in extremely rough weather conditions when other vessels had to remain in port," he added.

Mr. **Mello** stated that the Speed Command has carried up to 127 people on some trips and that the dashboat has operated in 10 to 12-foot seas at speeds up to 26 knots. On those occasions the passengers were comfortable and safe and arrived ready to work.

The Speed Command rides on a resistance-reducing cushion of air contained by catamaran-style side hulls and flexible bow and stern seals. When under way, the center portion of the hull is clear of water and supported by the air cushion that dramatically reduces resistance with the water. This low resistance characteristic results in much higher speeds per installed horsepower, and greatly improves the ride characteristics of the vessel.

The 110-foot by 39-foot all-aluminum vessel is powered by two SACM 12V175RVR diesel engines, each with a maximum continuous rating of 1,500 bhp at 1,560 rpm. The two double inlet centrifugal lift fans are powered by two GM Detroit Diesel 8V92N engines.

The Speed Command is registered at under 100 gross tons, and can carry up to 40 long tons on her spacious 1,000-square-foot aft deck. She is the first of four sister surface effect ships to be built for Command Marine at Halter Marine's Chalmette, La., division.

The Bell-Halter prototype demonstration vessel, the Bell-Halter 110, which is similar to the Speed Command, has been sold to the U.S. Navy. (See MR/EN, March 1, 1979) She has been in service for approximately two years and has completed demonstration tours on the U.S. East Coast and work tours in the Gulf of Mexico. She will serve the U.S. Coast Guard for six months prior to going in service with the U.S. Navy. Another Bell-Halter surface effect ship, the Rodolf, is now being operated by the U.S. Army Corps of Engineers as a hydrographic survey boat. (See MR/EN, April 15, 1980)

Port Engineers/SUNY Forum Discussed Fuels–Present And Future

The theme of this year's 29th Annual Fort Schuyler Forum, cosponsored by The Society of Marine Port Engineers New York, N.Y., Inc. and the State University of New York Maritime College, was "Fuels — Present and Future." The day-long meeting was held recently on the SUNY Maritime College campus at Fort Schuyler, Bronx, N.Y. Co-chairmen of this year's program were **John Antonetz** of Texaco, Inc. and Prof. **Jose Femenia**, chairman of the Engineering Department at the Maritime College.

Presiding at both the morning and afternoon technical sessions was Port Engineers Society president **George E. Murphy** of United States Lines. After an address of welcome by Rear Adm. **Sheldon H. Kinney** (USN Ret.), president of the Maritime College, Mr. **Antonetz** moderated the morning technical session.

This session featured three technical presentations: Impact of Fuel Qualities on Boilers and Diesels, by **Matthew F. Winkler** of Seaworthy Engine Systems, Inc.; Alternate Fuels for the Maritime Industry, by **Eldred N. Cart Jr.** of Exxon Research and Engineering Company; and Reengining Sea-Land Service Ships, by **John J. Nichols** of Sea-Land Service, Inc.

The afternoon session, moderated by Prof. **Femenia**, heard two additional presentations: Problems With Existing Fuel Purification Systems and Solutions, by **Nicholas H. Chavasse** of Alpha Laval, Inc.; and Filtrations in Marine Diesel Protection, co-authored by **William C. French** of Fuels Conditioning Systems, Inc. and **Darrell Wrolstad** of Nelson Industries, Inc.

The day's activities concluded with a social hour at the College Club on campus.

Officers and authors at recent Port Engineers/SUNY Forum at Fort Schuyler (L to R, seated): **Thomas J. Young**, 1st vice president; **John Antonetz**, Forum co-chairman; **George E. Murphy**, president; Prof. **Jose Femenia**, co-chairman; **Darrell Wrolstad**, author. Standing: **Edward English**, secretary/treasurer; **John J. Nichols**, author; **Nicholas H. Chavasse**, author; **William C. French**, author; **Eldred N. Cart Jr.**, author; **Matthew F. Winkler**, author.

Propulsion Systems Appoints Three New Sales Representatives

In a move to expand its sales representation in key market areas, Propulsion Systems, Inc. (PSI) of Kent, Wash., has recently added three new sales agents. **Peter F. Woeck**, president of PSI, has announced the appointment of Upton Marine Engineering and Service Company of Walpole, Mass.; Fulshear Kramer Company of Fulshear, Texas; and John C. Henberger & Company of San Diego to the PSI sales team.

Upton Marine will cover the New England states, Fulshear Kramer the state of Texas, and Henberger the Los Angeles and San Diego territories. They will provide present and future customers with information concerning a complete line of controllable-pitch propellers, thrusters, rotary vane steering gear, and electronic control systems manufactured by PSI. Drive Systems, Inc. and Charles A. Narwicz Co. still cover the Gulf-Southeast and New York City areas, respectively.

Title XI Approved On Offshore Ships Services' $3.2-Million Vessel

The Maritime Administration has approved in principle a Title XI application by Offshore Ship Services, Inc., 2017 Engineers Road, Belle Chasse, La. 70037, to aid in financing the construction of a 2,560-bhp oceangoing tug/supply vessel. The vessel is expected to be chartered to a major oil company engaged in offshore drilling or other energy projects.

If approved, Title XI financing would cover $2,800,000 or 87½ percent of the estimated cost of $3,200,000. Rysco Shipyard, Inc., Blountstown, Fla., is building the vessel, which is scheduled for delivery in August.

Gearmatic Announces New Hydraulic Hoist —Literature Available

Gearmatic Company, Surrey, B.C., Canada, has announced a new three-speed, hydraulic planetary hoist — the Model 54. Providing bare drum line pulls up to 56,000 pounds (25,800 kg) and line speeds up to 474 feet per minute (144 m/min), Gearmatic believes that its Model 54 is the largest, most powerful hydraulic winch built on a production basis in North America. Like the smaller models produced by Gearmatic, the Model 54 has all planetary reductions, automatic brake, and three-speed mechanism completely enclosed and running in oil. Reliability is therefore high with virtually no maintenance required.

The three-speed shift mechanism can be activated under load, and with the cable drum in motion. This means fast gear changes, decreased cycle times, improved productivity. Options available include a range of cable drums, ratios, and hydraulic motors, plus a free-fall capability allowing controlled high-speed lowering.

For further information and free literature,

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Foreman Joins Todd As Assistant Representative In Washington Office

E. David Foreman

E. David Foreman, founder and president of E. David Foreman & Associates, a Washington, D.C.-based marketing consulting firm, has joined Todd Shipyards Corporation, it was announced recently by **Robert J. Farrington,** vice president and Washington representative.

Mr. **Foreman** has been assigned to Todd's Washington office as an assistant Washington representative. Prior to forming his own company, he had for 12 years represented Ogden Corporation as director of Washington operations and assistant to the president for legislative programs as well as public relations representative. Before joining Ogden, Mr. **Foreman** was manager of the Dayton, Ohio, office of the Atlantic Research Corporation.

New Oily Water Separator Exceeds USCG Standards —Literature Available

A multi-chambered, gravity type oily water separator that discharges bilge water overboard and exceeds U.S. Coast Guard pollution control requirements is being marketed by Microphor, Inc., Sacramento, Calif. The company's new separator utilizes the straight coalescing method to remove oil from water. The device is available in seven sizes with capacities ranging from 1 to 1,322 gallons per hour. Its compact shape makes for easy fitting and handling onboard, states the company. Automatic oil drain and air deflator valve are located on the outside of the separator, ensuring continuous and unattended operation.

Oil is separated from water by the difference in specific gravity. Oily water from the bilge enters the unit by pump action and is roughly separated in the first chamber. Separation is completed by coalescing action in the remaining chambers. The unit is said to require no messy and expensive filter changes. Corrosion and oxidation resistance means longer service life. The device has been approved by the Inter-Governmental Maritime Consultative Organization (IMCO) and certified by the U.S. Coast Guard.

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MarAd Approves Title XI Amendment On Dredge To Cost $40 Million

The Maritime Administration has approved an application by Hartford National Bank & Trust Co. to amend its Title XI loan guarantee to aid in financing a hopper suction dredge. The amendment will increase the estimated cost of the vessel (which is used to compute the amount of the guarantee) from $34,947,577 to $40,043,421. The guarantee amount was increased from $30,579,000 to $35,037,000 but remains approximately 87½ percent of the vessel's estimated cost.

Avondale Shipyards, Inc. is building the dredge and expects to deliver it in 1982. The 372-foot-long, 9,980-dwt vessel will be powered by two 6,900-bhp diesel engines. Upon its completion, the dredge will be chartered to Carlisle Dredging, Inc., New York, which under an earlier name, National Dredging, Inc., filed the vessel's original Title XI application.

Howson Elected President And COO Of McDermott's Marine Construction Unit

Robert E. Howson

James E. Cunningham, chairman of the board and chief executive officer of McDermott Incorporated, New Orleans, has announced that **Robert E. Howson** has been elected president and chief operating officer of its Marine Construction Unit. This unit is responsible for providing worldwide engineering and construction services to the offshore oil and gas industry. He replaces **Robert K. Richie** who has resigned for personal and health reasons.

Mr. **Howson** joined the company in 1957 in the engineering department in Harvey, La., and in 1963 was named chief engineer for the offshore division. From 1964 until 1972 he was employed by Ingram Contractors, Inc., serving as a senior vice president. He returned to McDermott in 1972 as vice president with responsibility for South and Central America, and was named group vice president for the North Sea in 1974. This area of operations included Europe and the United Kingdom. In 1980, he was named senior vice president and group executive, McDermott Engineering.

Twin Disc Introduces New Torque Converters —Literature Available

Twin Disc, Incorporated of Racine, Wis., a leading manufacturer of power transmission components, has announced a new Type Four-2620 industrial hydraulic torque converter. This unit, specifically designed for oilfield applications, is one of four models offered in this new line. The Type Four converters have been developed for use with diesel engines and electric motors up to 2,237 kw (3,000 hp). These units are said to provide high torque multiplication and utilize prime mover power over a greater operating range than previous torque converters offered for oilfield applications.

The Type Four-2620 for hoisting operations covers a range of 242 to 466 kw (325 to 625 hp) at 1,300 rpm, and 1,063 to 1,790 kw (1,425 to 2,400 hp) at 2,100 rpm. For pumping and drilling operations this unit at 1,200 rpm covers a range from 194 to 365 kw (260 to 490 hp) and at 1,800 rpm, 671 to 1,230 kw (900 to 1,650 hp).

For further information and free literature,

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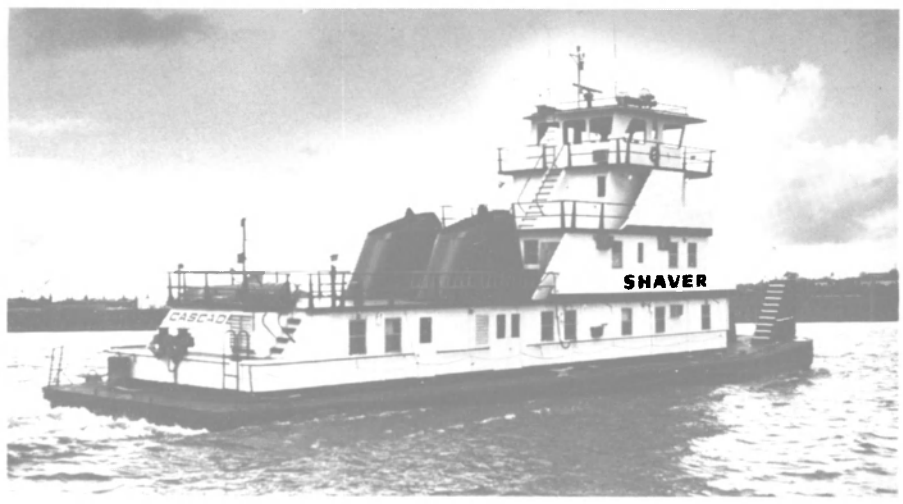
Edwin Roland Elected Vice President Of The Coastal Corporation

Edwin J. Roland Jr. has been elected vice president of The Coastal Corporation, a Houston-based energy supply company. He will be responsible for Coastal's marine operations, which include owned, time-chartered and spot-chartered tankers. The combined deadweight tonnage of the 18 vessels currently in Coastal's service is about 1.8-million tons.

Prior to joining Coastal, Mr. **Roland** was manager of vessel trading and traffic for Conoco, Inc. During his eight years with that company, he also served as technical director and later as manager of marine engineering in Connecticut before moving to Houston.



Shaver Transportation Acquires Big Towboat 'Cascades'

Expanding demand for grain movement from Idaho, eastern Oregon and eastern Washington prompted the acquisition by Shaver Transportation Company of its 13th vessel, the Cascades (shown above). The big towboat recently began service between Lewiston, Idaho, and Portland, Ore., according to **George H. Shaver**, president of the 101-year-old marine transportation firm.

In the past year and a half, Shaver Transportation has placed in service new grain barges costing approximately $5 million, which are the largest on the Columbia River, holding approximately 3,700 tons each, Mr. **Shaver** said. In 1980, Shaver Transportation moved 14 million bushels of grain down the Columbia River. Grain from the Inland Empire is shipped all over the world.

A pusher towboat, the Cascades has an overall length of 100 feet, a 36-foot beam, and a 10½-foot draft. With 3,000 bhp, she has a fuel capacity of 42,000 gallons. The vessel was named after a fast, beautiful sternwheeler that Shaver operated from 1909 to World War II. That Cascades was originally built for use by the U.S. Army Corps of Engineers during the construction of Cascade Locks.

The new Cascades was built by Scully Bros. Boat Builders in Morgan City, La. She was acquired by Shaver from Columbia Marine Service, Inc., which operated the towboat on the Mississippi River. Purchase price was over $1 million. Shaver Transportation has upgraded the electronics systems and engines in addition to painting the vessel.

In addition to the Cascades, Shaver recently placed in service the 2,500-bhp oceangoing tug Shaver, acquired at a cost in excess of $2 million. Besides its headquarters operations out of Portland, Shaver Transportation has vessels serving out of British Columbia, Alaska, and San Francisco.

Vosper Singapore Gets S$25-Million Contract For Five Naval Craft

Vosper Private Limited Singapore has been awarded a S$25-million (about $12 million) by the Oman Ministry of Defence for the supply of five naval craft and support services. Four of the craft are to be Vosper 25-meter fast patrol craft that will be deployed on surveillance duties in Oman's territorial waters, including the Straits of Hormuz. The craft are specifically equipped for long-range cruising at maximum fuel efficiency.

The fifth craft, a 30-meter ramped landing craft, is designed for transportation of armored fighting vehicles and/or general cargo, including fuel and freshwater supplies. The principal feature of the design of the craft is its ability to beach in strong surf and operate along a coastline exposed to the Indian Ocean.

New Catalog Describes Proform's Fiberglass Reinforced Barge Covers

A 12-page four-color catalog describing fiberglass covering systems for the marine transportation industry has just been released by Proform, Inc. of Minneapolis. The new catalog includes information on lift-off and roll-top barge covers, oceangoing, and LASH barge covers. All are constructed of tough yet lightweight, corrosion-resistant, Structural Fiberglass Reinforced Plastic®. The literature explains and illustrates the uses and benefits of cost-effective SFRP covers.

For a free copy of the brochure,
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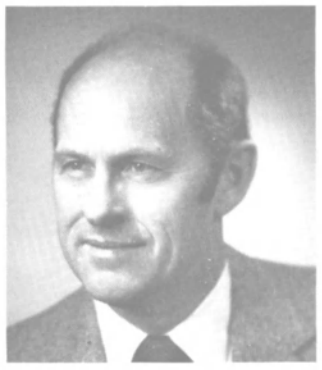
Kurzenhauser Named Vice President-Production At St. Louis Ship



Alfred Kurzenhauser

Alfred Kurzenhauser has been appointed vice president for production of St. Louis Ship and the Shipbuilding Group of Pott Industries Inc., according to **Edward Renshaw**, president. Most recently, Mr. **Kurzenhauser** was commander of the Norfolk Naval Shipyard, the nation's largest repair yard, after being its production manager. During a five-year period, that shipyard was often cited for its innovative approaches and improved productivity. He brings to St. Louis Ship 27 years of diversified experience in all facets of new ship construction, repair, alteration, and design in both private and public shipyards.

In his new position, Mr. **Kurzenhauser** will be responsible for production activities of St. Louis Ship in St. Louis; Caruthersville Shipyard Inc. in Caruthersville, Mo.; and Paducah Marine Ways Inc. in Paducah, Ky. The three shipyards comprise the Shipbuilding Group of Pott Industries Inc., the largest shipbuilding firm on the inland waterways. Pott Industries Inc., a subsidiary of Houston Natural Gas Corporation, is also engaged in inland waterways transportation, and offshore marine services, and coal terminalling.

New Spicer Universal Joint Couplings Described In New Catalog

A new 12-page catalog (No. 3231) describing Spicer® universal joint couplings for industrial applications is now available from the Spicer Universal Joint Division, Dana Corporation, Detroit. The catalog includes both cardan type and constant-velocity type joints.

Spicer universal joint couplings are used to transmit power through angles in a wide range of industrial applications, including pumps, conveyors, marine propulsion drives, and crane drives. The cardan design offers the advantage of small connecting flange diameters and high torque capacity.

The illustrated catalog describes the features and advantages of the two types of couplings. Layout type drawings together with tabular data provide complete dimensional information. Capacity rating tables provide available sizes, maximum torques, and maximum speeds. Also included is a list of typical applications.

For a free copy of catalog No. 3231,

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Brown & Root Named Verification Agent For U.S. Geological Survey

Brown & Root, Inc. of Houston, a Halliburton Company subsidiary, has been designated by the United States Department of Interior as an independent Certified Verification Agent on behalf of the U.S. Geological Survey. Certification means that the company is qualified to verify the design, fabrication, and installation of platforms and other structures subject to requirements of the OCS Platform Verification Program.

Brown & Root, one of the world's largest and most diversified engineering and construction companies, is a pioneer in worldwide engineering and construction of marine projects.

Shown at recent SNAME Los Angeles Metropolitan Section meeting are (L to R): **Ned Stewart**, chairman of the Section; **Vince DeGeorge**, author; **George Stiehl**, vice chairman; and **George Henning**, secretary-treasurer.

SNAME Los Angeles Section Discusses Lineshaft Alignment

At a recent meeting of the Los Angeles Metropolitan Section of The Society of Naval Architects and Marine Engineers aboard the Princess Louise, the evening's paper titled "The Combined Effect of Vertical and Horizontal Lineshaft Alignment on Main Reduction Gear" was authored and presented by **Vince DeGeorge** of General Electric Company. It challenged the attentive audience to think beyond customary lineshaft-to-reduction gear relationships.

Mr. **DeGeorge** used vu-graphs to illustrate the importance of predicting forces acting on the gear tooth interfaces during full torque hot operation, and to describe the computer program developed to accomplish the prognostications. The effect of additional horizontal and vertical loads imposed by external lineshaft misalignment was postulated, in terms of gear-to-pinion tooth load maximums, using force vector analysis. To validate the prediction programs, strain gauges were placed in the roots of test gear-set teeth and misalignment was induced. Further validation was accomplished by cold check measurement of existing shipboard applications.

Mr. **DeGeorge** concluded the paper by asking the audience to put the relationship between lineshaft alignment and the main reduction gear in a new perspective and evaluate that relationship for each specific reduction gear and lineshaft design. The prediction program, however, does not consider transient changes in lineshaft alignment due to sea or ship operating conditions. The author and audience participated in a lively and expansive question and answer session following the presentation.

Moore McCormack To Modify Six Existing Vessels In $42-Million Project

Moore McCormack Lines, Inc., a subsidiary of Moore McCormack Resources, Inc., One Landmark Square, Stamford, Conn. 06901, has applied for a Title XI guarantee to aid in financing the reconditioning and reconstruction of six existing vessels.

Moore McCormack intends to modify the Mormacvega, Mormaclynx, Mormacargo and Mormacrigel, all 7,247-deadweight-tons Constellation-class vessels built by Ingalls Shipbuilding Corp., Pascagoula, Miss., and delivered in 1964 and 1965. A 115-foot cellular midbody section and three 40-ton cranes will be added and the No. 3 hatch converted and dedicated to cellularized containers, making each of the vessels self-sustaining cargo/container ships.

The company also intends to perform the cellular conversion of No. 3 hatch on the Mormacaltair and Mormacdraco, which had midbodies added in 1975.

All of the vessels are expected to be delivered in 1982, but no builder has been selected. Construction subsidy for the project has also been requested.

If approved, the Title XI guarantee would cover $31,875,000 or 75 percent of the estimated actual cost of $42,500,000.

New On-Site Generator Produces On-Demand Oxygen From Ambient Air

MARINOX 1, an on-site, on-demand oxygen generator that eliminates the need for pressurized oxygen cylinders, is now available from XORBOX, Division of Greene & Kellogg, Inc., Tonawanda, N.Y. Contained in a sturdy, salt corrosion-resistant and watertight unit, MARINOX 1 is said to be ideal for cutting, welding, and brazing operations at offshore rig sites, shipbuilding yards, aboard ships at sea, and similar environments requiring ample quantities of oxygen-rich air. The Coast Guard-approved unit meets the ASME Code, and the 400-pound apparatus is a compact 40 by 20 by 56-inches.

The principle of operation of the MARINOX 1 involves air from the atmosphere being supplied to the unit's generator by a standard compressor, at a regular pressure of 60 psig. Nitrogen is then removed by a regenerative, inert ceramic material. The resulting 95 percent pure oxygen is stored in a surge tank to be drawn off at a regulated pressure of 30 psig. Continuous function is achieved through the use of two absorbents, which alternate drawing in air and expelling nitrogen from the machine. MARINOX 1 completes its cycle in two minutes.

The new MARINOX 1 is economical not only because it eliminates the need for oxygen cylinders, but also because it gives customers a fixed cost for all the oxygen they produce and use, the manufacturer states. Additionally, once the MARINOX 1 pays for itself, the only cost is the minimal electric expense to run it. With the power of a 110-volt, 60-cycle outlet, the unit produces oxygen at 75 schf and 0-50 psig. Oxygen can be produced continually, ready for on-site, on-demand use.

For further information,

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Title XI Approved For Seven Rio Marine Barges Costing $8.7 Million

The Maritime Administration has approved in principle an application from Rio Marine, Inc., Pearland, Texas, for a Title XI guarantee to aid in financing the construction of seven double-skin chemical tank barges.

Three of the vessels were delivered last year (one in June and two in December). Two were scheduled for delivery last month and two in December. Newpark Shipbuilding and Repair, Inc., Houston, Texas, is the builder.

All of the barges will be 295 feet in length, with molded beams of 54 feet. Each will have a total oil and chemical cargo capacity of 20,750 barrels. The vessels will be used on rivers and the intercoastal waterways in the U.S. Gulf area.

The total actual cost of the seven barges is $8,746,509 and the depreciated actual cost, $8,-674,154. The approved guarantee is for up to 87½ percent of the latter amount, or $7,589,000.

Kiyotaka Furuno Wins Award Presented By NMEA

Kiyotaka Furuno, president and founder of the Furuno Electric Company, Ltd., Nishinomiya City, Japan, was given special recognition by the National Marine Electronics Association (NMEA) in the closing ceremonies of their recent annual convention held in St. Petersburg Beach, Fla. Mr. **Furuno** received the Reginald A. Fessenden Award which was created three years ago to honor outstanding living individuals who have made "a lasting contribution to the public good through marine electronics," according to NMEA sources.

The third industry figure, and the first non-American to win the award, Mr. **Furuno** was cited for more than 30 years of significant technical contributions to the field of marine electronics. The Fessenden Award was received in behalf of Mr. **Furuno** by **Shigeru Kunitomo,** managing director of Furuno Electric. The annual NMEA awards represent the opinion of the leading marine electronics sales and service dealerships across the country.

Westfalia Oil Purifiers Improve Performance— Literature Available

Designed for efficient purification of diesel fuel and lubricating oils, two types of Westfalia oil-purifying centrifuges — OSA 7 (automatic type) and the OTB 2 (take-down type)—are representative of the range of Westfalia oil purifiers available for use on service vessels and in offshore platform power-generating facilities.

Westfalia oil-purifying centrifuges are being increasingly specified by diesel engine manufacturers to remove water and impurities from heavy oil, in order to improve engine performance and reduce the possibility of breakdowns due to diesel engine damage. Westfalia oil purifiers are also widely used to remove carbon and metal particles from lube oil; this prevents premature engine wear, reduces downtime, and extends lube oil life.

Because of their automatic and continuous operation, the Westfalia OSA purifiers incorporate self-cleaning disc type bowls designed for optimum oil/water separation even when feed densities vary widely. Entrained solids are simultaneously removed from the oil/water mixture and intermittently ejected with minimum loss of oil. OSA models are available with maximum rated capacities up to 19,000 liters/hour (4,000 gph), but actual throughput depends on the viscosity of the feed.

Westfalia take-down oil purifiers (type OTB) are designed for de-watering and removal of solid impurities from oils and emulsions containing a small proportion of solids (less than 0.1 percent). OTB purifiers are currently in use on many small service vessels in the Gulf area.

For further details and free literature,

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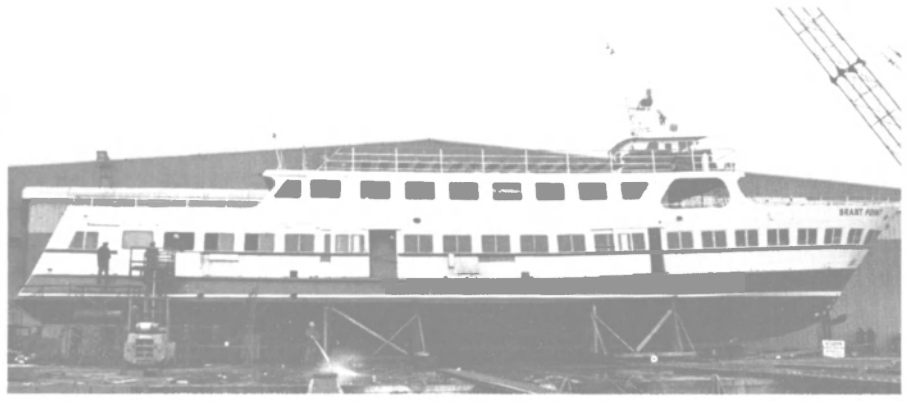

STRETCHING THE 'POINT' — Newport Ship Yard, Inc., Newport, R.I., recently completed the lengthening of the passenger vessel Brandt Point (shown above) for the upcoming season. The Brandt Point, owned by the Hyannis Tours Company of Hyannis, Mass., regularly carries passengers to Nantucket Island. The vessel was lengthened from 122 feet to 134.5 feet. The production took place following hauling and side transfer of the vessel from the NSY's 3,000-ton marine railway drydock to a dockside repair and construction area. The conversion project included a new main deck aft to be used for carriage of luggage and/or bicycles, installation of a service bay, extension of upper deck allowing 52 additional seats, and extension of a new bridge deck permitting 32 additional seats.

Wardwell Named Chairman And Lesch Elected Vice Chairman Of NOIA

Edward A. Wardwell

Edward A. Wardwell, chairman, president, and chief executive officer of Oceaneering International, Houston, has been elected as the new chairman of the board of directors of the National Ocean Industries Association (NOIA). He served as NOIA's vice chairman last year and as a member of the board of directors for five years. In addition, he served as NOIA's treasurer during 1978 and 1979.

James R. Lesch, president and chief executive officer of Hughes Tool Company, also of Houston, was elected vice chairman of the board. He has been chairman of the Association's Audit Subcommittee for four years.

Mr. **Wardwell** succeeds **John P. Laborde,** chairman and CEO of Tidewater, Inc. New Orleans, who remains on the board as NOIA's immediate past chairman.

Macawber Gets Another Contract For Equipment On Coal-Fired Ships

Macawber Engineering group, Maryville, Tenn., a world leader in the field of pneumatic coal conveying, has been awarded another project for coal conveying equipment onboard the new generation of coal-fired ships. Macawber has now been awarded all the coal conveying business so far placed for the new coal-fired ships, which are seen by the shipping world as a major technological step forward.

The latest project is worth $1 million. A letter of intent has been signed by Mitsubishi Heavy Industries of Japan for complete Macawber Denseveyor pneumatic coal conveying systems for two 75,000-dwt cargo carriers currently building for the Australian National Line. When in service the carriers will carry coal from Weiper to Gladstone on a dedicated route off the Northeast Coast of Australia.

The Macawber Systems will comprise a series of six model 8/10 Denseveyors with individual 5-inch nominal bore pipeline that will transfer coal at the rate of 12 tons per hour from the ships' main bunkers to feed hoppers located over the boilers.

The announcement of the latest project comes only two months after Macawber was awarded the world's first contract for coal conveying equipment of this type for marine applications. That was also a $1-million plus contract and was for two 75,000-dwt ore carriers currently being built in the Monfacone Yard of Italcantieri in Italy.

Murray-Benjamin Offers New Catalog Listing U.S. Navy Electrical Cable

A new catalog is available from the Murray-Benjamin Electric Company of Brooklyn, N.Y., containing a comprehensive listing of U.S. Navy shipboard electrical cable and coaxial cable, listing all the current types and many of the more popular discontinued types. The available selection should be invaluable to ship repair yards. Many sections of the new catalog are also devoted to U.S. Navy electrical fittings — symbol items—that are described and illustrated.

For a free copy of the new catalog,

Write 91 on Reader Service Card

Stewart & Stevenson Has Orders For Five Drilling Rigs To Cost $75 Million

Stewart & Stevenson Services, Inc., Houston, has announced that it now has $75 million in orders for five barge drilling rigs to be delivered between May 1981 and March 1982. The rigs are designed for drilling in water depths up to 25 feet. They feature complete systems from Stewart & Stevenson, including diesel electric power and switchgear.

Stewart & Stevenson is the prime contractor for all five drilling rigs. They are being built for Temple Drilling Company, Phoenix Management Corporation, Blocker Energy International, JHJ Drilling Company, and Anderson-Barnett Drilling Company.

Larry Anderson Named Marketing Manager For Raytheon Marine

Larry C. Anderson

The appointment of **Larry C. Anderson** to the position of marketing manager, Raytheon Marine Company dealer/distributor programs, was announced by **Stan Clark**, director of marketing operations. Mr. **Anderson** will administer the company's light marine sales and marketing programs, working closely with Raytheon's U.S. network of dealers and distributors.

Mr. **Anderson** returns to Raytheon Marine Company offices in New Hampshire following a year abroad as the company's European manager of business development. He joined Raytheon in 1976 as New England regional sales manager and was promoted to national sales manager the following year. After a brief hiatus in 1979, he returned to Raytheon and was moved to Europe in March 1980. He has recently been recalled to the United States to assume his new position.

New Technical Reports Now Available From Ship Structure Committee

The Ship Structure Committee has recently published three new technical reports which are available free of charge. SSC-297, "Evaluation of Liquid Dynamic Loads in Slack LNG Cargo Tanks," presents a review of worldwide scale model sloshing data and reduces the data to a common format for the purpose of design load coefficients. Additional scale model laboratory experiments have been conducted to supplement the available model sloshing data.

SSC-298, "Investigation of Steels for Improved Weldability in Ship Construction—Phase 1," is the initial effort of an ongoing project to minimize heat-affected zone and weld-metal property degradation for high desposition rate welding. Two production steels and 20 laboratory heats of steels of various chemical compositions have been recommended for further examination.

SSC-299, "Ultimate Strength of a Ship's Hull Girder in Plastic and Buckling Modes," analyzes limiting conditions beyond which a ship's hull girder will fail to perform its function. Vertical and lateral bending moments and torsional moments are used to develop a procedure for estimating the ultimate capacity of the hull.

For copies of these reports, an index of past reports, or further information, contact Secretary, Ship Structure Committee, U.S. Coast Guard Headquarters, G-MMT/13, Washington, D.C. 20593.

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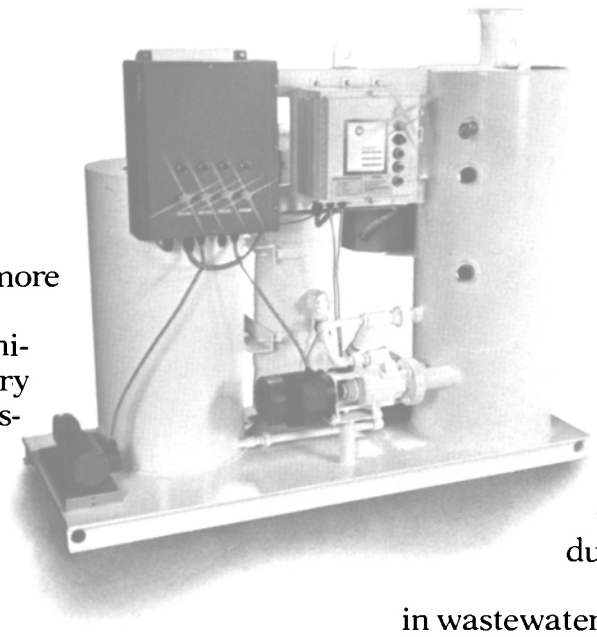

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Model 12M812-27. 6'3"Wx5'9"Hx3'6"D; 120 man unit; 3,600 gal/day.

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Southern Marine Research Moves To New Sales And Service Facility

Southern Marine Research (SMR), manufacturers of commercial and recreational marine electronics, have recently moved to an expanded facility in Miami. "The move was essential to meet our increasing national and international sales and a growing product line," SMR president **Gary Scarborough** announced. "This year alone we have introduced six new products to our line. The new facility will allow for expansion of our product development and service departments."

The new SMR building is near the Miami International Airport and adjacent to a lake that will be utilized for testing and development of new depth sounders and recorders. The SMR sales and service headquarters are now located at 1401 N.W. 89th Court, Miami, Fla. 33172; phone (305) 591-9433.

Gerald Carson Joins APL As North America Director Of Operations

Gerald R. Carson has joined American President Lines (APL) as a director of operations, North America, according to **Lorenz P. Robinson**, vice president for the North America area.

Mr. **Carson** is responsible for the overall coordination and control of the intermodal carrier's operations within North America, working in conjunction with the managing directors of the seven regions. He brings to the position more than 20 years of diversified experience in the transportation industry. Among his specific areas of responsibility will be terminal operations, equipment management, intermodal operations within the regions, and maintenance and repair. He is based at North America headquarters, 1221 Broadway, Oakland, Calif.

APL, with a fleet of 22 vessels in the Pacific, provides regular container and breakbulk service between North America and all major ports in the Far East and Arabian Gulf, and landbridge service to Europe. The North America area is served by some 32 offices, with direct international service available to and from dozens of cities throughout the country.

New Liquid Cargo System Introduced By Vu-Gage— Literature Available

A uniquely simple system for measuring and inspecting cargoes of petroleum and chemical tankers and barges is the topic of a new 24-page brochure offered by Vu-Gage System, a Mobil Company.

The Vu-Gage® system covered by the brochure has been accepted for installation on U.S. Coast U.S. Coast Guard-certified vessels and those classed by the American Bureau of Shipping. The brochure gives information on the safety, measuring, and visual inspection aids offered by Vu-Gage. The components — including the basic Vu-Gage sight gauge, the Vu-Gage ullage cover, liquid seal relief valve, gas dispersal nozzle, ullage tape winder, interface detector, and bottom water sampler — are available for installation separately or as a complete system. The units are suitable for new vessels or retrofit installation.

Designers of the system are introducing it to the marine industry to fill a need for an inspection system that is so simple and practical that it insures proper, routine use by ship crews. It is said to aid in handling hazardous fluid cargo with greater safety, help protect crews from chronic exposure to fumes, and can aid in avoiding fire and explosion.

For a free copy of the new brochure,

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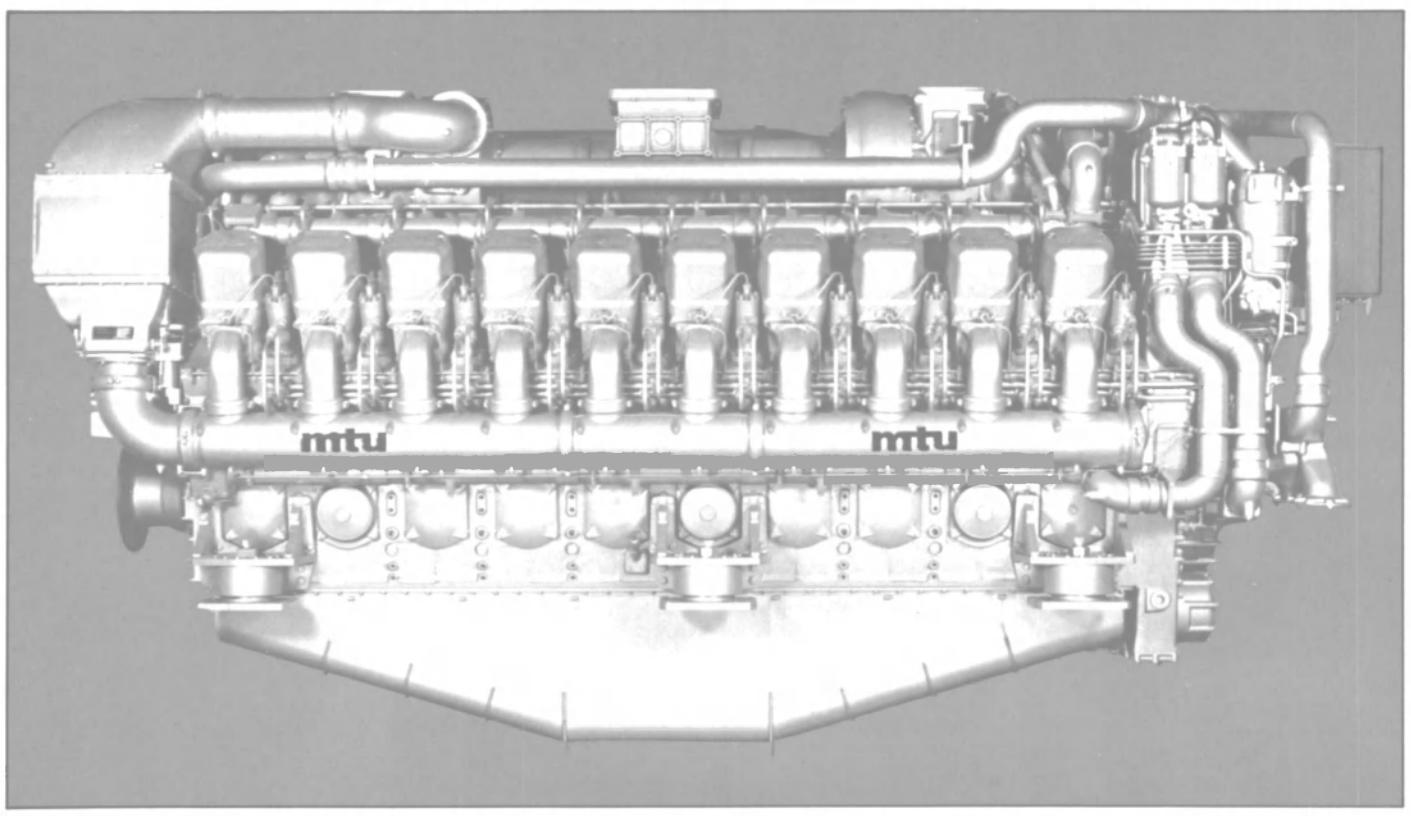
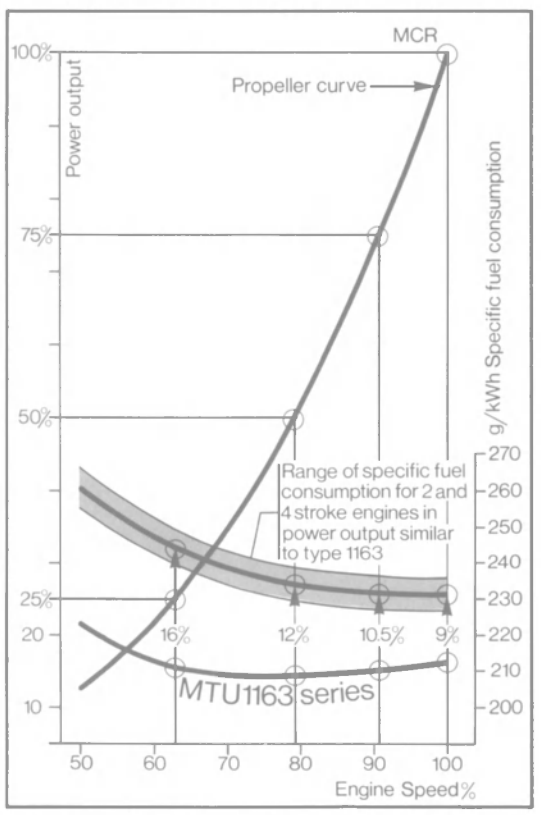
the fuel efficiency problem: MTU has the answer

At MTU we've gained a reputation for building quality marine diesel engines. Yet, while maintaining the highest design and production standards, we've solved a lot of the problems related to fuel efficiency. Through utilization of the latest engineering advances, MTU has developed a highly efficient, low fuel consuming diesel engine. Because of high fuel prices, European technology historically has demanded an engine that would deliver optimum performance while consuming a relatively small amount of fuel. Our 4-cycle engine, by its very nature, consumes less fuel than any comparable engine—as much as 10% less. Over an engine's lifetime, the savings are tremendous.

These savings, together with MTU's complete power package availability, ease of engine maintenance, complete service/parts back-up and service, and service parts exchange program, has solved a number of marine propulsion problems.

Decades of testing and technology have resulted in this progress and because of our experience and expertise, we can satisfy your marine propulsion needs.





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NCAA Chapter Awards Honorary Membership To Captain Barnaby

Shown during recent award ceremony at Naval Air Development Chapter of the Naval Civilian Administrators Association are (L to R): **Frank Drummond,** vice president; **Donald Morway,** president; Capt. **Ralph S. Barnaby,** USN (ret.); **Dino Mancinelli,** award recipient; and **Harley Bcwen,** national executive secretary of NCAA.

The Naval Air Development Center, Warminister, Pa. Chapter of the Naval Civilian Administrators Association recently awarded an honorary membership to Capt. **Ralph S. Barnaby,** USN (ret.). Captain **Barnaby,** now 87 years old, has had a long and intimate association with the Center and its civilian management personnel. In 1944, he became the first commanding officer of the Center when he was dispatched by the Navy Department with a small civilian staff to assume command of the failing Brewster Aircraft Company.

Captain **Barnaby** has continued to be active in his retirement. Currently he serves on the staff of the Franklin Institute in Philadelphia. For nearly 15 years he has headed the aeronautical work of the Institute's Research Laboratories and acted as the exhibits consultant to the director of the Institute's Science Museum.

As the first official act of his honorary membership and in keeping with established tradition of the NAVAIRDEVCEN Chapter, Captain **Barnaby** presented the 1980 Ralph S. Barnaby Award to **Dino A. Mancinelli,** associate technical director of NAVAIRDEVCEN.

The Naval Civilian Administrators Association is a national organization of senior level managers employed in Navy civil service. It is organized into 13 chapters located in seven Naval shipyards, three Naval aviation activities, the Naval Ships Engineering Command, and the Polaris Missile Facility/ Naval Weapons Station, Charleston.

SNAME To Sponsor Exhibition At 90th Annual Meeting In 1982

The First International Marine Technology Exhibition will be sponsored by The Society of Naval Architects and Marine Engineers and held in conjunction with its 90th Annual Meeting on November 18-20, 1982, at The New York Hilton Hotel. This precedent-setting announcement was made by **John J. Nachtsheim,** president of the Society.

Mr. **Nachtsheim** made the observation that at present, there was no single major maritime industry exhibition with professional/technical society sponsorship held in the United States. He said, "We expect to attract an impressive array of exhibitors from all over the world, who will welcome the opportunity to display their latest technical achievements to our sophisticated audience of naval architects, marine and ocean engineers. Our members will not only benefit from the outstanding annual meeting papers presented in the two-day technical program, but learn from the exhibiting companies as well."

The decision to establish an exhibition was made by the Society's Executive Committee based upon a survey of industry interest. Policy and planning are under the direction of an Exhibition Committee consisting of the following Society members: **Robert J. Bazzini** (Delaval), **Jerome M. Gruber** (Waukesha Bearings), **Robert B. Hedges** (Combustion Engineering), **Jack A. Obermeyer** (Texaco), **Charles P. O'Malley** (Maritime Reporter), **Louis E. Rau** (Colt Industries), **J. Thomas Schroppe** (Foster Wheeler), and **Harry R. Yagel** (Westinghouse). **Robert G. Mende,** secretary and executive director of the Society, serves as Committee chairman.

For information regarding the exhibition, contact the Exhibit Manager: Reber-Friel Company, 216 Goddard Boulevard, King of Prussia, Pa. 19406; telephone (215) 265-0825.

B.F. Jensen Merges With Norwegian-Owned Marine Consultant Firm

The merger of B.F. Jensen & Associates, Inc., Seattle naval architects and marine engineers, and the Norwegian-owned Maritime Technical Consultants Corporation of Seattle was announced recently. The announcement was made jointly by **B.F. Jensen** and **Kaspar Overaa** of MTCC. The merged organization will be called Jensen Maritime Consultants, Inc.

B.F. Jensen & Associates, founded in 1961, is well-known for its designs of new and converted vessels for Pacific Northwest and Alaskan waters. MTCC is a sales and service office owned jointly by two leading consulting naval architects and marine engineers, Nordvestconsult and Fiskerstrand and Eldoy, both in Aalesund, Norway. Organized in 1978, MTCC has been especially active in the design of large self-contained factory vessels for the bottom fishing industry.

B.F. Jensen

Kaspar Overaa

Mr. **Overaa** will be president and CEO of Jensen Maritime Consultants, Inc., and Mr. **Jensen** continues with the new organization as a special consultant. **Ulf Hansson** and **Gilbert Nilson** will be vice presidents.

Ulf Hansson

Gilbert Nilson

Mr. **Jensen,** a cofounder and former vice president and chief engineer of Marine Construction and Design of Seattle, is widely recognized for his designs for crab boats, gillnetters, salmon trollers, and other commercial vessels.

Higbee And Marchiando Get New Responsibilities At National Supply Company

David A. Higbee

John C. Marchiando

National Supply Company, Houston-based oilfield equipment firm, has named **David A. Higbee** and **John C. Marchiando** to new managerial responsibilities in the National Drilling Equipment Division. Mr. **Higbee** is promoted to general manager-manufacturing. He will be accountable for the company's plants in Torrance, Calif.; Gainesville, Texas; and Stockport, England, and for Baylor Industries, Houston subsidiary that manufactures electrical components for drilling rig power plants.

Mr. **Marchiando**, general manager-fabrication, adds responsibility for two other National subsidiaries — Par Industries, Inc. shipyard in New Iberia, La., that specializes in offshore drilling barges and platforms and Derrick Service International, manufacturer of derricks, mast, and substructures for drilling rigs. DSI has facilities in Conroe and Tomball, Texas, and Nisku, Alberta. Mr. **Marchiando** continues responsibility for the company's five machinery centers that fabricate and assemble drilling rigs.

Mr. **Higbee** started with National Supply's parent company, Armco, in 1965 and held positions in research and product management before joining National Supply in 1980. He has been responsible for management of the company's Advanced Drilling Machine project, the industry's first automated, deep-well drilling rig. He will continue that responsibility.

Mr. **Marchiando** has been a National Supply employee since 1959, progressing through a variety of manufacturing assignments until becoming works manager of the Torrance, Calif., plant. After seven years in that assignment, he was transferred to Houston headquarters in 1979 to assume the new position of general manager-fabrication.

Delaval Gets $14.5-Million Contract For Diesel Engines To Power Falcon I Tankers

A contract to provide diesel main propulsion engines for two new 35,000-dwt Falcon

Similar to the two tankers for which Transamerica Delaval will provide main propulsion engines is this Falcon I-MSC vessel which entered service in 1975. Twin Delaval diesels power the original ships—a fleet of five. The two new tankers will be equipped with the same engines: Delaval "Enterprise" RV-16, medium-speed diesels. Each 16-cylinder unit is rated at 7,360 bhp.

I tankers has been awarded to the Transamerica Delaval Inc. Engine and Compressor Division in Oakland, Calif. The announcement was made by Division general manager **Clinton S. Mathews.**

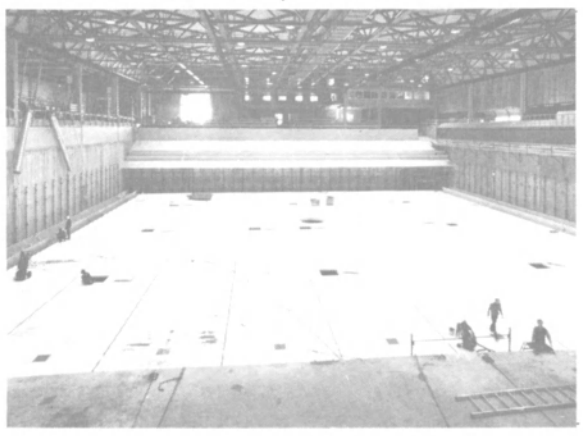
The two 666-foot vessels are being built by Bath Iron Works at Bath, Maine. They will be owned by Falcon I Sea Transport Company, Houston, and leased to the Military Sealift Command (MSC) in transporting fuels to government bases worldwide.

The Bath contract to Transamerica Delaval amounts to $14.5 million, for four "Enterprise" RV-16 diesel engines and associated reduction gears and auxiliary equipment. The 16-cylinder, medium-speed diesels, each rated at 7,360 bhp, are designed to operate on various fuels, including the more economical grades with viscosities of up to 3,500 Redwood sec. Deliveries of the engines will be completed this year.

The Transamerica Delaval Engine and Compressor Division produces diesels ranging to 13,500 bhp. Recently that product line was extended to 24,000 bhp — the highest medium-speed diesel rating in the world — with the signing of a U.S. manufacturing and marketing agreement with Stork-Werkspoor Diesel B.V. of Amsterdam. Under the agreement, Transamerica Delaval will exclusively offer in North America the Enterprise-SWD TM620.

Transamerica Delaval Inc. is the manufacturing subsidiary of Transamerica Corporation, San Francisco.

Big Testing Basin In Norway Built At Cost Of $25 Million



Construction of the Ocean Environment Basin (shown above) in Trondheim, Norway is nearing completion. Total building expenditures for the basin, which has been under construction for more than two years, will amount to approximately $25 million. By means of this basin, the research consortium Otter hopes to compete in the front rank for the testing of offshore structures.

The Ocean Environment Basin measures 80 by 50 meters (262.5 by 164 feet), with a depth of 10 meters (32.8 feet). It is primarily the great depth, together with Otter's experience, that it is hoped will put the basin in a leading market position. Because of the basin's depth, testing conditions for real depths down to 500 meters (1,640.4 feet) can be simulated in the scale 1:50. This means that the Norwegians will be able to perform model testing for offshore structures designed for far greater depths than has so far been possible on the Norwegian Continental Shelf.

The Ocean Environment Basin has a movable bottom, which makes it possible to vary the depth, depending on each test. Both sides of the basin are equipped with advanced wave machinery that can create realistic wave conditions.

The length of the basin is equipped with 144 separate flaps, making it possible to generate short-crested waves. Furthermore, special cleaning equipment will make it possible to simulate oil recovery operations. It will also be possible to conduct tests for new kinds of energy production from the sea.

M.A.N. And B&W Diesel Form New Company For Marketing And Licensing

M.A.N. Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft and B&W Diesel A/S, Copenhagen (a 99.5 percent subsidiary of M.A.N.) have founded the M.A.N.-B&W Diesel GmbH with a view to coordinating all diesel engine marketing and licensing activities. M.A.N. and B&W Diesel A/S are parity shareholders of the new company.

Lars Holmblad (B&W Diesel A/S) and **Werner Knapp** (M.A.N.) have been appointed general managers. The new company, with branches in Augsburg, Copenhagen, and Frederikshavn, will perform its activities on behalf of M.A.N. and/or B&W Diesel A/S. Its activities will be backed up by the existing marketing organizations of the two companies.

The founding of the new company is a further step in the intensification of cooperation in the development, production, marketing, and product support activities of M.A.N. and B&W Diesel A/S.

ABS Signs Cooperation Agreement With Chinese Classification Society

The American Bureau of Shipping (ABS) has signed an agreement with the Register of Shipping of the People's Republic of China (ZC) for reciprocal performance of classification and other services, such as assigning Load Lines. The agreement allows ABS exclusive surveyors to be stationed in China to survey ships and other marine structures built or converted to ABS class. It also enables ABS to perform surveys and other classification services on ABS-classed vessels that enter Chinese ports. ABS can enlist the services of ZC as needed for assistance in conducting these services.

Two mobile offshore drilling units are the first marine structures to be built to ABS classification under the agreement. Dalian Shipyard, Dalian, China, is building the self-elevating units for Magnum Marine Corporation, Conroe, Texas. They will be 155 feet long, 110 feet wide, and 15 feet deep and be capable of drilling in water depths up to 100 feet in the elevated position. An ABS exclusive surveyor will attend the construction of the units at Dalian and visit the mills and manufacturing plants in China where the materials and components are being built for the units.

Polypropylene Netting Protects Marine Cargo —Literature Available

In covering materials for marine transporting, problems exist that can be eliminated by the use of a super strength netting available from the Griffolyn Company Division of Reef Industries, Houston. The primary applications for the netting are: prevention of tarp ballooning due to high winds; secure and contain loose materials; safety barriers; and cargo separation.

Super strength netting is a polypropylene with high tensile strength providing long life and weather resistance. It has a 3-inch mesh size and is knotless for less abrasive action and easy application. Being a polypropylene, super strength netting is reusable year after year, and is said to have an average life of four years.

For more information or free samples and brochure,

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Dwight Toney Appointed Sales And Operations Manager At American Aero

American Aero, Inc. of Houston, a subsidiary of Weatherford International, has promoted **Dwight Toney** to sales and operations manager for its Marine Crane Division. He will be responsible for both domestic and international sales involving the firm's varied line of hydraulic marine cranes. Mr. **Toney** previously served as AAI's crane service manager.

Jim Kavanaugh has joined American Aero as production control manager, and **John Talhelm** has joined the firm's crane sales team, serving the Western United States. Mr. **Kavanaugh** previously served as the standards development unit manager for the Pfaudler Corporation in Rochester, N.Y., and Mr. **Talhelm** was a project engineer with Furlow Philbeck Associates in Houston before moving to AAI.

In other personnel moves, AAI named **Ken Carlson** as materials manager. He will be responsible for purchasing, warehousing, inventory control, and materials systems. **Ray Antes** has joined AAI's sales team as a market analyst.

Sinclair & Rush Liquid Plastic Coating Provides Protection And Insulation

Sinclair & Rush of St. Louis, a leading vinyl plastisol dip molder, now offers a do-it-yourself, air-drying liquid plastic coating. This easy-to-use coating can be applied by dip or brush onto metal, wood, foam, rubber, glass, rope, plastic, and many other materials.

Because the coating quickly air-dries, it can be used for color coding, insulation, and protection. It resists attack from rust, water, and salt water. The inexpensive plastic coating is shipped from stock in handy one-gallon containers, and is ready for immediate use.

For more information,

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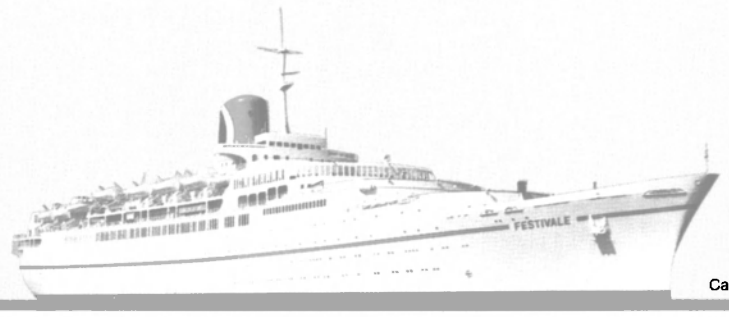

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Blohm + Voss Plans To Manufacture Its Joiner System On Gulf Coast

The Blohm + Voss M1000® joiner partition and ceiling system, which has been installed in more than 580 merchant and naval vessels and some 85 offshore units in the North Sea, will now be manufactured in the United States. B + V recently announced plans for a plant in the Gulf Coast area.

The M1000 system is said to offer a number of advantages for fabricators as well as owners and crews. The system is approved by the U.S. Coast Guard and international classification societies, and it meets the requirements of the SOLAS 74 and IMCO Conventions.

The versatile B + V system offers great flexibility to suit individual requirements. Bulkheads and ceiling panels are easily replaced if necessary, and components are standardized. Each space outfitted with the M1000 is in accordance with its function — a self-contained architectural entity.

For further information and free literature on the M1000 system,

Write 80 on Reader Service Card

HUDSHIP Announces Major Expansion Of Shipbuilding Operation

Wendle W. Huddleston, president and chief executive officer of Hudson Shipbuilders, Inc. (HUDSHIP), announced that the company had acquired additional property for a major expansion of its shipbuilding operation. The new property is located on the west bank of the East Pascagoula River just south of the Pascagoula (Miss.) River Bridge. The 16½ acres, which was purchased from H.B. Marine, was formerly known as the Corps of Engineers Pascagoula Boatyard and later as the Gulf Coast Marine Ways, Inc.

Mr. **Huddleston** announced plans to construct vessels up to 250 feet in length at the new facility. HUDSHIP already has contracts for at least eight 185-foot oilfield supply vessels. Construction of these vessels will begin soon at the new facility.

HUDSHIP will continue to build its present line of 112-foot to 145-foot offshore supply vessels, harbor and ocean tugs, and river pushboats at its east bank facility located on Cedar Street north of the Pascagoula River Bridge. Both facilities will be operated under vice president and general manager **Travis Short**. Headquarters for the operation will be moved to the new facility; however, many of the support functions will remain at the present facility.

In addition to the new yard, Mr. **Huddleston** also announced a major upgrading of HUDSHIP's present facility, including a new machine shop and fabrication building, and the installation of a large-capacity lathe and plate shear.

V. Wayne Davis Elected President Of NCAA Norfolk Naval Shipyard Chapter

V. Wayne Davis has been elected as president of the Norfolk Naval Shipyard Chapter, Portsmouth, Va., of the Naval Civilian Administrators Association (NCAA). The testing superintendent from the Production Department succeeds **Andy James**, head, Employee Relations Division of the Industrial Relations Office.

The other officers elected for this year are **Mark H. Davis** as vice president, **Roger H. Kerley** as secretary-treasurer, and **Roland E. McArthur, J. Hunter Brantley Jr.**, and **Robert C. Hartman** as directors.

The yard's NCAA Chapter consists of 75 senior civilian administrators and managers. The chapter is one of 13 at seven naval shipyards, three aviation activities, the Naval Ship Engineering Center, and the Naval Facilities Engineering Command.

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Four More Rigs Ordered At General Dynamics' Charleston Facility

General Dynamics' Charleston (S.C.) Facility will fabricate components for four offshore drilling rigs under a $33-million contract from Bailey & Shannon Drilling Company, Inc. of Stafford, Texas. The award involves construction of major portions of steel work on the rigs.

The components will be used in jackup drilling rigs with a 16,000-foot drilling capability and in workover rigs capable of drilling to 25,000-foot depths. The rigs will be used off the Gulf Coast.

This is the second contract that General Dynamics has received for major portions of steel work on offshore drilling rigs in four months. Last December, the firm was awarded a contract for components for two rigs for the same owner. The new contract work will begin late this year, with delivery of the components scheduled in 1982.

The work will provide jobs for approximately 250 employees at the Charleston Facility. The new contract, along with other awards, has boosted the backlog at the facility from $8 million to $48 million since January.

Hitco Awarded $9.6-Million Navy Contract For Sub Bow Domes & Accessories

Hitco, Gardena, Calif., is being awarded a $9,585,305 firm fixed price contract for bow domes and attachment rings and spiders for SSN-688, SSN-594, SSN-637, and SSBN-726 class submarines. The Naval Sea Systems Command is the contracting activity. (N00024-81-C-4319)

New Officers Elected For Marine Society Of City Of New York

The 211-year-old Marine Society of the City of New York has announced the election of the following officers: president, Capt. **T.H. Pineault** (American Bureau of Shipping); 1st vice president, Capt. **Richard N. LePage** (Farrell Lines Incorporated); 2nd vice president, Capt. **Gilbert S. Schugart** (National Cargo Bureau); secretary, Capt. **Richard M. Perry** (F.W. Hartmann & Company); and treasurer, Capt. **Dino S. Savastio** (Moore-McCormack Lines, Inc.).

Symposium On Ship Operations To Be Held In New York November 17-19

An International Symposium on Ship Operations (ISOSO) will be sponsored in New York City November 17-19 by five major maritime industry organizations, each representing a separate discipline within the industry. The Symposium will be held in the spacious Passenger Terminal on the Hudson River at the foot of West 55th Street. A major portion of the facility will be given over to exhibit space, and there will be two conference areas to provide for concurrent sessions.

The five sponsoring groups are: The Hydrographic Society, American Institute of Merchant Shipping, The Council of American Master Mariners, Inc., the Council of American Flag Ship Operators, and the host of the organization, the Maritime Association of the Port of New York.

Exhibitors in the area of communications, weather, navigation, deck and engine equipment, ship maintenance, ship services, safety, lighting, fuel and fuel quality control, and any other product or service affecting the economics and profitability of ship operation will find a responsive audience at ISOSO, according to **N. Nick Cretan**, Maritime Association executive director.

Details on conference sessions and exhibiting can be obtained from any of the sponsoring organizations or from the Maritime Association ISOSO office, 34th Floor, 80 Broad Street, New York, N.Y. 10004; telephone (212) 425-5704.

Paul Lewis Appointed Materials Manager At Jeffboat Incorporated

Paul Lewis

Paul Lewis has been named materials manager by Jeffboat Incorporated, Jeffersonville, Ind. He started with Jeffboat in 1968 as a material control expediter. At various stages of his career he has held the positions of warehouse foreman, assistant material control supervisor, material control supervisor, material control superintendent, and material control manager. His new responsibilities will include all the purchasing functions in addition to his material control duties. He will report to **Scott Dowdell,** who is director of manufacturing services.

Armco's Nitronic 50 Ideal For Downhole Use —Literature Available

Few applications have more demanding and at the same time sensitive material requirements than those encountered in downhole petroleum exploration. However, many manufacturers are finding Armco Nitronic 50 stainless steel to offer the type of properties needed for dependable downhole service.

One such application involves instrumentation that is periodically lowered down the well hole to measure temperature, depth, direction, and inclination during drilling. To protect the instruments package and permit lowering and raising, a housing must be provided. This housing must resist corrosive attack common to oil well environments, resist high compressive stresses, and have very low magnetic permeability to avoid interference with the magnetometer in the instrument package.

Type 316 stainless steel, considered because of its good corrosive resistance, doesn't meet all the other requirements, so many operators were forced to use more expensive copper-nickel alloys. Now many are using Nitronic 50 stainless steel because of its excellent performance at significant cost savings compared to the copper-nickel alloys. In addition to the cost advantages of Nitronic 50, the material is also nonmagnetic so there's no interference with the instrumentation.

Nitronic 50 stainless steel is said to provide a combination of corrosion resistance and strength not found in any other commercial material available in its price range. This austenitic stainless steel has corrosion resistance greater than that provided by Types 316 and 316L, plus approximately twice the yield strength at room temperature. It also has good mechanical properties at both elevated and sub-zero temperatures.

For further information and free literature on Nitronic 50,

Write 61 on Reader Service Card

North American Trailing Asks Title XI For $16-Million Hopper Barge

North American Trailing Co., a subsidiary of Great Lakes International, Inc., 2122 York Road, Oak Brook, Ill. 60521, has applied for Title XI financing to aid in constructing a 281-foot, self-propelled, suction hopper barge.

The barge, which is to be used in the coastwise, inland, and foreign trade, will be equipped with two 3,000-horsepower diesel engines.

If approved, Title XI financing would cover $12,375,000 or 75 percent of the estimated actual cost of $16,500,000.

Southern Shipbuilding Corp., Slidell, La., is the builder of the vessel. Delivery is set for September 30.

SNAME Spring Meeting/STAR Symposium—A Preview

Ice Tech '81

Ottawa, Canada — June 16-19

This major event will bring forth the results of research and development in designing ships for ice navigation by many nations of the world.

For years to come "Ice Tech '81" will be considered and referenced as a major event in resource and marine development in the Arctic regions and ice-covered waters. Ice Tech '81 is the title of the Society of Naval Architects and Marine Engineers annual Spring Meeting/STAR Symposium. This year it will be held in the Chateau Laurier, Ottawa, Ontario, Canada from June 16 through 19. The Eastern Canadian Section of the Society will be the host.

A total of 26 technical papers have been prepared, all dealing with ice navigation and the design of ships for Arctic and Antarctic conditions. The authors come from the USSR, Finland, Germany, Japan, Canada and the United States, thus, giving a worldwide view of this important subject. In 1975, the Eastern Canadian Section of the Society organized the successful "Ice Tech '75." Ice Tech '81 will be a timely successor to that outstanding meeting.

Technical Sessions

All of Ice Tech '81 technical sessions will be held in the Drawing Room of the hotel, directly off the Ballroom Lobby on the ground floor.

Paper No. 1 — "Manhattan's Arctic Venture; A Semi-Technical History" by **W.O. Gray** and **R. Maybourn**.

SYNOPSIS: The conversion of the 106,000-dwt Manhattan in 1969 to enable her to undertake icebreaking experiments in the Canadian Arctic was described as "the most extensive and enterprising shipbuilding endeavor in the United States since World War II." This paper describes the basic purposes and results of the project which led its sponsors to conclude that it had been successful and might someday lead to the introduction of economic year-round Arctic marine transportation.

Paper No. 2 — "SS Manhattan Arctic Marine Project Data: The Impact on Technology" by **A.D. Mookhoek, R.P. Voelker** and **F.W. DeBord**.

SYNOPSIS: During the period 1968-71, EXXON, ARCO and BP participated in a project to determine the feasibility of transporting Alaskan North Slope crude oil via icebreaking tankers. This paper describes and discusses the technical and operational data resulting from that project and assesses its impact on future Arctic marine technology. Design criteria for a new icebreaking tanker were developed based on analytical studies, model tests and results from the SS Manhattan icebreaking tests.

Paper No. 3 — "Marine Transportation of Oil and Gas in the Alaskan Arctic" by **J.G. German, M.D. MacPherson, J. Meakin** and **C.W. Parker**.

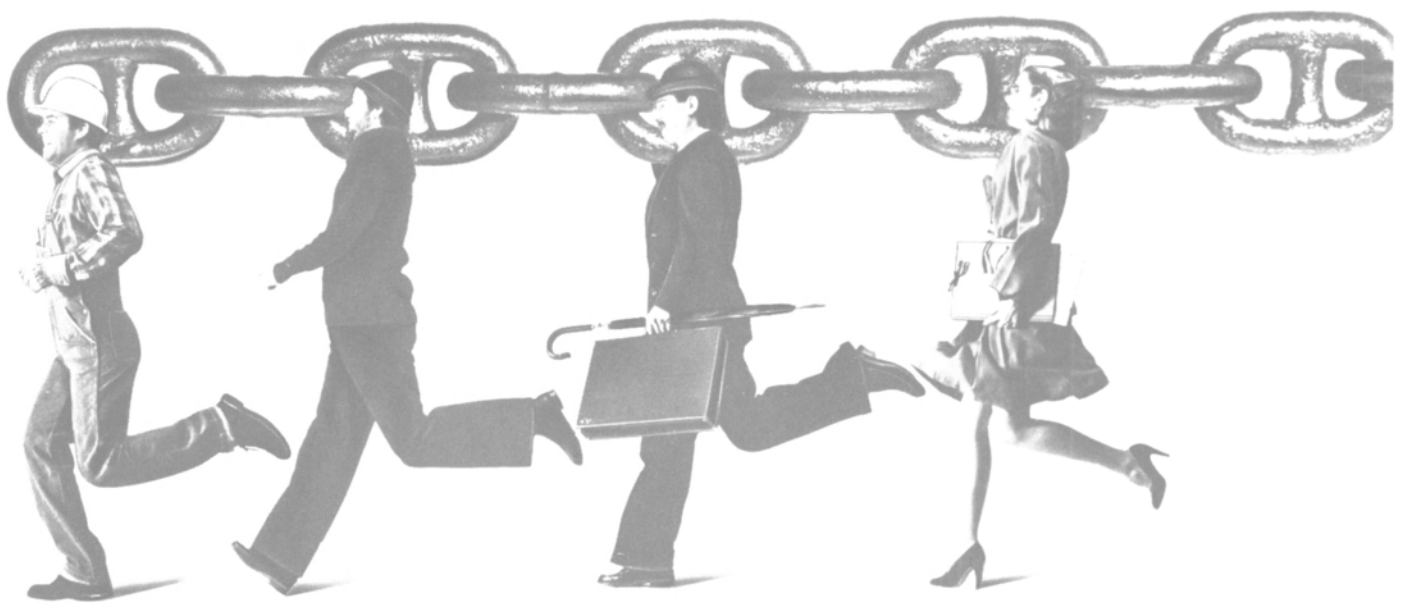
SYNOPSIS: A number of studies prepared over the last few years have attempted to define the environmental conditions in the Arctic and to develop the marine systems which will be needed to operate them. This paper summarizes the previous work related to Arctic marine transportation and presents the results of a technical and economic comparison of a number of Arctic marine transportation alternatives which were evaluated parametrically for the U.S. Maritime Administration.

Paper No. 4—"Commercial Marine Transportation of Arctic Natural Resources" by **J.B. Montgomery** and **C.R. Jordan**.

SYNOPSIS: This paper begins by identifying the Arctic resources

(continued on page 42)

Are there any type of chains or anchors you need?



We'll bring them to you immediately wherever in the world.

We are one of the most important Firms in Europe specializing in chains and anchors.

Just contact us by telephone, telex, or cable and we are ready to bring you promptly what you need, whether you are in Singapore, Aberdeen, Naples or Copenhagen.

Our materials are covered by tests certificates, these tests being performed on our testing house with a capacity up to 500 tons, acknowledged and approved by all Classification Registers.

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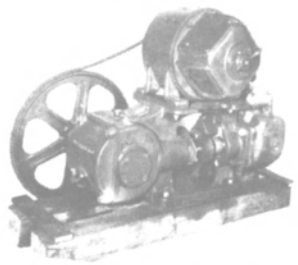
PUMPS

WORTHINGTON 2½x2 SANITARY & FLUSHING PUMP — 20 GPM — 80 LBS

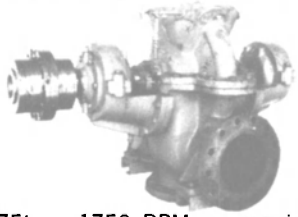


Motor driven type KAA — 1½" suction — 1" discharge. MOTOR: 2 HP — 230 VDC. Can also be furnished with A.C. motor if desired.

UNUSED 5"x4" — 500 GPM @ 20 PSI — 1800 RPM WEIL GENERAL CIRCULATOR SERVICE PUMP

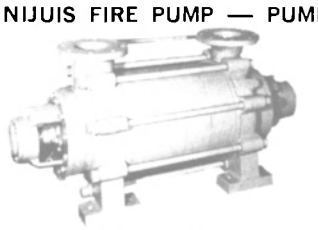
With totally enclosed explosion-proof motor. Bronze pump — horizontally split case — flooded submergence test pressure 300 PSI. MOTOR: Continental 10 HP — 440/3/60 — 1800 RPM — fan cooled — totally enclosed — horizontal — self-ventilated — EXPLOSION-PROOF. Unit 60" long — 24" flange to flange.

2000 GPM @ 75'
BRONZE PUMPS



8X8 — 2000 GPM @ 75' — 1750 RPM — requires 50 HP 440/3/60 1750 RPM motor — frame 445-S. Pumps are ball-bearing split case centrifugals with cast iron driplip base. Very good condition.

UNUSED NIJUIS FIRE PUMP — PUMP ONLY



HID-5125250 — 531 GPM @ 323' head @ 1800 RPM

6X5 BRONZE GARDNER-DENVER PUMP

Split case type D — 1000 GPM — 125 lbs — 281' @ 1800 RPM. Requires 100 HP diesel drive. Suction lift 15 to 25' — 10½" diameter flange. 6" Suction 5" Discharge.

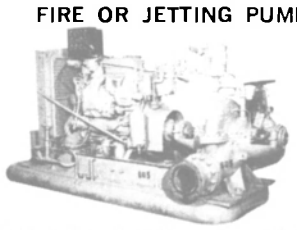
"EUREKA" DUPLEX DOUBLE-ACTING RECIPROCATING BILGE PUMP 500 GPM — 100' HEAD

Motor driven — pump operates at 320 RPM. MOTOR: 15 HP — 440/3/60 1750 RPM. DIMENSIONS: 5'9" high — 3' wide — 4' deep. Ex-M.V. Globtic Sun.

NIJUIS 3510 GPM DIESEL DRIVEN FIRE PUMP

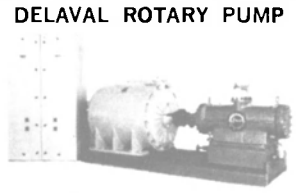
3510 GPM @ 350' head — 161.7 PSI. Pump is 10X8 — factory new — horizontally split case. ENGINE: GM 6V-71 or 8-V-71. Can furnish with heat exchanger & radiator.

GARDNER-DENVER 6"X5" BRONZE CENTRIFUGAL FIRE OR JETTING PUMP



Driven by GM 3-71 diesel engine. PUMP: 1000 GPM @ 150 PSI/1500 GPM @ 100 PSI — 1750/2000 RFM. Maximum head 175 PSI. Self-contained fuel tank in base. Automatic self-priming optional.

NEW UNUSED — 700 GPM — 150 PSI DELAVAL ROTARY PUMP



6X8 — 700 GPM @ 150 PSI — 1150 RPM — with 4-speed motor & control 100/75/50/37.5 HP — 440/3/60 — 1200/900/600/450 RPM. With Cutler-Hammer controller.

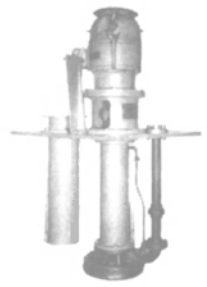
UNUSED BRONZE 2000 GPM @ 337' HEAD FIRE OR HIGH PRESSURE SERVICE PUMP

Mfg by Frederick Iron & Steel — 8" side discharge; — 8" bottom suction — model 8DSU-SPL. MOTOR: Crocker Wheeler — 250 HP — 240 volts DC — 1900 RPM — 102 7/8" O.A.L. — 34½" wide — 37" high.

NEW UNUSED KINNEY 20 GPM FUEL OIL SERVICE PUMP

Vertical — 50 PSI — with 2" inlet & outlet. MOTOR: 2 HP — 440/3/60 860 RPM — with starter. For fuel oil service, etc.

NEW UNUSED SUMP OR LOW PRESSURE DRAIN PUMPS



Bronze — 40 GPM @ 40 PSI. 2" Discharge — single impeller — CW rotation — 32" from deck plate to base. Complete with flotation equipment. Totally enclosed 5 HP 440/3/60 1725 RPM motor. Repair parts for motor & pump included.

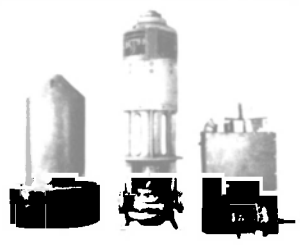
CARVER CHILLED WATER SERVICE PUMP 160 GPM — 57 PSI

For air conditioning or water circulation. 160 GPM @ 57 PSI — 110 ft. head. Closed coupled — 10 HP 440/3/60/3500 RPM.

500 GPM FIRE SERVICE PUMP

Mfg. by Buffalo. Bronze — 500 GPM @ 100 Lbs. — 5X4 — 30 HP/240 DC — 105 amps — 1750 RPM.

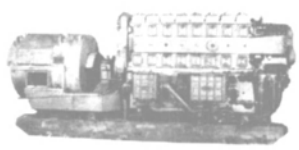
PASSENGER/CRUISE SHIP SELF PRIMING NEW WORTHINGTON VERTICAL SUBMERSIBLE BILGE PUMP



FOR EMERGENCY USE ON PASSENGER SHIPS, ETC. PUMP: JAS — 264 GPM — 171' head — two 6" inlets — one 5" outlet. MOTOR: 40 HP — 230 volts DC — 149 amps. COMPLETE WITH NASH — SELF PRIMING PUMP ATTACHED.

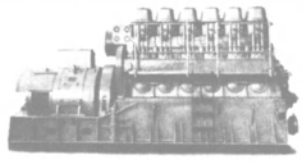
DIESEL GENERATOR SETS

290KW GM 8-268A DIESEL GENERATOR SET



120/240 VDC—1250 amps—shunt wound. ENGINE: GM 8-268A — 8 cyl — 6½X7 — 1200 RPM — good condition.

300KW BALDWIN DIESEL GENERATOR SET

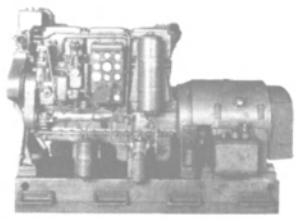


300KW — 120/240 VDC — 1250 amps — stab. shunt — 450 RPM. Baldwin diesel model VO. Ex C-1MAVO1.

100KW GBD8 DIESEL GENERATORS

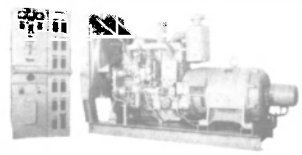
From LST vessels. 120/240 VDC — 417 amps — stab shunt — 1200 RPM — Delco generator — self-excited. ENGINE: Superior GBD-8 — 8 cyl — 5½X7 — 150 HP — 30 volt electric starting. Reconditioned to ABS. Dry weight 10,000 lbs. — OAL 124" — 65 11/16" high — 42" wide. Height necessary to pull piston 68". Fuel consumption 0.620 lbs/hr.

60 KW CUMMINS DIESEL GEN. SETS



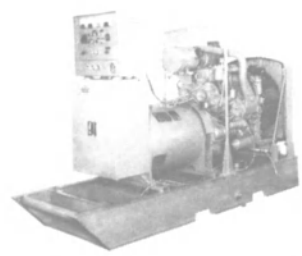
60KW — 120 volts — 500 amps DC generators. 6-Cyl. model H Cummins diesel engine.

75 KW CUMMINS DIESEL GENERATOR SET



75KW — 93.8 KVA — 440/3/60 — 1200 RPM — electric starting. Cummins 6-cyl engine with free-standing switchgear.

GM-4-71-T TURBO-CHARGED 100 KW DIESEL GENERATOR SET RADIATOR COOLED 1800 RPM

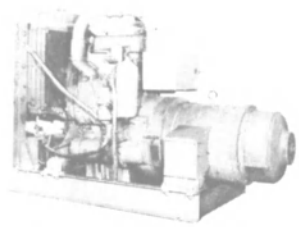


12 wire — all voltages possible — 100 KW 440/220/3/60. With switchgear. Has protective cabinet.

GM 8-268A 200 KW A.C. DIESEL GENERATOR SETS

ENGINE: 8-268A — 6½" bore — 7" stroke — 1200 RPM — driving Westinghouse generator — 200 KW — 440 volts — 3-phase — 60 cycle — 321 amps — 80% PF @ 1200 RPM. Switchgear available.

20KW 2-71 DIESEL GENERATOR SETS TEST RUN 1 HOUR

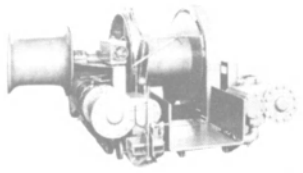


220/3/60 — 1200 RPM — Electric Machinery Co. or Delco. Brushless — will demonstrate running. (Also have 20KW sets with 220/440/3/60 — with brushes — 1200 RPM — Delco. Weight 2200 lbs.)

GM 3-268A 100 KW DIESEL GENERATOR SETS
ENGINE: GM 3-268A — 6½X7 — 1200 RPM — 80% PF — electric starting. GENERATOR: 100 KW — 440/3/60/1200 RPM — 161 amps. Dripproof — open — self-ventilated. (Class A insulation stator — class B insulation on field). EXCITATION: 2 KW DC unit — 9′ 1¾″ long — 37″ wide.

WINCHES

STEAM MOORING WINCHES

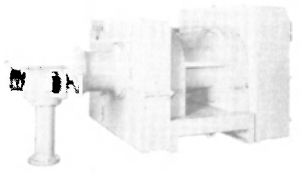


12″ X 14″ — AUTOMATIC TENSIONING with foot brake & declutchable gypsy head 20,000 LBS @ 100 FPM — FIRST LATER ALSO HANDLES 16,000 @ 150 FPM OR 50,000 @ 8 FPM.

Drum will show 1500 ft or 1½″ wire in 9 layers. Steam inlet 3½″ — 4″ exhaust — 171 PSI working pressure. BASE DIMENSIONS: 6′ X 6′ 3½″ — overall 8″ 4½″ wide x 9′ long. Mfg by Friedrich Kocks.

ALL UNITS CAN BE DEMONSTRATED RUNNING

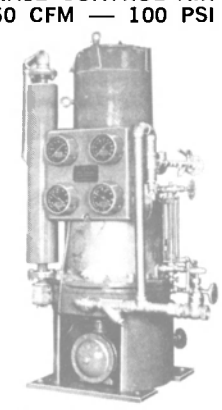
MODEL U1 UNIT WINCHES



7450 Lbs. @ 223 FPM. G.E. 50 HP Motor — 230 VDC. With controls and master switch.

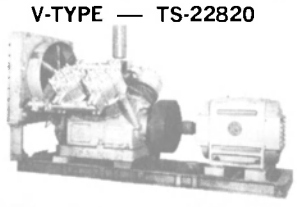
AIR COMPRESSORS

NASH MULTI-PHASE CONTROL AIR COMPRESSOR
50 CFM — 100 PSI



Model MV-673. Continuous pressure maintained by pressure control valve. Complete with motor, heat exchanger, separator, silencer, pressure control valve, water seal pressure control valve. CAPACITY: 50 CFM @ 100 PSI — 3500 RPM. Motor 27 HP — 440/3/60. Cooling water flow 35 GPM — relief valve set for 110 PSI. Vertical configuration. Pressure switch: on 80 PSIG — off 100 PSIG. Just removed from AT&T Vessel "Long Lines". Excellent condition.

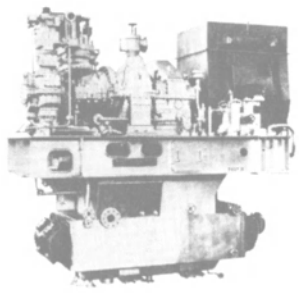
MARINE SHIPBOARD AIR COMPRESSOR
V-TYPE — TS-22820



160 CFM @ 125 lbs — two stage 870 RPM — 8X8¼X8¾ — air cooled — with intercooler. Direct — connected air compressor #2261021. MOTOR: 50 HP 440/3/60 — mfg by U.S. Motor. AIR COMPRESSOR: Mfg by Air Pumps Ltd. Excellent condition — formerly used on AT&T Vessel "Long Lines" and removed only because they needed a larger unit. Complete with inter- and after-cooler. Very good condition.

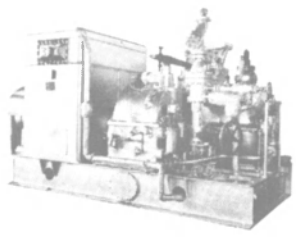
TURBO GENERATORS STEAM TURBINE — GEARS

1000 KW DELAVAL ALLIS-CHALMERS GEARED TURBO GENERATORS



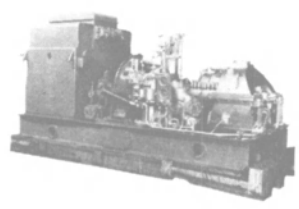
DeLaval turbine 1442 HP — 10019 RPM — class GJN — 9-stage — 1050 PSI — 950° TT. GEAR: 10019/12000. GENERATOR: Allis-Chalmers 1000 KW — 450/3/60/1200 — static excitation. Complete with condenser & switchgear optional. Send for brochure.

750 KW G.E. 7-STAGE TURBINE



450/3/60/1200 RPM — type FN3-FN24 — 10033 RPM. GEAR: 10033/1200 RPM. GENERATOR: type ATL — 6-pole — 450/3/60/1200 RPM — 0.80PF. EXCITER: 10KW 120 volts DC. Steam inlet 2½″ — 125% load — 2 hour normal steam condition. Normal steam condition 525 lbs/825°TT — 1 lb absolute back pressure at turbine exhaust flange. Steam flow 100% load 7870 lbs. OAL 11′ 4½″ — OAW 6′ ½″ — OAH 6′ 4″. Total weight 24,500 lbs.

MARINER CLASS TURBINE & GEAR ONLY



G.E. 700KW DRV618-MR73 — 10938/1200 RPM 850 PSI — 850°TT — GEI-90755 CONDENSING. Complete with rotor bearings, diaphragms, packing, etc. Gear complete — type S — 432 — Form B — 10938/1200 RPM.

TURBINE & GEAR ONLY — NON-CONDENSING
G.E. 700KW DRV318-MR1 — 10938/1200 RPM — 850 PSI — 850°TT — 24 PSIG exhaust pressure. Rotor, diaphragms, packings, bearings available.

AUXILIARY TURBO GENERATORS ROTORS ETC.

- **400KW DELAVAL ROTOR — 7-STAGE — CLASS CD — 5910 RPM**

835 lb W.P. — 840°TT — ex-Esso: Gloucester — Dallas Class — some Beth Sparrows Point & Quincy vessels, & Newport News Hulls 499-504 — in Book 820.

- **750KW DELAVAL ROTOR — 7-STAGE — CLASS G.J.**

9823 — 585/865# steam pressure

- **GEARS**

Class KD — 9283/1200 — ex-City Service "Alton Jones" type vessels

GE ROTOR
NEW
750 KW

Type FN-3-FN24 — 7-stage — 10033 RPM

WESTINGHOUSE
NEW
1250 KW

540# — 825°TT — 8050 RPM

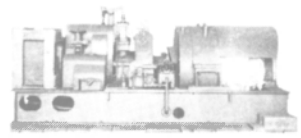
- **FOR G.E. T2 VESSELS**

G.E. DORV-325M — 5654 RPM — T2 tanker

- **WESTINGHOUSE 538KW**

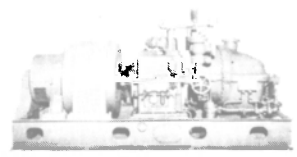
5010 RPM — T2 vessel

TURBINE & GEAR ONLY



New DeLaval type H.D. Turbine — #245204 — gear type KDC — 730 HP — 440# — 740°TT — 9977 RPM — with reduction gear output 1200 RPM. Turbine serial #245204.

G.E. 300KW TURBO GENERATOR & GEAR



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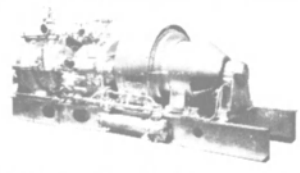

Ex USN — turbine type DN — 5-stage — 10012 RPM. GEAR: s-155 — single hellcal. GENERATOR: 200KW — 450/3/60/1200 RPM. Steam conditions: 540# — superheat 197°/208°.

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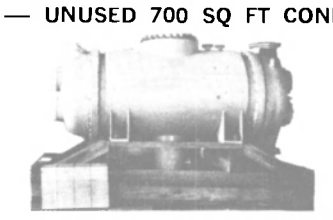

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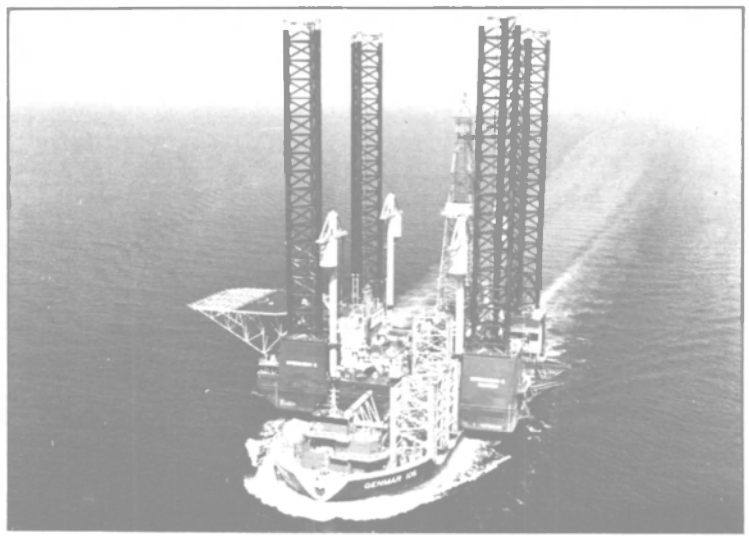

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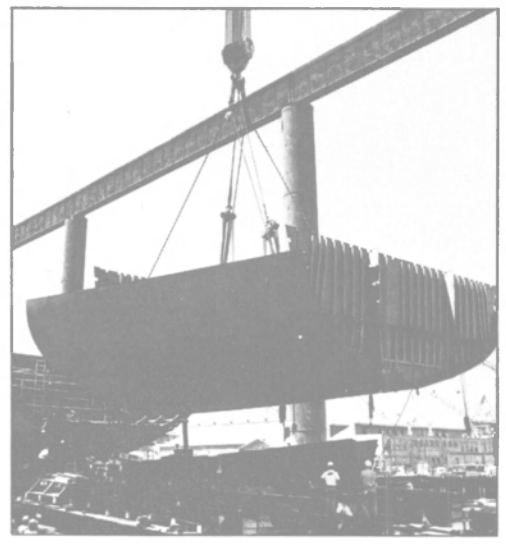

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MARITIME REPORTER AND ENGINEERING NEWS

Ice Tech '81

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which are expected to be of commercial importance during the remainder of this century, their location, quantity, physical characteristics and the market location to which they must be shipped. Three potential marine transportation systems are described in detail.

Paper No. 5—"Technical Development of An Environmentally Safe Arctic Tanker" by **B. Johnasson, A. Keinonen, B. Mercer** and **J. Stubbs**.
SYNOPSIS: Following Dome Petroleum's Arctic research and development experience, the overall safety criteria are introduced for an environmentally safe nonspilling Arctic tanker design. Safety in ship/ice interactions and the prevention of major ice impacts by new remote sensing technology are addressed.

Paper No. 6 — "Development and Implementation of Ship Ice Certificates" by **D.D. Maksutov** and **Yu. N. Popov**.
SYNOPSIS: Annual growth of cargo traffic and the lengthening of the navigation season in the Arctic demand a large number of cargo and research vessels suited for ice navigation. Because of the possibility of ice damage, each ship should have an "Ice Certificate" containing information which ensures the fail-safe operation of the ship. This paper describes the background and requirements for "Ice Certificates" in the USSR.

Paper No. 7 — "Arctic Marine Shipping Route Evaluations" by **D.F. Dickens**.
SYNOPSIS: Recent studies have attempted to refine our understanding of winter shipping conditions, particularly in dynamic areas such as the Beaufort Sea. This paper uses several recent Arctic shipping route evaluations as case studies, and attempts to isolate those ice characteristics considered amenable to a reliable statistical treatment, and relevant to vessel designers and operators.

Paper No. 8—"A Ship Transit Model for Passage Through Ice and Its Application to the Labrador Area" by **R.J. Gill, A. Aboul-Azm, B. Terry** and **W.E. Russell**.
SYNOPSIS: A transit time computer model for passage through pack and continuous ice is described, and the results of its application to offshore Labrador and Lake Melville are discussed. The model uses ice conditions which are digitized along specific routes and outputs total transit time for passages at various times during the ice season.

Paper No. 9 — "Ice Conditions Affecting Navigation in the Beaufort Sea" by **B.D. Wright** and **D.L. Schwab**.
SYNOPSIS: In this paper, quantitative data on ice conditions in the Beaufort Sea are presented which include the distribution of ice type, floe size, undeformed ice areas and pressure ridge height, frequency and orientation. The data presented are currently being used in the design of offshore production systems for the Canadian Beaufort Sea.

Paper No. 10 — "A Rational Basis for Hull-Ice Strengthening Criteria" by Capt. **J.L. Coburn, A. Nawwar** and **J.B. Montgomery**.
SYNOPSIS: Several classification societies and various government regulations provide guidelines for strengthening of ice-transiting ships. However, there are inconsistencies among these different guidelines, and ships have suffered hull damage from ice while operating in zones for which they were supposedly strengthened adequately. This paper reports on the results of a study to develop the basis for rational selection of ice-strengthening criteria.

Paper No. 11—"On the Structural Analysis of Ice Transiting Vessels" by **P.C. Xirouchakis** and **R. Stortstrom**.
SYNOPSIS: This paper develops a methodology for a rational selection of ice-strengthening criteria for ice-transiting commercial ships so that the scantlings of structural members can be determined. The method predicts the load carried by each transverse bulkhead, the maximum bending moments developed in

the longitudinal stringer and transverse framing which result from ice compression.

Paper No. 12 — "Evaluating Commercial Arctic Marine Transportation with Polar Class Icebreakers" by **R.P. Voelker, F.W. DeBord, T. Brennan** and **C.W. Parker**.

SYNOPSIS: Although recent studies have shown the technical and economic potential of Alaskan Arctic marine transportation, the risk assigned by investors to this mode of transportation remains high. The U.S. Maritime Administration and the U.S. Coast Guard decided to use the Polar Class icebreakers to incrementally extend Alaskan marine routes during the winter season. This paper presents the results of the first two years of this program and describes plans for the following years.

Paper No. 13 — "Polar Class Icebreakers — Contribution to Technology" by **R.E. Kramek** and **R.W. Gulick**.

SYNOPSIS: The purpose of this paper is to present the status and results of various tests, experiments and design modifications for the U.S. Coast Guard icebreakers, Polar Star and Polar Sea. Areas discussed include: Controllable-pitch propeller design, performance, ice test results, and modifications; vessel vibration problems and operational experience.

Paper No. 14 — "The Performance of the Controllable Pitch Propellers on the U.S. Coast Guard Polar Class Icebreakers" by **D.G. Langrock, W. Wuhrer** and **L. Vassilopoulos**.

SYNOPSIS—After initial strength problems, the 16-foot diameter, 15 MW CP propellers without ducts have been shown to stand up against the loading of an actual extended icemilling in unrestricted icebreaking operations. This paper describes the design features of the 35.8 percent hub-ratio propellers and their implications for exposed icebreaker duty and explains in detail the initial serious problems with the propeller system.

Paper No. 15 — "Polar Class Icebreakers — Ice Deflection Hull Appendages; A Joint Research Effort" by **R.W. Gulick, G.P. Vance, J.R. Hill** and **D. Dagnel**.

SYNOPSIS: Ice ingestion by the Polar Class icebreaker propellers has resulted in significant failures and resultant downtime. In 1978 the Coast Guard began an evaluation of potential ice deflecting hull appendages. This program included construction of and laboratory experiments with a 20-foot self-propelled model. The results of these efforts and identifiable future research efforts are described.

Paper No. 16 — "A Provisional Calculation of the Icebreaking Resistance of the USCGC Polar Star" by **J.A. McIntosh** and **J.P. Welsh**.

SYNOPSIS: The Coast Guard extensively instrumented the CGC Polar Star and conducted icebreaking tests on several occasions. This paper presents the results of resistance computations based on selected portions of the data and makes comparisons with theoretical and model experiment ice resistance predictions.

Paper No. 17—"Propulsion and Its Efficiency in Ice" by **K. Juurmaa** and **H. Segercrantz**.

SYNOPSIS: Propulsion of icebreakers and icebreaking vessels has been studied quite extensively for many years. Experience in the Baltic and in the Soviet Arctic during the last 5-10 years has shown that all main problems are now well under control. Helsinki Shipyard has conducted several full-scale trials and model tests to study the efficiency of propulsion in ice. This paper presents some results of model tests of propellers in open water and ridged ice fields and pure propeller efficiency in ice.

Paper No. 18 — "Prediction of the Icebreaking Performance of the German Polar Research Vessel" by **J. Schwarz, P. Jochmann** and **L. Hoffmann**.

SYNOPSIS: In order to fulfill the requirements for becoming a full member of the Antarctic Treaty Countries, the government of the Federal Republic of Germany has

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decided to build a polar research vessel. The hull form of this research vessel has been designed by the Hamburg Ship Model Basin. The most important achievement was the development of ship lines which prevent the ingestion of ice into the propellers. This paper covers ice technological aspects of the ship and reports on model test results.

Paper No. 19 — "Division of Icebreaker Ice Resistance into Components" by **I.I. Poznvak** and **B.P. Ionov**.

SYNOPSIS—For the development of a concept design of an icebreaker it is necessary to have a scientific, soundly based method of estimating ice resistance and of dividing the total ice resistance into components. This paper deals with the results of theoretical and experimental studies concerning the division of the ice resistance into its components and a proposed method for their estimation.

Paper No. 20 — "An Experimental Study of Hull Forms for the New Japanese Antarctic Observation Ship" by **S. Narita** and **M. Yamaguchi**.

SYNOPSIS: The Japanese Government is building the nation's second Antarctic observation ship. The new vessel is to be a 30,000-shp, triple-screw polar icebreaker and will be twice as powerful as her predecessor. This paper describes the results of the experimental study of hull forms for both icebreaking capability, conducted at HSVA, and open-water propulsive performance, conducted at the NKK Tsu Ship Model Basin.

Paper No. 21—"Icebreaker Bow Forms—A Parametric Variation" by **P. Noble** and **V. Bulat**.

SYNOPSIS: Using the lines of Canada's most recent class of icebreaker, the "R" Class, as a starting point, a model test program was undertaken to investigate possible improvements in level ice resistance and ridge penetration capability which might result from changes in the forebody shape of the vessel. A parent hull model and three variants were tested in the Artec Canada ice towing basin. This paper describes the developments of the various hull forms, the test program and the results of the analysis of the model test data.

Paper No. 22 — "Study of Ship Ice Performance in Narrow Channels" by **V.I. Kashtelyan** and **L.G. Tsoy**.

SYNOPSIS: The growth of the dimensions of ice class ships is inhibited by the dimensions of icebreakers employed in convoys. The width of a channel controlled by the breadth of the icebreaker has proved one of the most important factors affecting ship speed in the icebreaker channel. This study is an assessment of the effects of relative channel width on ship speed in an icebreaker channel. Some full-scale results and the results of model tests in the Arctic and Antarctic Institute, Leningrad, are given.

Paper No. 23—"Results of Full-Scale Trials in Ice of CCGS Pierre Radisson" by **R.Y. Edwards, B. Johnson, M. Dunne, G. Comfort** and **V. Bulat**.

SYNOPSIS: In July, 1978, the Canadian Coast Guard accepted delivery of the first of the "R-Class" icebreakers, the CCGS Pierre Radisson. The ship was extensively instrumented prior to her maiden voyage which was to take her from Victoria, B.C., through the Northwest Passage to her new home port of Quebec. Full-scale data gathered in thick first-year and multi-year ice in the Arctic and subsequently during winter operations provided performance information for a wide range of ice types, thickness and strength. This data is presented together with 1/36-scale model experiment results.

Paper No. 24—"Performance of CCGS Franklin in Lake Melville 1980" by **M. Michailidis** and **D.C. Murdey**.

SYNOPSIS: This paper presents ice performance data of CCGS Franklin as obtained from trials during two probes into Lake Mel-

(continued on page 46)

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Ice Tech '81

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ville in early 1980. Comparisons with clear water overload and some icebreaking model tests are given. Stresses obtained from strain gauge rosettes in selected bow locations also are reported.

Paper No. 25—"Full-Scale Icebreaking Tests of the USCGC Katmai Bay" by **G.P. Vance, A.S. Gracewski** and **M.J. Goodwin**.

SYNOPSIS: This paper describes the full-scale icebreaking tests conducted on the USCGC Katmai Bay, the first of a new class of USCG icebreaking tugs. Analysis of the data indicates that the vessel could penetrate up to 22 inches of homogeneous sheet ice with 3 inches of snow cover and up to 48 inches of brash ice. The vessel has an installed bubbler system and a low friction coating. This paper describes the tests that were conducted, the instrumentation utilized and an analysis of the results.

Paper No. 26—"Ice Effects and Ship Performance Data Gathering System on Board the Icebreaking Bulk Carrier M.V. Arctic" by **J.D. Hearnshaw, J.G. German, A. Benjamin, J. Stirling** and **P. Timonin**.

SYNOPSIS: The decision to provide a permanently installed instrumentation system aboard the ice-strengthened cargo vessel M.V. Arctic and to gather ice-performance data over a number of Arctic shipping seasons, was taken by Transport Canada in 1977. This paper describes the evolution of the scientific evaluation program, the development, details and installation in the ship of an instrumentation system, the data collection undertaken and the results of data analysis achieved to this point in the five-year program.

Special Activities

All social events and special activities are open to both registrants and their guests.

Ice-Breaker Reception, Tuesday, June 16, 5:30 p.m. to 7:30 p.m. Burgundy Room. For those early arrivals who wish to meet new and old friends, a cocktail party will take place.

Ladies' Hospitality Suite will be provided in the Burgundy Room on the hotel mezzanine floor. It will be open Wednesday through Friday.

Film Program—In parallel with the technical sessions, in the Cartier Room, there will be a screening of films about the exploration, the ecology, the people and the economic development of Arctic regions.

Authors / Moderators Briefing will take place in the Salon L'Orangerie on the mezzanine floor at 7:00 a.m. to 7:45 a.m. on Wednesday, June 17.

Orientation Breakfast—A welcoming breakfast preceding and outlining the technical sessions will be held in the Adam Room at 7:45 a.m. on Wednesday, June 17.

President's Reception—Society President **John J. Nachtsheim** will receive all registrants and guests at the National Art Centre which is located across Confederation Square from the Chateau Laurier on Wednesday, June 17, at 6:30 p.m.

President's Luncheon will be held in the hotel's Ballroom on Thursday, June 18 at 12:15 p.m. It will feature the presentation of several important awards and an address by Mr. **Nachtsheim**.

Reception and Capital City Ball—A gala evening featuring dinner, dancing and musical entertainment, with a distinct Canadian flavor will be held in the Ballroom on Thursday, June 18, starting at 7:30 p.m. It will be preceded by a reception in the Drawing Room, starting at 6:30 p.m. Dress is optional.

Information

Further information about the 1981 Spring Meeting/STAR Symposium, Ice Tech '81, may be obtained from the Society, One World Trade Center, Suite 1369, New York, N.Y. 10048.

Liberian Shipowners Refute UNCTAD Proposals In Two New Reports

During meetings in New York recently, **Grady Brown**, chairman of the board of the Liberian Shipowners' Council, discussed shipowner reactions to UNCTAD proposals regarding the phasing out of open registry shipping.

Two reports have been prepared by the Council, entitled "Some Arguments Against UNCTAD's Proposal for Phasing Out Open Registries," and "LSC Commentary on the Four Areas of Study Authorized by UNCTAD." In summary, they point out the social and economic consequences of such a move. A network of global bilateral trade agreements would be essential, note the reports, to prevent a few especially competitive nations from dominating the industry. Countries would be faced with the need, regardless of their individual economic priorities, to undertake the high cost of developing national-flag fleets and the necessary infrastructure. A consequence would be the unavoidable rise in freight rates.

The Liberian Shipowners' Council is an association of owners and operators of the Liberian flag. With 68 members, the LSC now represents approximately 47 percent of the total Liberian fleet, and is the largest international shipowners organization in the world.

New Brochure Describes Jackups Available From Marathon LeTourneau

A new six-page four-color illustrated brochure titled "Treasure Islands" is now available from Marathon LeTourneau Offshore Company, the leading designer and manufacturer of mobile self-elevating, offshore drilling rigs. The brochure gives specifications of the company's line of slot and cantilever platforms, including information on the Class 150-88-C "Gorilla" rig, newest and largest Marathon LeTourneau jackup.

Class 150-44-C shallow water cantilever platforms and Class 82-SD series shallow draft platforms designed to operate in water depths from 15 feet to 250 feet along with Class 116 series platforms which are designed to operate in water depths up to 300 feet are all described in the new publication.

Marathon LeTourneau Offshore Company's self-elevating platforms, designed for exploration and production drilling as well as workover operations, are manufactured in the company's facilities in Vicksburg, Miss., Brownsville, Texas, the Republic of Singapore, and by licensees in Hong Kong, in Canada, and Clydebank, Scotland.

For a free copy of this brochure,

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Maintenance Repair And Overhaul Parts Catalog From Reliance Electric

A new catalog showing a broad range of electrical components and accessories for maintenance, repair, and overhaul of industrial equipment is now available from Reliance Electric Company, Cleveland. Containing hundreds of photos, drawings, and diagrams, the 154-page catalog is full of product descriptions, specifications, dimensions, and prices. Conveniently divided into seven separate sections for quick and easy reference, the catalog presents information about Reliance control parts, motor parts and accessories, motor windings, test equipment, tools, circuit board repair and exchange services, plus chemicals, cable fuses, resistors, and miscellaneous items.

A major feature of the Reliance MRO catalog is the inclusion of information in each quick-reference section about product advantages and benefits, plus the proper selection and application of all products listed. All ordering information is included.

To obtain a free copy of the new catalog,

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Students and officers at recent meeting of SNAME Pacific Northwest Section (L to R): **D.N. Bruce Cowper,** 3rd place student paper; coauthors **Nicholas J. Carpenter** and **James J. King,** 2nd place student paper; **Richard Storch,** student relations chairman; **Carl Scragg; K. Scott Hunziker,** 1st place student paper; **Les Coward;** and **Tom Dyer.**

Pacific Northwest SNAME Holds Annual Student Meeting

The Pacific Northwest Section of The Society of Naval Architects and Marine Engineers held its annual student meeting recently. The turnout for students was very good, ranging from high schools in the Seattle area to colleges from British Columbia to Oregon. The student paper, titled "The Hood Canal Bridge: Dynamic Loading from Wind and Waves," was presented by **K. Scott Hunziker** from the University of Washington.

The bridge sank in a storm on February 13, 1979, with winds of 80 knots and gusts up to 100 knots. A brief outline of the construction of the Hood Canal Bridge was given, explaining how the floating pontoons were constructed and held together. Mr. **Hunziker's** paper examined the questions of whether the bridge sinking was due to the actions of the wind and waves.

The second paper was "Wake Analysis of Two Cross-Sound Ferries," presented by **Carl Scragg** of Science Applications, Inc. The problem was to determine possible cause of propeller blade failure by analytically examining the ferry wake.

Swiss Fabricating Provided Staging For New Drydocks At Newport News Ship

Swiss-Lok has designed and fabricated a special design staging for the new drydocks at Newport News Shipbuilding. This staging will save time in erection and needs no wood planking. The staging is designed to support Swiss Fabricating's Swiss-Lok design removable roof in sections of 48 feet by 40 feet. The roof sections can be stored on top of the roof sections beside it.

The staging is in 48-foot-long units by 54 feet high that can be lifted and moved back to the wall of the drydock. This permits clearance for the moving of the ship, in or out. While the staging is in place at the ship, the individual working platforms can be rolled in or out, toward the ship.

Swiss Fabricating, Inc. of Pittsburgh has been selling its standard Swiss-Lok scaffolding and also designing special large staging equipment for Newport News Shipbuilding for the past 10 years.

For further information on staging,

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Nauteknik Introduces New Offshore Survival Suits—Literature Available

Nauteknik A/S of Oslo, a leading Norwegian supplier of lifesaving, safety, and firefighting equipment, has introduced its newly developed survival suits. The NORD 15 model suit is designed to give a person 15 hours of survival time in icy water, and is approved by the Norwegian Maritime Directorate. Some 6,000 of the NORD 15 have already been ordered by offshore companies.

The NORD 15S model, a one-size survival suit of flameproof material and fitted with a lifting bridle, is also approved by the Maritime Directorate for use aboard ships and fishing vessels. The NORD 15A model is a combined work/survival suit for use aboard supply boats and other vessels. This suit is fitted with protective boots and loose mittens.

For a free 4-color brochure on these survival suits,

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Rockwell's Flow Control Division Plans New Valve Plant In Waco, Texas

Rockwell International's Flow Control Division has announced plans to build a valve manufacturing plant this year on a 30-acre site in Waco, Texas. Construction of the new facility was expected to start in April and be completed in December of 1981. The plant will manufacture valves for oil and gas production and processing facilities, transmission pipelines, and gas distribution pipelines.

Rockwell International is a major multi-industry company applying advanced technology to a wide range of products in its automotive, aerospace, electronics and general industries businesses.

Van der Naillen Named AWO Board Chairman

Ralph E. Van der Naillen, vice president of Cargo Carriers, Inc., Minneapolis, has been installed as chairman of the board of The American Waterways Operators, Inc. (AWO). He has served as vice chairman of the board for the past year. Mr. **Van der Naillen,** in an address to the AWO annual meeting, said: "We are indeed facing most unusual times. Our government is now embarked on a project of 'economic engineering' the likes of which we have not seen before."

He added that the key issue facing the industry in 1981 is the Administration's proposal to increase the user tax on barge fuel by 240 percent over the levels already mandated by Congress. "Increases of this magnitude would have a profound effect on the competitiveness of barge transportation," he said. "Fuel costs already account for 50 percent of our operating expenses; increasing the tax by the proposed amounts would cause a substantial loss of cargo to other modes of transportation, thus jeopardizing the health of an important part of the nation's transportation system."

Mr. **Van der Naillen** succeeds **John M. Donnelly Jr.,** president of Ingram Barge Co., Nashville, as AWO chairman. Mr. **Donnelly** was honored by the board for his "outstanding leadership and guidance on key issues" during the year.

MarAd Postpones Bidding On Five Obsolete Ships

The Maritime Administration has postponed until June 4 the opening of bids for the sale of five obsolete Government-owned vessels for conversion and operation in the fisheries or the domestic commerce of the United States. Invitation for Bids No. PD-X-1035, issued last October 31, offered for sale to U.S. citizens the 459-foot reefer Arcturus and the 463-foot store ship Hyades, located at the James River Reserve Fleet, Fort Eustis, Va.; and the 459-foot reefers Pictor and Procyon and the 459-foot store ship Zelima, all located at the Suisun Bay Reserve Fleet, Benicia, Calif.

The deferral of the bid opening date is to provide time for further study of the meaning of the phrase "operation in the fisheries of the United States." A further amendment will be issued to clarify that language when the question is resolved. At that time a schedule for potential bidders to inspect the ships will also be announced.

Bids, which will be received until 2:30 p.m. Eastern Standard Time, June 4, will be publicly opened at that time in Room 3708 of the Department of Commerce Building.

Simrad Loran C Receiver Is Fully Automatic— Literature Available

Simrad's computer-controlled TL-838 takes advantage of microprocessor technology to insure quality operation. It quickly and automatically acquires and tracks the master and all secondary signals in a selected Loran C chain. All TDs can be tracked simultaneously while any two are displayed. An indicator shows the signal strength. The memory and instant recall capability makes it possible to store and recall up to three way points. The large, bright numerals are easy to read.

Four tunable and two internally preset notch filters reject interference and noise to ensure high performance. The TL-838 has a dynamic range of 110 dB and a quick settling time of 1-3 minutes depending on signal conditions. Several alarm systems assure accuracy. It has a self-test function for the microprocessors and displays.

An optional TC-28A Loran C coordinate converter is available. The TL-838 is designed to meet or exceed all requirements of the U.S. Coast Guard-endorsed RTCM 70 Minimum Performance Standards.

For further information and a free brochure,

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Hoffert Marine Adds Hundested Propellers To Its Product Line

Hoffert Marine Inc., Jacksonville, Fla., supplier of deck and engine equipment and services, has added Hundested Multi-Pitch propellers to its products for distribution from New York south along the East Coast and to ports along the Gulf Coast. The Multi-Pitch propellers are manufactured in Hundested, Denmark and can be designed to individual customer requirements for trawlers, ferryboats, cargo vessels, seine net boats, and pleasure boats.

The manufacture of the propellers includes the original two-bladed propellers from 400 to 1,650-mm in diameter, as well as the three and four-bladed models from 380 to 2,680-mm in diameter. The propeller pitch can be designed according to individual customer requirements. Maneuverability, power, speed, and fuel savings are said to be some of the advantages of the Hundested Multi-Pitch propellers. By setting the pitch of the propeller blades, it is possible to obtain infinitely variable control of the vessel's speed fully independent of the engine speed.

For further information and free literature,

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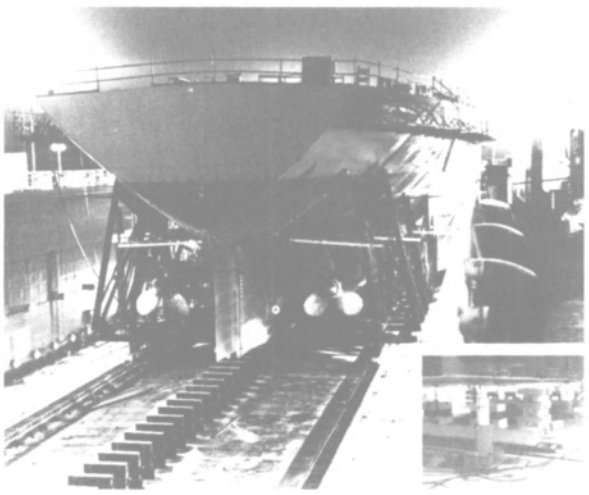
Hydranautics' Transfer System Now In Use At Rauma Repola Yard

Fabricating and transferring of ships and drill rigs using special Hydranautics hydraulic systems equipment has begun at Rauma Repola's Mantyluoto yard in Pori, Finland. The equipment permits ships of 8,500 tons steel weight to be constructed on land in sections, then assembled and moved onto a concrete floating dock for launching. The equipment can also be used for ship retrieval.

One of the first ships to be handled by the new Hydranautics system was the first of the three drillships ordered by V/O Sudoimport. This ship is said to be the world's first ice-classified drilling vessel and is designed for oil exploration in the Arctic.

Hydranautics designed the 8,500-ton transfer system that includes jacking beam, pile cap, roller cage assembly and roller beams, and floating dock beams. Equipment provided by Hydranautics includes eight 110-ton gripper jack assemblies with a maximum moving capacity of 10,000 tons at 0.088 coefficient of friction; two 75-hp power/control units; six lift-and-lower, two-stage 70-ton jacks with 40-inch stroke; 34 hydraulic positioning jacks for vertical lift and horizontal move during positioning of ship sections; and accompanying interconnecting hoses with quick disconnects.



Ship at Pori rests on Hydranautics roller beams prior to movement onto floating dock. Insert shows positioning jacks that are used to align ship sections in preparation for ship assembly welding.

In operation, the lifting/lowering jacks are used to remove the ship section from a wheeled vehicle to the roller beams. The positioning jacks are used to align ship sections in preparation for ship assembly welding. The gripper jacks are used to move major ship sections and to move the entire ship on roller beams directly onto the floating dock for launching.

Rauma-Repola officials at Pori report complete satisfaction with the fact that the new Hydranautics heavy-load moving system allows easy access of men and equipment to the ships under construction. They also report appreciable savings in cost and time with the way the division is now able to build ships.

H.P. Drewry Offers 125-Page Study 'Governments And Dry Bulk Shipping'

Globally the structure and organization of the international shipping industry is undergoing fundamental and in many instances rapid change. This change has been manifest during the late 1970s by geographical change in both the flag and ownership of tonnage and by the increasing encroachment of government into the operations and control of shipping services.

The UNCTAD Code of Conduct for the Liner Trades has almost been ratified by the requisite number of states, and there is a gathering momentum from the UNCTAD Secretariat to regulate the dry bulk trades in a similar fashion and at the same time phase out flags of convenience. Legislation to mandatory enforced cargo sharing within the dry bulk trades has been promoted in the belief that the existing structure of international dry bulk trades prevents free entry and thus inhibits the growth of the developing nations' dry bulk fleets, and also that the existence of FOC fleets provides unfair competition to emerging developing countries' dry bulk fleets.

During the 1970s, the developing countries' dry bulk fleets (including combined carriers) increased from 2.9 million dwt in 1970 to 20 million dwt by 1980—this represents an increase from 4.7 percent to 11.0 percent of the world fleet — this has been achieved without recourse to introducing widespread dry bulk cargo reservation. This significant increase in the drybulk fleets of developing nations was due to state-sponsored vessel acquisition programs in a very few countries, e.g., Brazil and India, and vigorous activity in the secondhand market, e.g., China PR. African countries had negligible bulk fleet acquisition during the 1970s. Those countries which did acquire fleets appear to have had little difficulty in obtaining cargo both in their domestic trades and in the cross trades.

The purpose of the 125-page survey "Governments and Dry Bulk Shipping" is to analyze the role of developing nations in the dry bulk trades and in dry bulk shipping.

The developing countries have varying degrees of influence and importance in the world dry bulk trades, and are generally exporters of industrial raw materials and importers of foodstuffs, and there is very little trade between developing countries. The survey analyzes in detail the volume and patterns of the dry bulk trades for the major and minor bulks utilizing 1978 base data which may be summarized as follows:

Participation of Developing Countries In Dry Bulk Trades 1978

Commodity	% World Exports	% World Imports
Iron Ore	52	7
Coal	1	14
Grain	8	35
Bauxite/Alumina	68	5
Phosphate Rock	67	23
Minor Bulks	16	27
% of World	27	20

Source: HPD Shipping Consultants

The survey forecasts the growth of dry bulk trades to 1985 and, taking into account

changing voyage patterns and vessel productivity, shipping demand expressed in ton-miles is expected to increase by 38 percent, but only a marginal increase is expected in developing countries shipping demand because the largest increases in seaborne trade are expected to occur in the coal trade and in particular the steam coal trade where the major exploited reserves are in developed nations and the largest consumers are also in the developed industrialized world.

The survey analyzes the effect on dry bulk shipping demand of developing countries implementing mandatory cargo sharing measures. The overall effect will be to decrease vessel productivity and thus increase dry bulk vessel demand. For example, if a goal of a 40 percent share is achieved by 1985 (which is unlikely) the net effect would be an additional developing country fleet requirement of 20-million dwt at an estimated cost of $5.5 billion (1980 prices).

The survey also considers and compares the economic criteria of shipowning between developed and developing nations, and also considers a number of alternative strategies to mandatory cargo-sharing in order to assist some developing countries to realize their justifiable shipping aspirations which would mean a gradual increase in developing countries' dry bulk shipping operations — as has happened during the 1970s. The developing countries have already made remarkable progress throughout the 1970s in developing dry bulk fleets — by and large this has been achieved without recourse to cargo-sharing schemes. Perhaps changing cost structures have been one of the most important influences in the flag restructuring of the world fleet which has taken place. More and more countries are negotiating the sale of their exports on a CIF basis (e.g., Brazil now sells 40 percent of iron ore exports to Japan on a CIF basis). Also the mere fact that UNCTAD is seriously discussing dry bulk sharing schemes has already had a significant effect on the attitude of shipowners and raw material consumers in the developed world and, even if UNCTAD proposals do not get any further, these owners and consumers are now acting in a more benevolent and sympathetic manner to the maritime aspirations of the developing nations.

No. 23 in a series, this survey "Governments and Dry Bulk Shipping" is available, post-free, from H.P. Drewry (Shipping Consultants) Ltd., 34 Brook Street, London W1Y 2LL, priced at £110 in the U.K., and US$265 overseas.

Martinez And Faass Join Waukesha Engine Division In International Sales Posts

Jose Luis Martinez — Werner Faass

Waukesha Engine Division, Dresser Industries, Inc., has announced the addition of **Jose Luis Martinez** and **Werner Faass** to their international marketing staff. Mr. **Martinez** has been named district sales manager in the firm's Mexico City office, and Mr. **Faass** is regional sales manager in the Caracas, Venezuela, office.

Mr. **Martinez** will be responsible for Waukesha marketing activities in Mexico and Central America. He is a graduate of the University of Mexico, receiving BSEE and BSME degrees in 1969. Prior to joining Waukesha he worked for Fairbanks Morse, the manufacturers of Volvo Penta Engines, as well as Rolls-Royce in Mexico.

Mr. **Faass** will be responsible for marketing activities in South America and the Caribbean. Prior to joining Waukesha he had eight years' experience with the Cummins Engine Company, and 10 years' experience at Robert Bosch in both sales and service in Europe and Latin America.

Waukesha Engine Division manufactures heavy-duty diesel and gas engines for the marine, petroleum, off-highway equipment, and power generation markets.

HUDSHIP Gets Another Big Contract From Gulf Fleet Marine

Pictured at contract signing are **Wendle Huddleston** (left), president of HUDSHIP, and **Richard Currence**, president of Gulf Fleet Marine Corporation.

Hudson Shipbuilders, Inc. (HUDSHIP) of Pascagoula, Miss., has announced that it has signed a multimillion-dollar, six-vessel contract with Gulf Fleet Marine Corporation of New Orleans. This new contract represents HUDSHIP's second major order it has received from Gulf Fleet Marine.

The six vessels consist of four 185-foot by 40-foot by 14-foot offshore supply vessels and two 112-foot by 26-foot by 10-foot offshore utility vessels. The 112-foot utility vessels are presently under construction at HUDSHIP's East Bank facility, and the 185-foot supply vessels will be constructed at HUDSHIP's new West Bank facility, also located in Pascagoula.

NEW LINK SPAN FOR PORT OF OSLO

As more Ro-Ro ships enter service, demands for berthing facilities are increasing. In the Port of Oslo, the considerable depth of water would require extensive and costly engineering works if permanent new piers were to be constructed.
The Port has therefore chosen to use a floating link span which can easily be moved from one location to another within the Port to cope with varying requirements due to changes in the traffic pattern.
The link span can serve two ships simultaneously. The shore ramp can also be moved to one end enabling the link span to be used as a bridge where there is a sloped quay. Furthermore, the pontoon can be used as a transfer barge in the Port area . . . and all this for a very modest investment.

P.S. Ask for our new leaflet showing alternative applications.

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MarAd Offers Canadian Transshipment Study

The Maritime Administration has released a study, "U.S. Exports & Imports Transshipped Via Canadian Ports," which presents the dollar value of estimated tonnage for United States trade transshipped through Canada during calendar year 1979.

It revealed that the value of exports in 1979 were 164 percent greater than 1976 totals and long tons exported increased by 51 percent. Dollar value imports for the same period increased 176 percent and long tons imported increased by 50 percent.

A similar report was prepared by MarAd in January 1978 covering exports for calendar year 1976.

The new study includes charts which show the tonnage and dollar value of cargoes imported and exported by area.

Limited copies are available from MarAd's Public Affairs Office, Room 3895, Commerce Building, 14th & E Streets, N.W., Washington, D.C. 20230.

New Brochure Describes Capitol Gears' Line Of Drive Transmissions

A new four-page brochure, No. 1-DD179, illustrates and describes the full family of direct drive transmissions available from Capitol Gears, Inc. All models discussed, including the new HY-400 and HP-500 offer forward, neutral, and reverse, and provide a direct transfer of engine power without reduction of speed. The combined capacity range is approximately 600 to 6,000 pounds-foot torque.

Marine applications include power takeoff, bow thruster, V-drive, and steerable propeller. Options listed are clutch variations, keyed or flanged shaft, and torque converter application. The brochure also provides a full list of compatible engines.

For further information and a free copy of the brochure,

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Jeffrey Dickerson Joins Delta Line As Director Of Systems Development

Jeffrey H. Dickerson has joined Delta Steamship Lines, Inc. as director-systems development. The announcement was made by **Robert E. Griffin,** senior vice president-finance and planning. Mr. **Dickerson** comes to Delta from Saunders Leasing, where he held the position of manager-systems and programming.

In making the announcement, Mr. **Griffin** stated that Mr. **Dickerson** would be responsible for budgeting, staffing, schedules, policies, and procedures for all new application development work in the management systems area.

Mid-Coast Marine To Build $1-Million Pusher Towboat For Mexican Owner

Mid-Coast Marine of Eastside, Ore., recently received a $1-million contract for construction of a 72-foot pusher type towboat for Rocafosforica Mexicana S.A. de C.V. The vessel will be delivered in September to the owner's operation in Baja California, Mexico.

Propulsion will be provided by two GM Detroit Diesel Allison 12V-149 engines, each rated 675 bhp at 1,800 rpm, driving twin ducted propeller systems engineered by Mid-Coast Marine. Full follow-up steering will be provided from three stations. Two 30-kw generators powered by Detroit Diesel 3-71 engines will be installed.

An unusual feature for the vessel is the elevated pilothouse that will put the operator's eye level 32 feet above the waterline. The towboat will be constructed to American Bureau of Shipping Rules for inland waterway vessels. This type vessel will become another stock product offered by Mid-Coast in its line of towboats.

Omnithruster Appoints Manotherm Representative For Benelux Countries

Charles M. Aker, vice president and general manager of Omnithruster Inc., has announced the signing of a representative's agreement with Manotherm B.V. to cover the Benelux countries, and act as service agents in many chief seaports of the world. An affiliated company of Wilton Fyenoord and of Rhine-Schelde-Verolme, Manotherm is based in Rotterdam, Netherlands.

Headed by **Jack Krijthe,** managing director, **Jack Van der Vlies,** head of sales department, **Bart Ohlsen,** head of service and repair, and **John Hoek,** technical assistant to sales department, Manotherm has been in business for more than 25 years working with shipyards, shipowners, naval architects, classification societies, and others. The firm offers special services to the marine industry: designing and assembling of systems for combustion controls, feedwater equipment, cooling water systems, lube oil systems, burners, repairs, commissioning, and after sales service. Facilities are 7,400 square meters, which include Manotherm Industrial B.V. at Vlaardingen.

Omnithruster Inc. manufactures a complete line of maneuvering and propulsion equipment using a unique application of hydrojet reaction force principles. Equipment is sized from 25 horsepower up to single-thrust modules of 1,000 hp and combined thrust capable of 6,000 hp. The firm also offers solid state motor controls and microprocessor logic equipment. Thruster systems are currently installed on vessels ranging from tugs, fishing boats, offshore supply and crewboats, to large ore carriers and tankers. Research and survey vessels as well as military ships are using sophisticated maneuvering and positioning systems employing the Omnithruster principle.

For further information,

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Inland Waterways Asks Title XI For 10 Barges —Cost $2.9 Million

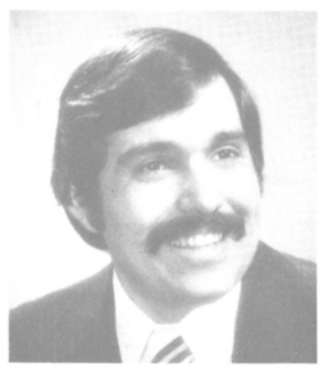
Inland Waterways, Inc., 10 South Brentwood Blvd., Clayton, Mo. 63105, has applied for Title XI financing to aid in construction of five covered hopper barges and refinancing of five others.

The barges will be used on the inland and intracoastal waterways of the United States Gulf Coast.

United States Steel Corporation, AmerBridge Division, Ambridge, Pa., built and delivered the first five barges in 1980. Dravo Corporation, Engineering Works Division, Neville Island, Pa., is building the remaining vessels, for delivery in September.

If approved, Title XI financing would cover $2,577,750 or 87½ percent of the estimated actual cost of $2,947,205.

Thomas Varani Joins Kramer Machinery As Account Manager



Thomas Varani

Kramer Machinery Inc., the Caterpillar dealer for northeastern Wisconsin and the Upper Peninsula of Michigan, has announced that **Thomas Varani** joined their organization as a marine and material handling engine account manager and sales engineer. Mr. **Varani,** who has an experienced background in engines, will cover all of northeastern Wisconsin and the Upper Peninsula.

Ocean Barge Applies For Title XI For Cargo Barge Costing $18.3 Million

Ocean Barge Corp., No. 12 Canal Street, New Orleans, La., 70130, has applied for a Title XI guarantee to aid in financing the construction of a 33,000-deadweight-ton ocean dry-bulk cargo barge.

Bay Shipbuilding Corp., Sturgeon Bay, Wis., is the proposed builder.

The vessel, scheduled to be delivered in November, will operate in both the domestic and international commerce of the United States.

If approved, the Title XI guarantee would cover $16,082,000 or about 87½ percent of the estimated actual cost of $18,380,000.

William Heffernan Named Senior Vice President At U.S. Navigation

Donald F. Wierda, president, and the board of directors of United States Navigation, have announced the election of **William V. Heffernan** to the position of senior vice president. In this new capacity he is responsible for corporate planning and development, inland and port offices, administration, and certain subagency relationships.

Mr. **Heffernan** joined U.S. Navigation in April 1980 after having served in various executive positions within the steamship industry.

Dallas-Based Company To Open Coal-Exporting Facility At Port Of Albany

The export of coal from the United States, hampered today by limited port facilities, will get a boost from a significant new facility slated for the Port of Albany, N.Y. New Amsterdam Coal, Inc. of Dallas has announced plans to open the new facility in Albany by the fall of 1981. With an immediate capacity to handle two million tons of coal per year, the facility's ultimate capacity will range from four to six million tons per year. Based on 1980 coal exports, the new facility's ultimate capacity represents a 10-percent increase in the coal export capabilities of the U.S.

According to **R. Vincent Lynch,** chairman of New Amsterdam Coal, the new facility will have a number of vital advantages. "First, this facility will be open and operating long before the final plans are even completed for a number of other new facilities that have been recently announced," he said.

"There will be no demurrage, no waiting, for ships to load. This is a critical problem today, when ships have to wait an average of 60 to 70 days at Hampton Roads to load Appalachian coal. Recently there have been as many as 150 colliers waiting to load off the East Coast. Foreign buyers are incurring demurrage costs as high as $15,000 per day in these circumstances. The Port of Albany poses no such problem, and instead offers immediate access," Mr. **Lynch** added.

"Moreover, our facilities will be able to load at the rate of 1,000 tons per hour, accommodate ships up to 30,000 dwt, and ultimately store 500,000 tons of coal. The port is ideally located on the Hudson River, and has a channel depth of 32 feet," Mr. **Lynch** said. He pointed out that the Port of Albany has excellent rail linkage on Conrail, and additional linkage can be provided as required to meet demand.

"We anticipate moving coal to Albany by rail primarily from West Virginia and western Pennsylvania," Mr. **Lynch** said, "because of the excellent rail connections and the quick access to the port by ship." New Amsterdam Coal, Inc. is a privately held company, formed by R.V. Lynch & Company, a firm engaged in oil and gas exploration and production, and pipelining.

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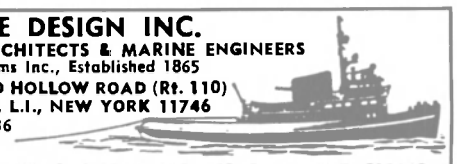

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Norfolk Naval Shipyard NCAA Presents Productivity Award

A method of reclaiming more than 3½ million gallons of waste fuel and oil from ships being overhauled at the Norfolk Naval Shipyard has brought **Matthew H. Monette** of Portsmouth, Va., the shipyard's Naval Civilian Administrators Association Productivity Award for the last quarter of 1980. More than a million dollars, by the most conservative estimate, has been saved for the shipyard since the Shop 72 foreman helped devise the new system in 1979. That estimate uses 36 cents as the price for reclaimed fuel, as compared with the current outside purchase price of about $1.34.

The process uses yard barges and oil separators within the shipyard to reclaim the waste oil and fuel. About half of the fuel

NCAA Norfolk Naval Shipyard Chapter president **V. Wayne Davis** (left) presents a special productivity plaque to **Matthew H. Monette**, the fifth person in the Norfolk Naval Shipyard to be cited by the Naval Civilian Administrators Association Chapter for significant individual contributions to productivity.

has been used to operate barges and various equipment, or burned in shipyard power plants that provide steam heat, power, or electricity. The rest has been sent to the Craney Island Fuel Depot for processing and use by the Navy.

A special jacket, an engraved mug, and a large certificate were presented to Mr. **Monette** at a staff conference. He also gained custody for three months of a special rotating plaque (photo) that goes temporarily to each new award winner.

Mr. **Monette**, a former Navy boilertender who has been in the yard for 15 years, is the yard's only engine and pump operator foreman. His work involves the operations of sludge barges and associated equipment, and the decontamination and cleaning of tanks aboard ships being overhauled at the yard.

Industrial Marine Achieved Rapid Turnaround Time In Repairing Drilling Rig

Downtime was cut by half when dockside repairs on the jackup drilling rig Salenergy V (shown above) were completed by Industrial Marine Services in Cameron, La. The interval between the rig's arrival at Industrial Marine and the day the work was completed on schedule was approximately half the repair time that would have been required if the rig had been repaired in the Gulf. The rig will begin initial drilling operations for ARCO off Morgan City, La., in the Gulf of Mexico.

The Salenergy V, which drew 20-22 feet

when docked at Cameron, was worked on 24 hours a day by 40-man shifts. This intensive work force and the extensive dockside facilities of Industrial ensured the rapid turnaround time.

Industrial Marine Services is located within the complex of Cameron Offshore Services, which is a one-of-a-kind facility, similar only to a smaller operation in Aberdeen, Scotland. It takes the "general store" approach to serving the oil industry, and includes more than 80 acres on a deepwater channel one mile from the open Gulf.

Cameron Offshore supplies marine base packages that serve as support bases for several oil companies. Services include: office space; fuel and water; the largest pipe storage and handling facility in the Central Gulf area, with terminals in Westlake and Sulphur, La.; and a barite mill and loading facility. Industrial Marine is a maintenance operation that performs welding, sandblasting, offshore platform hookups, platform rig moves, and general repairs.

Second Latex Carrier For Firestone Christened At Koyo Dock Yards

The second specially designed rubber transport ship, destined for Firestone's trans-Atlantic service, was christened recently at Koyo Dock Yards in Japan. After several months of outfitting and shakedown, the new Harbel Tapper will join her sister ship, Harbel Cutlass, this summer in transporting natural rubber and latex from Firestone plantations in Liberia to the United States. The ships are chartered to a subsidiary of The Firestone Tire & Rubber Company, Akron, Ohio.

The new ship is 461 feet long, 72 feet wide, has three cargo holds, one 'tweendeck and can carry 72 standard containers on deck. She is equipped with 14 tanks with an approximate capacity of 4,000 tons of liquid latex. She is also equipped with pumping capability on all tanks for efficient unloading.

The ship will make regular runs between the United States and Liberia, which will further expedite shipments and service to Firestone's latex customers. Normal ports of call in the United States will be at Fall River, Mass., Baltimore, and Savannah, where Firestone has latex terminal facilities.

New Ship/Shore Power Connectors From Joy— Literature Available

Connecting and disconnecting docked ships to shore-generated power is now faster, safer, and easier thanks to rugged new ship/shore connectors recently introduced by Joy Manufacturing Company, LaGrange, N.C. The Joy ship/shore three-phase connector offers several important features. It can handle currents up to 500 amperes per phase, continuous, and has a rating of 450 volts. An optional built-in power shut-off switch can withstand even the most harsh operating conditions, including rain, salt spray, humidity, and sunlight. It meets MIL-C-24368 in both the properly mated and unmated conditions.

Joy ship/shore receptacles were designed to prevent contact misalignment and use a strain relief with an interlocking safety switch. The receptacle withstands shock (Type A, Grade A, Class 1 of Mil-S-901C) and vibration (Type 1 of Mil-Std-167), and features a reinforced ribbed housing for added strength.

For more information and free literature,

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AUM Appointed Exclusive Worldwide Marketer Of NRG Lube Treatments

American United Marine Corporation (AUM) of Saugus (Boston), Mass., has been appointed the exclusive worldwide maritime industry sales agent for marketing NRG™ lubrication treatments for engines and gears. The announcement was made recently by **Robert J. Robideau,** president of Ariel International Corporation of Houston, the manufacturers of the extensive line of chemically complex lubricating systems.

Based on solid, submicron fluorocarbon components, the NRG products are not mere engine "additives" that must be used frequently or continuously. Instead, they are designed to coat moving metal parts with a dry, anti-friction film layer that will endure for long periods of use. In some cases one treatment may last for the life of the engine, although in cases of heavy use or extensive wear "booster" treatments may be required at intervals of months or years.

For further information and free literature on the NRG products,

Write 62 on Reader Service Card

New Bulletin Describes Warren Pump Division's Full Line Of Products

A new 16-page bulletin describing Warren Pumps Division's wide line of centrifugal, rotary, and reciprocating pumps for marine and industrial applications is available. The new catalog contains information on the company history, engineering and testing, as well as field service and distributors. Also included is a complete table listing every marine pump application and matching each one with the series of Warren pumps ideal for each application. Detailed specs and photographs provide complete and separate data on each series of pumps available from Warren. Warren Pumps is a division of Houdaille Industries, Inc., Warren, Mass.

For a free copy of the bulletin,

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"Capability Report" On Container Crane Systems Available From Paceco

A new brochure/folder called a Capability Report has just been released by Paceco, Inc. It tells the story of why Paceco Portainer® crane systems are the choice for development of productive and cost-effective container-handling facilities. Photo's, drawings, and text describe the Paceco line. A pocket in the folder holds product information sheets with current information on Portainer cranes, a list of world-wide licensees and a detailed mechanical drawing of the standard Paceco Portainer Crane.

Paceco designed and built the first shore-based container crane in 1959. Since then the company has earned the reputation as a leader in design and manufacture of container-handling equipment. The brochure states that Paceco has sold more container cranes than any other company in the world.

For a free copy of the new brochure/folder,

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Conrad Industries Names McAdams And Bailey To New Management Posts

Conrad Industries president **Parker Conrad** has announced the promotion of **Michael J. McAdams** to general manager, and the appointment of **Herman J. Bailey** to new construction superintendent, Building Two.

Mr. **McAdams,** who moves from construction superintendent to general manager, joined the marine construction industry as a helper in 1966 and progressed rapidly through many marine construction trade areas. He brings to the general manager's post extensive experience in both production and management.

Mr. **Bailey's** area responsibility in the company now includes purchasing, coordinating customer projects, employee supervision, barge designing, engineering, lofting, material, and coordinating specifications required by the United States Coast Guard and the American Bureau of Shipping for certain projects. He started as a helper and progressed to shop superintendent during nine years at Scully Brothers Boat Company.

In addition to deck barges, Conrad Industries, Inc., Morgan City, La., specializes in fuel, spud, and self-propelled barges. The company prefabricates modular sections utilizing semiautomatic arc welding techniques that cut production time.

New Brochure On Watch Receivers Available From Electro-Nav

Electro-Nav, Inc. is offering a new brochure detailing its complete line of IMCO-mandated watch receivers, including the EN2182R that is approved by the U.S. Federal Communications Commission, British Home Office, and Liberian Bureau of Maritime Affairs for vessels flying their flags, and the EN2182GR designed to meet the requirements of most European maritime regulating authorities. The new EN-2182TR watch transceiver and auxiliary watch receiver equipment are also discussed in this brochure.

For a free copy of the brochure,

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Galatas And Graham Get Promotions At Southern Shipbuilding Corporation

Wilfred J. Galatas

Ernest M. Graham

Wilfred J. Galatas has been appointed vice president and assistant plant superintendent, and **Ernest M. Graham** has been named assistant to the president at Southern Shipbuilding Corporation, Slidell, La.

Mr. **Galatas** has been with SSC since 1972, serving in sales and as repair superintendent. Prior to joining Southern Ship he was chief surveyor in charge of Breit Marine Surveying Company, and has a total of 23 years' experience in the marine field.

Mr. **Graham** has been with SSC since 1978, serving as assistant chief engineer. He is a 1974 graduate of Mississippi State University with a degree in naval architecture and marine engineering.

Amoco Foundation Contributes To Maine Maritime Academy

Maine Maritime Academy announced that Amoco Foundation, Inc. of Chicago has contributed $4,000 in support of the ongoing activities at the Academy, as part of its annual giving program. **Donald G. Schroeter**, executive director of the Amoco Foundation, approved the contribution on the recommendation of **Harry Rinkema**, vice president, marine transportation, Amoco International Oil Company, Chicago.

In recent ceremonies at Maine Maritime Academy's Center for Advanced Maritime Studies, **George M. Kellner** (shown above, left), supervisor, marine operations, Amoco Shipping Company, New York, made the presentation of the $4,000 check on behalf of the Amoco Foundation to Rear Adm. **Edward A. Rodgers**, superintendent of the Academy. Admiral **Rodgers**, in acknowledging the contribution, said: "We deeply appreciate this much-needed support for the Academy programs, and look forward to being of service to the Amoco marine organization in the field of advanced maritime training."

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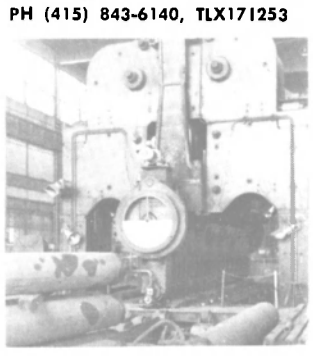

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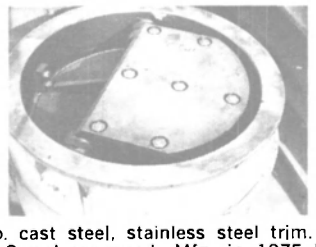

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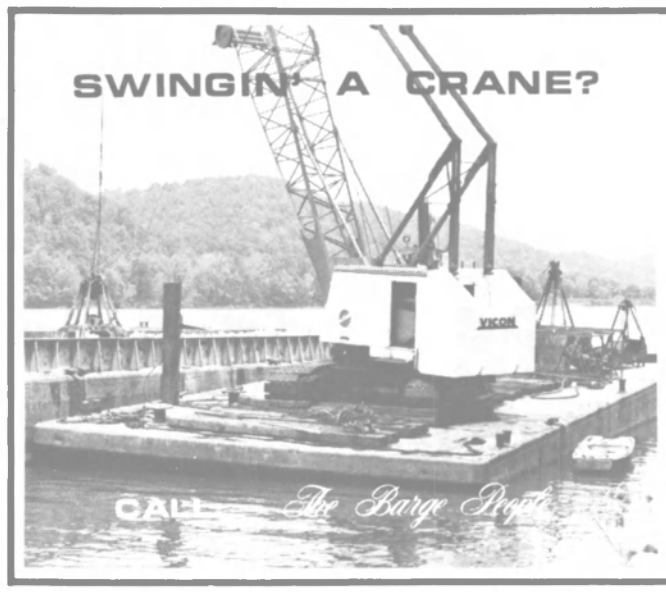

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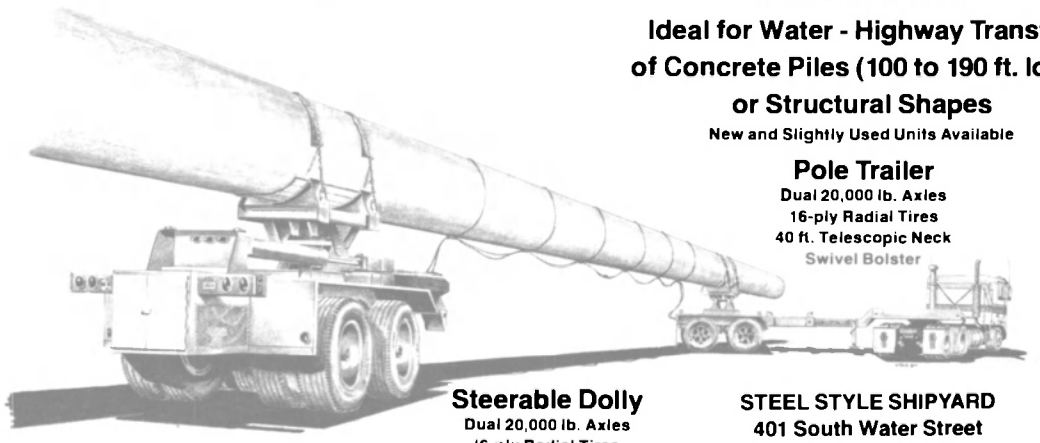

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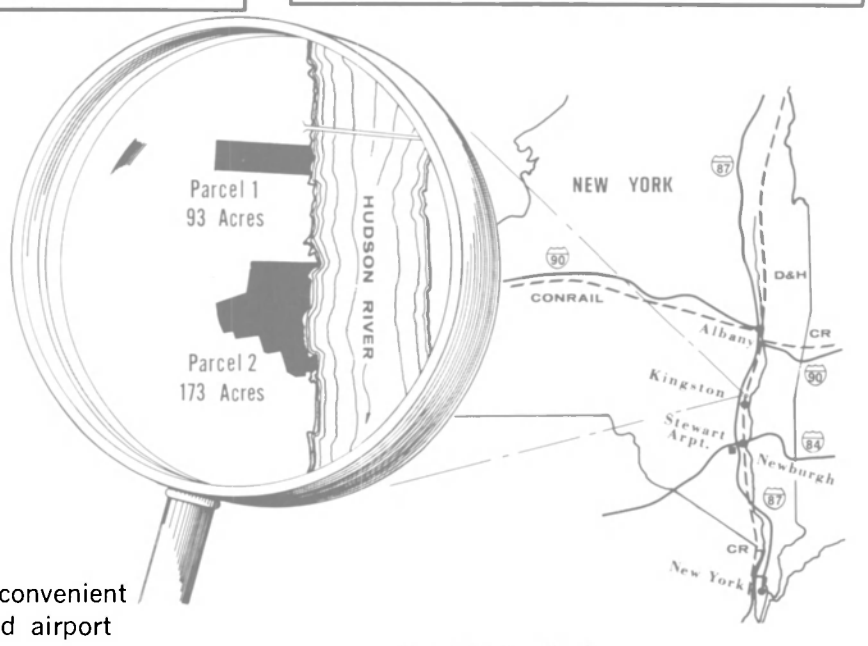

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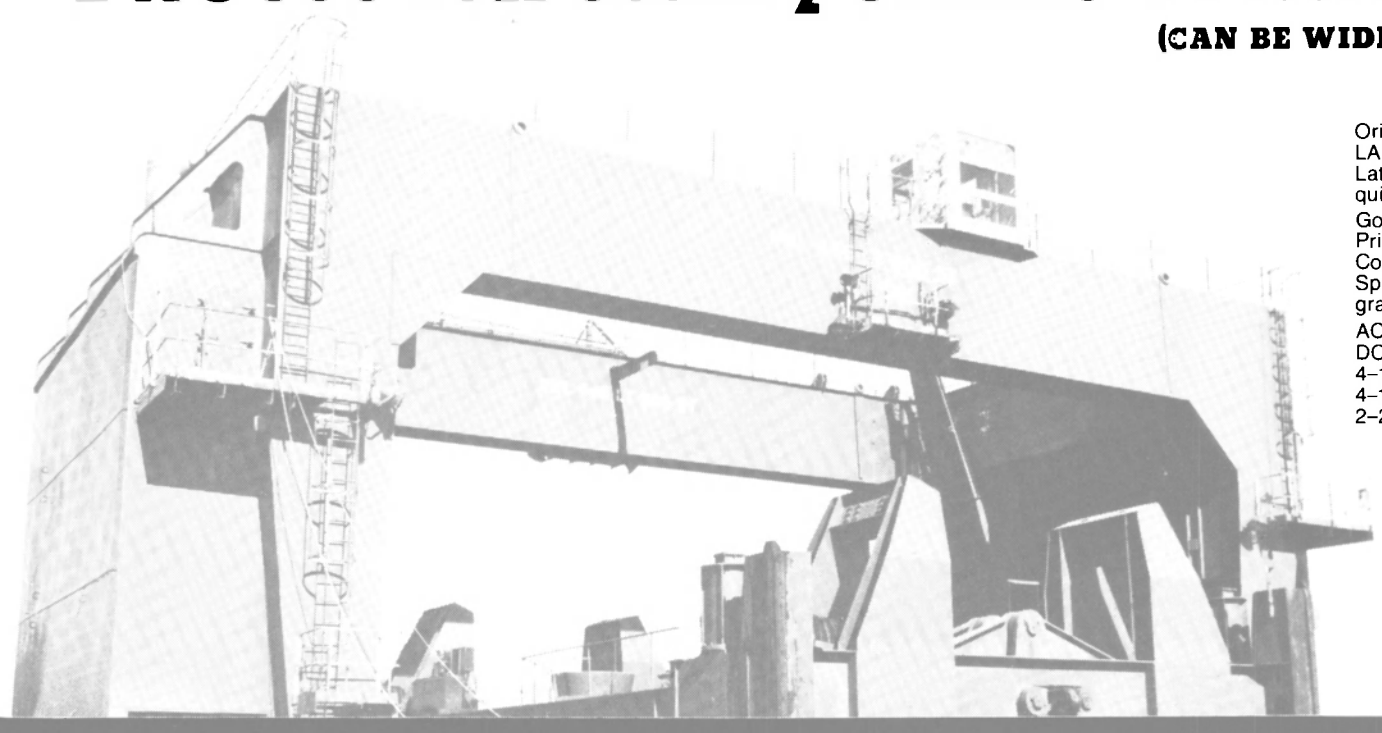

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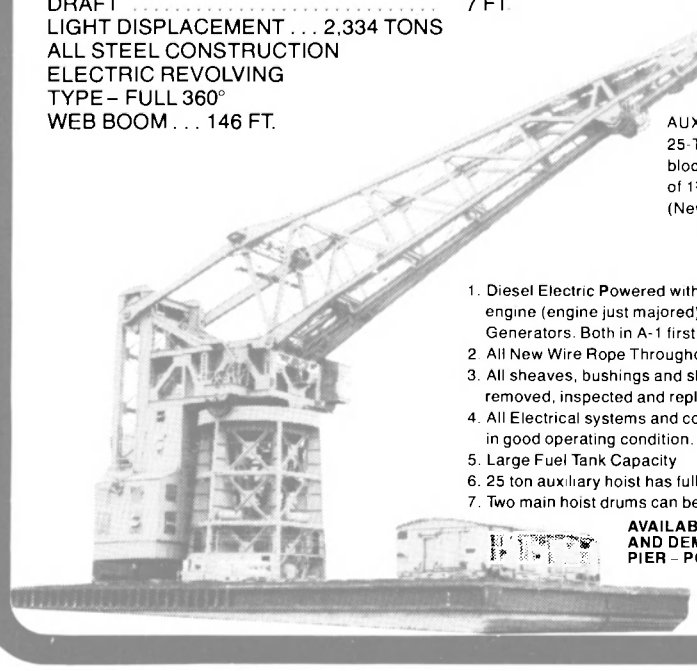

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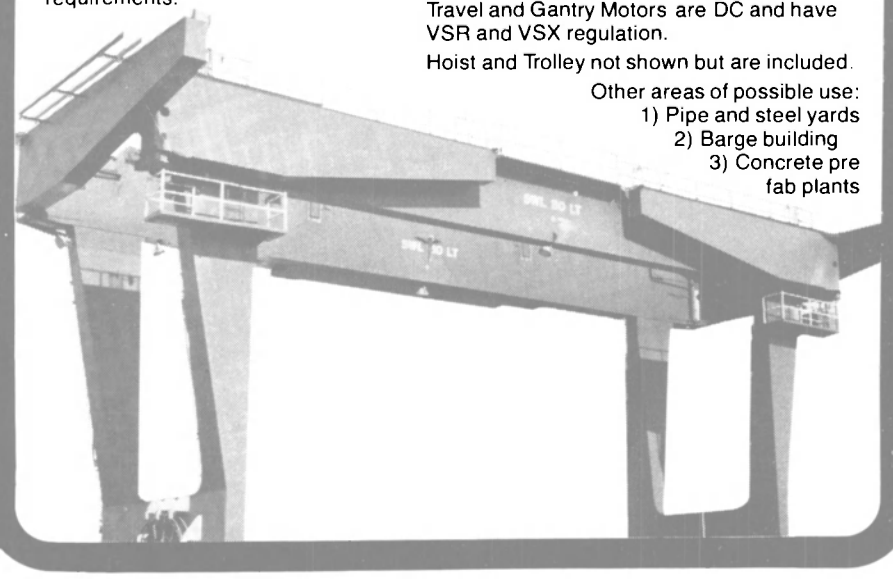

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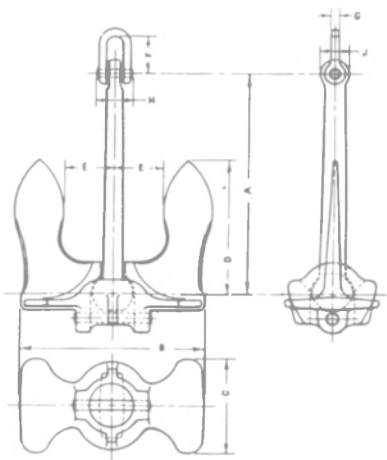

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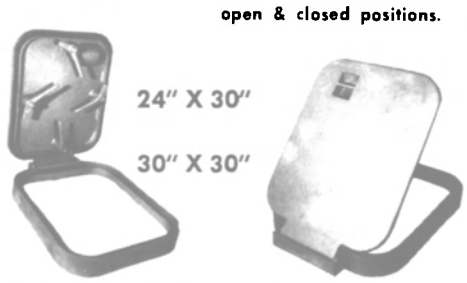
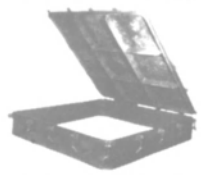


24" X 30"

30" X 30"

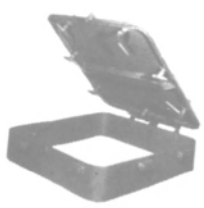
4 Dogs on underside—topside flush, with T-Key openers.

60" X 42" X 12"
10-DOG



72" X 72" X 12"
16-DOG

36" X 26" 7-DOG TANKER EXPANSION TRUNK



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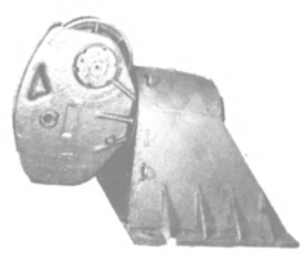

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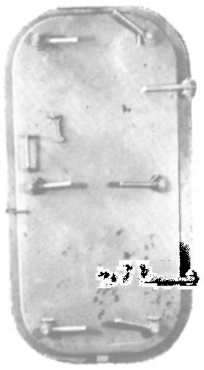

Steel Dogs

6-Dog right and left hand hinged doors with frames. Constructed of 1/4" steel plate and meet Coast Guard regulations for above deck as well as below deck use. All dogs are bronze bushed. Also available with 8" bronze portlights.

SIZE

26"x48" 26"x66"
26"x60" 30"x60"

EACH DOOR

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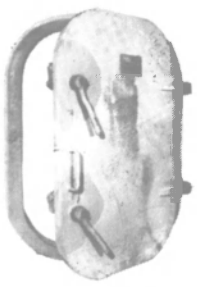
NEW SMALL STEEL WATERTIGHT DOORS



24" X 36"

2-DOGS

5 Right Hand
2 Left Hand

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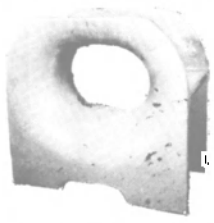
NEW 7" RADIUS PANAMA CHOCKS

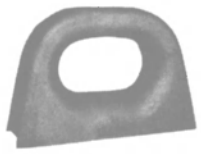


(MEET PANAMA REGULATIONS)

14" X 10" CLEAR OPENING

With extended legs for welding to deck. 14" Wide on base — length 28" — height 27¼". IMMEDIATE DELIVERY FROM STOCK.

NEW UNUSED 12"X6½" PANAMA CHOCKS FOR SMALL VESSELS



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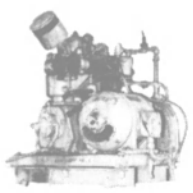

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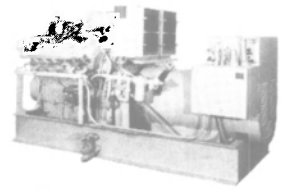
INQUIRE FOR PRINT AND ADDITIONAL INFORMATION

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
Marine Warehouse (301) 752-1077
TWX: 710-234-1637

250KW GM 12-V-71 DIESEL GENERATOR SETS AIR START



440/3/60/1800 — with free-standing switchgear. Generators manufactured by Electric Machinery Co. — E.M. Bemac — brushless — synchronized — keel cooled.

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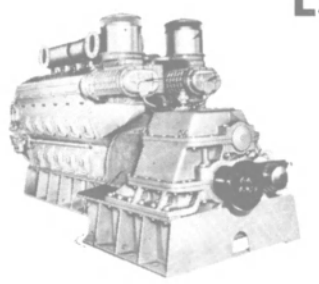
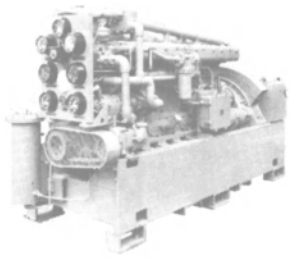
LST MACHINERY



PORT & STARBOARD GM 12-567A 900 HP DIESEL ENGINES

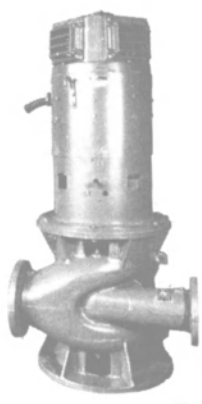
with Falk reverse & reduction gears

ENGINE: GM 12-567A — 8½X10 — V-type — 2-cycle — 747 RPM—electric starting—serial Nos. 1041 & 1060. GEAR: Falk AirFlex — reverse & reduction — 2.48:1 forward — 2.52:1 reverse.



100KW GBD-8 DIESEL GENS.

120/240 VDC—417 amps—stab shunt—1200 RPM—Delco generator—Self-excited. ENGINE: Superior GBD-8—8-cyl —5½X7—150 HP—30 volt electric starting. Reconditioned to ABS. Dry wt. 10,000 lbs—DAL 124"—65 11/16" high —42" wide. Hgt necessary to pull piston 68". Fuel consumption 0.620 lbs/hr.

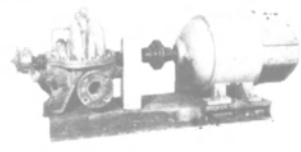


GARDNER-DENVER BALLAST PUMP

Bronze — 1500 GPM — 56' head or 25 bs — 8" suction — 6" discharge. MOTOR: Century 30 HP 230 VDC 110 amps 1750 RPM. 40°T rise — stab. shunt — ballbearing — dripproof. Controls available.

TAILSHAFTS

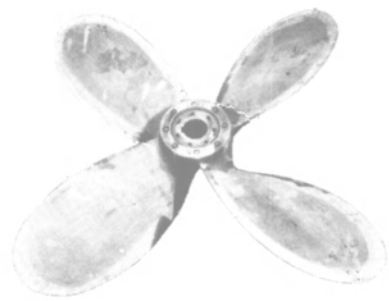
Diameter: 6 1/8" Length: 21' 2 5/8"



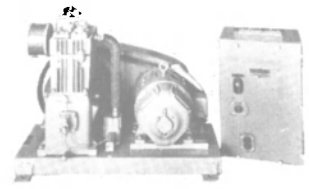
GOULD FIRE & BILGE PUMP

250 GPM & 100 lbs—4" suction—3" discharge—2200 RPM—bronze—manufactured by Gould. Direct connected to 30 HP 230 volt DC Louis-Allis motor.

4-BLADE PROPELLERS BRONZE — PORT & STARBOARD



7' Diameter—pitch constant 4.699. Bore tapers from 6 1/8" to 4 53/64". 14½" Taper equal to 1"/foot on diameter. U.S. Navy reconditioned. Average weight 1760 lbs.



CLUTCH TIRE AIR COMPRESSOR

Model 320—4 X 2½ X 3"—10/15 CFM—100/150 PSI—700 RPM. MOTOR: 3 HP—230 volts DC—1750 RPM.

COMBINATION LUBE OIL & SALT WATER COOLING PUMPS

Model 3630—mfg by Goulds—1150 RPM. Rotary lube oil pump one end (35 GPM @ 15 PSI—1½"X1½")—salt water circulating pump other end (35 GPM @ 15 PSI—2" X 1½") G.E. Motor model 5B254A1988—type B —Frame 254—3 HP—230 VDC—11.9 amps—1150 RPM compound—Cont. 40°C temp rise. Ball bearing.

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313 E. Baltimore St. 752-1077 Baltimore, Md. 21202
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BUYERS DIRECTORY

AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION
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Goff Corporation, One Pleasent Grove Rd., Seminole, OK 74868

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Combustion Engineering, Inc., Windsor, Connecticut 06095
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Capt. Astad Company, Inc., P.O. Box 53434, New Orleans, La. 70153
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Hughes Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
Mowbray's Tug and Barge Sales Corp., 21 West St., N.Y., N.Y. 10006

BUNKERING SERVICE
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Gulf Oil Trading Co., 1290 Ave. of the Americas, N.Y., N.Y. 10019

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Henschel Corporation, 14 Cedar St., Amesbury, Mass. 01913
Megasystems, Inc., 5909 West 130th Street, Cleveland, OH 44130
Pan American Systems Corporation, P.O. Drawer 400, Belle Chasse, LA 70037
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.
Transamerica Delaval, Inc., Gems Sensors Division, Cowles Road, Plainville, CT 06062

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Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501

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Navire Cargo Gear (SEA) Pte. Ltd., 9th Floor Orchard Towers, Orchard Road, Singapore 0923

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Teledyne Metal Finishers, 1725 East 27th Street, Cleveland, OH 44114
Teledyne Metal Finishers, 3125 Brinkerhoff Road, Kansas City, KS 66115
Twin Disc, Incorporated, Racine, Wis. 53403

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Federal Pacific Electric Company, P.O. Box 1800, Somerville, NJ 08876
Marine Safe Electronics of Canada Ltd., 101 Jardin Dr., Suite 24, Concord, Ontario, Canada L4K 1B6
Oceanic Electrical Mfg. Co., Inc., 159 Perry Street, N.Y. 10014
Port Electric Supply, 157 Perry Street, N.Y., N.Y. 10014
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, Ore. 97201

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Argo Marine, Div. of Argo Intl., 140 Franklin St., New York, N.Y. 10013
Comet Marine Supply Corp., 157 Perry St., New York, N.Y. 10014
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Consafe Inc., P.O. Box 40339, Houston, TX 77040
Kearfott Marine Products, 550 South Fulton Ave., Mount Vernon, N.Y. 10550
J. H. Menge & Company, Inc., P. O. Box 23602, New Orleans, La.
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Rockwell International, Power Tool Division, 400 N. Lexington Ave., Pittsburgh, PA 15208
Schnitzer-Levin Marine Co., 445 Littlefield Ave., So. San Francisco, CA 94080
Schwepper Beschlag GmbH, Postfach 101110, 5620 Velbert 1, West Germany
Sudoimport, 5 Kalyaevskaya, Moscow K-6, USSR
Unitor Ships Service A/S, Mastemyr, 1410 Kolbotn, Norway
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wisc. 53186
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Riley-Beaird, Inc., P.O. Box 1115, Shreveport, La. 71130

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Millard Controlled Metals, 5 Louise Drive, Ivyland, PA 18974

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Hartzell Propeller Fan Company, 901 S. Downing Street, Piqua, OH 45356
Joy Manufacturing Co., 338 So. Broadway, New Philadelphia, Ohio 44663
Zidell Explorations, 3121 S.W. Moody St., Portland, Ore. 97201

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Greyhound Leasing & Financial Co., Greyhound Tower, Phoenix, AZ 85077
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Sub Enterprises, Inc., P.O. Box 16531, Irvine, CA 92713

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Hydranautics, 6338 Lindmar Drive, Goleta, CA 93017
Voss, Inc., Building J, 7029 Huntley Road, Columbus, Ohio 43229

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Comar Corporation, P.O. Box 460, Worcester, MA 01613
Foster Wheeler Boiler Corp., 110 So. Orange Ave., Livingston, N.J. 07039
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Bailey Carpenter & Insulation Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231

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Adams & Porter, 1 World Trade Center, Suite 8433, New York, N.Y. 10048
Alexander & Alexander, Inc., 1185 Ave. of the Americas, New York, N.Y. 10036
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Midland Insurance Co., 160 Water St., New York, N.Y. 10038
Whitehall Brokerage, Inc., 685 3rd Ave., New York, NY 10017

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Walz & Krenzer, Inc., 400 Trabold Road, Rochester, NY 14624

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Oceanic Electrical Mfg. Co., 157 Perry Street, New York, N.Y. 10014
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Perko Inc., P.O. Box 6400D, Miami, Florida 33164
Phoenix Products Company, 4785 North 27th Street, Milwaukee, WI 53209
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Schnitzer-Levin Marine Co., 445 Littlefield Ave., So. San Francisco, CA 94080

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Jacksonville, Florida 32211
Del Breit Inc., 326 Picayune Place (Suite 201), New Orleans, LA 70130
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CADCOM, 107 Ridgely Ave., Annapolis, MD 21401
Childs Engineering Corp., Box 333, Medfield, Mass. 02052
John P. Colletti & Associates, P.O. Box 13378, Pittsburgh, PA 15243
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James S. Krogen & Co., Inc., 3333 Rice St., Miami, Fla. 33133
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Lucander Designs, P.O. Box 711, San Perlita, TX 78590
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Maritime Service Company, 1357 Rosecrans St., Suite B, San Diego, CA 92106
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Oromar International Enterprises, Inc., P.O. Box 13069, Port Everglades, FL 33316
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Pacific Industries Inc., 1440 Canal Street, Suite 1915, New Orleans, LA 70112
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Schmahl and Schmahl, Inc., 1209 S.E. Third Ave., Fort Lauderdale, Florida 33316
Seacor Systems Engineering Associates, Corp., P.O. Box 2030, 19 Cherry Hill Industrial Park, Perina Blvd., Cherry Hill, NJ 08003
Seaworthy Engine Systems, 36 Main Street, Essex, CT 06426
George G. Sharp, Inc., 100 Church St., New York, N.Y. 10007
T. W. Spaetgens, 156 West 8th Ave., Vancouver, Canada V5Y 1N2
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XPLO Corporation, 229 Fifth Street, Gretna, LA 70053

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Apelco Marine Electronics, Division of Raytheon, 676 Island Pond Rd., Manchester, NH 03103
Communication Associates, Inc., 200 McKay Road, Huntington Station, N.Y. 11746
Comsat General Corp., 950 L'Enfant Plaza, S.W., Washington, D.C. 20024
Dantronics Company, P.O. Box 204, Bocca Raton, FL 33432
Debeg Marine, Inc., 10 Manor Parkway, Salem, NH 03079
Electro-Nav Inc., 840 Bond Street, Elizabeth, NJ 07201
EPSCO, Inc., 411 Providence Highway, Westwood, Mass. 02090
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
Griffith Marine Navigation, Inc., 134 North Avenue, New Rochelle, NY 10801
Harris Communications, RF Communications Division, 1680 University Avenue, Rochester, NY 14610
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Hose McCann Telephone Company, Inc., 9 Smith Street, Englewood, NJ 07631
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ITT Mackay Marine, 2912 Wake Forest Road, Raleigh, N.C. 27611
Intermarine Electronics, Inc., Flowerfield Bldg. #7, St. James, N.Y. 11780
Iotron Corp., 5 Alfred Circle, Bedford, MA 01730
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Maritel, Inc., 139 Old Solomon's Island Road, Annapolis, MD 21401
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Navidyne Corp., 11824 Fishing Point Drive, Newport News, VA 23606
Navigation Communications Systems, Inc., 20100 Plummer Street, Chatsworth, CA 91311
North American Philips Communication Corp., 91 Mckee Road, Mahwah, N.J. 07430
RCA Service Co., Building 204-2, Camden, N.J. 08101
Radar Devices, Inc., 2955 Merced Street, San Leandro, CA 94577

Raytheon Marine Co., 676 Island Pond Road, Manchester, N.H. 03103
Raytheon Ocean Systems Company, Westminster Park, Risho Avenue, East Providence, RI 02914
Raytheon Service Co., 103 Roesler Rd., Glen Burnie, MD 21061
Simrad Inc., 1 Labriola Court, Armonk, N.Y. 10504
Southern Marine Research, Inc., 1401 N.W. 89th Court, Miami, FL 33172
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.
Texas Instruments Inc., P.O. Box 226080, M/S 3107, Dallas, TX 75265
Tracor, Inc., Industrial Products Div., 6500 Tracor Lane, Austin, Texas 78721

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Ferrous Corporation, P.O. Box 1764, Bellevue, WA 98009
Gulf Oil Company—U.S. (Domestic Oils), 909 Fannin Street, Houston, TX 77001
Gulf Oil Trading Co., 1290 Ave. of Americas, New York, N.Y. 10019
Houston Marine Services, Inc., 505 Atrium One, 11811 I-10 East, Houston, TX 77029
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
Mobil Oil Corporation, 150 East 42nd St., New York, N.Y. 10017
Texaco, Inc. (International Marine), 135 East 42nd St., N.Y., N.Y. 10017

OIL/WATER SEPARATORS
Alfa-Laval, Inc., 2115 Linwood Avenue, Ft. Lee, NJ 07024
Butterworth Systems Inc., 224 Park Ave., Florham Park, N.J. 07932
Sigma Treatment Systems, 2 Davis Ave., Frazer, PA 19355

PAINTS—COATINGS—CORROSION CONTROL
American Abrasive Metals, 460 Coit Street, Irvington, NJ 07111
Belzona Molecular Metalife Inc., 224 7th Street, Garden City, NY 11530
"CONSOL" manufactured by Hanline Bros., Inc., 1400 Warner St., Baltimore, MD 21230
Devoe Marine Coatings Co., P.O. Box 7600 Louisville, KY 40207
Eureka Chemical Company, 234 Lawrence Ave., So. San Francisco, CA 94080
International Paint Co., 17 Battery Place North, Suite 1150, New York, N.Y. 10004
Jotun-Baltimore Copper Paint Co., 501 Key Highway, Baltimore, MD 21230
Mobil Chemical Co., Maintenance & Marine Coatings Dept., P.O. Box 250, Edison, N.J. 08817
Palmer Products Inc., P.O. Box 8, Worcester, PA 19490
Woolsey Marine Industries, Inc., 1250 Broadway, New York, NY 10001

PETROLEUM SUPPLIES
Houston Marine Services, Inc., 505 Atrium One, 11811 I-10 East, Houston, TX 77029
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002

PIPE—HOSE—Cargo Transfer, Clamps, Couplings
Camlock Flange Sales Corp., 449 Sheridan Blvd., Inwood, L.I., N.Y. 11696
CUNICO Corp., Cooney Pipe & Copper Works Div., 214 N. Hawaiian Ave., Wilmington, CA 90748
Hydro-Craft, Inc., 4223 Edgeland, Royal Oak, Mich. 48073
Kubota Ltd., 2-47, Shikit Suhigashi 1-Chome, Naniwa-Ku, Osaka 556-91, Japan
Penco Division/Hudson Engineering Co., 1114 Clinton St., Hoboken, N.J. 07030
Tioga Pipe & Supply Company, 2450 Wheatsheaf Lane, Philadelphia, PA 19137

PLASTICS—Marine Applications
Hubeva Marine Plastics, Inc., 390 Hamilton Ave., Bklyn, N.Y. 11231

PROPULSION EQUIPMENT—Bowthrusters, Diesel Engines, Gears, Propellers, Shafts, Turbines
Alco Power Inc., 100 Orchard St., Auburn, N.Y. 13021
Alsthom-Atlantique, 2 quai de Seine, 93203 Saint-Denis, France
Armco Steel/Advanced Materials Div., 703 Curtis St., Middletown, OH 45043
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, La. 70150
Bird Johnson Company, 110 Norfolk St., Walpole, Mass. 02081
Burmeister & Wain Alpha Diesel AS, DK-1400 Copenhagen K, Denmark
Burmeister & Wain Diesel, Inc., 50 Broadway, New York, NY 10004
Caterpillar Tractor Company, Engine Division, Peoria, IL 61629
Colt Industries' Fairbanks Morse Engine Division, Beloit, Wisc. 53511
Combustion Engineering, Inc., Windsor, Connecticut 06095
Electro-Motive Division, General Motors Corp., LaGrange, Ill. 60525
Elliott Company, (Div. of Carrier Corp.), Jeanette, PA 15644
General Electric Co., Diesel Power Products, 2901 E. Lake Rd., Erie, PA 16531
Kawasaki Heavy Industries, Ltd., 2-4-1 Hamamtsu-cho, Minato-ku, Tokyo, Japan
MTU of North America, Inc., 10450 Corporate Drive, Sugar Land, TX 77478
Maritime Industries, Ltd., 6307 Laurel St., Burnaby, B.C. Canada V5B 3B3
Michigan Wheel, 1501 Buchanan Ave., S.W., Grand Rapids, MI 49507
Omnithruster Inc., 15418 Cornet Ave., Santa Fe Springs, CA 90670
Oosterhuis Industries, Inc. (Marine Engineering, Inc.), P.O. Box 30587, New Orleans, LA 70190
Port Electric Turbine Div., 155-157 Perry St., New York, N.Y. 10014
Propulsion Systems Inc., 21213 76th Ave., So., Kent, WA 98031
Schottel of America, Inc., 8375 N.W. 56 Street, Miami, Fla. 33166
Skinner Engine Company, P.O. Box 1149, Erie, PA 16512
Steamco Corporation, 364 Stowe Avenue, Orange Park, FL 32073
Tacoma Boat Co./Escher Wyss, 1840 Marine View Dr., Tacoma, WA 98422
Transamerica DeLaval Inc., Engine & Compressor Div., 550 85th Ave., Oakland, CA 94621
Transamerica Delaval, Inc., Turbine & Compressor Div., P.O. Box 8788, Trenton, N.J. 08650
Turbine Specialties, Inc., P. O. Box 207, West State Street Road, Salina, KS 67401
Voith Schneider of America—U.S. Agent: Eli Sharprut, 347 Evelyn St., Paramis, N.J. 07652

PUMPS—Repairs—Drives
Barco Corporation, 16 Bahama Circle, Tampa, FL 36606
Penco Division Hudson Engineering Co., 1114 Clinton St., Hoboken, N.J. 07030
Transamerica Delaval, IMO Pump Division, P.O. Box 447, Monroe, NC 28110
Warren Pumps, Inc., Bridges Ave., Warren, Mass. 01083

REFRIGERATION—Refrigerant Valves
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
Port Refrigeration Div., 157 Perry Street, New York, N.Y. 10014

ROPE—Manila—Nylon—Hawsers—Fibers
American Mfg. Co., Inc., Willow Avenue, Honesdale, Pa. 18431
Samson Ocean Systems, Inc., 99 High Street, Boston, Mass. 02110
Tubbs Cordage Company, Orange, CA 92668

RUDDER ANGLE INDICATORS
Electric Tachometer Corp., 68th & Upland St., Philadelphia, Pa. 19142
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Hose McCann Telephone Co., Inc., 524 W. 23rd St., N.Y. 10011
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.

SANITATION DEVICES—Pollution Control
Argo Marine Pollution Systems Division, 140 Franklin St., New York, N.Y. 10013
Chapman Engineers (Omnipure Division), 6101 Southwest Freeway, Suite 100, Houston, TX 77057
Envirovac (Division of Dometic Inc.), 1260 Turret Drive, Rockford IL 61111
Marine Moisture Control Co., Inc., 449 Sheridan Blvd., Inwood, L.I., N.Y. 11696
Marland Environmental Systems, Inc., N. Main Street, Walworth, WI 53184
Microphor, Inc., P.O. Box 490, Willits, CA 95490
Red Fox Industries, P.O. Drawer 640, New Iberia, LA 70560
Research Products/Blankenship, 2639 Andjon, Dallas, Texas 75220
St. Louis Ship FAST Sewage Systems, 611 East Marceau St., St. Louis, Mo. 63111
Sigma Treatment Systems, 2 Davis Ave., Frazer, PA 19355

SCAFFOLDING EQUIPMENT—Work Platforms
Patent Scaffolding Co., 2125 Center Ave., Fort Lee, N.J. 07024
Spider Staging Sales Co., P.O. Box 182, Renton, Washington 98055
Trus Joist Corp., P.O. Box 60, Boise, Idaho 83707

SHACKLES
West Footscray Engineering Works P/L, 52 Cross Street, West Footscray, Melbourne, Victoria, 30 12. Australia

SHAFT SEALS, REVOLUTION INDICATOR EQUIPMENT
Bird-Johnson Co., 100 Norfolk St., Walpole, MA 02081
Electric Tachometer Corp., 68th & Upland St., Philadelphia, Pa. 19142
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Penco Division/Hudson Engineering Co., 1114 Clinton St., Hoboken, N.J. 07030

SHIPBREAKING—Salvage
American Ship Dismantlers, Inc., Division of Schnitzer Industries, 3300 N.W. Yeon Avenue, Portland, Ore. 97210
The Boston Metals Co., 313 E. Baltimore St., Baltimore, Md. 21202
Levin Metals Corporation, 1310 Canal Blvd., Richmond, CA 94807
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, Ore. 97201

SHIPBUILDING STEEL
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., One State Street Plaza, N.Y. 10004

SHIPBUILDING—Repairs, Maintenance, Drydocking
A.D.M. (Amsterdam Drydock Mfg.), Moatschappij bv, P.O. Box 3006, 1003 AA, Amsterdam, Holland
AMT, Inc., 2400 N.W. 39th Avenue, Miami, FL 33142
Asmar Shipyards Co., Astilleros y Maestranzs de la Armada, Prat 856, Piso 14, Casilla 150-V, Valpariso, Chile, S.A.
Astilleros Espanoles S.A., 17 Padilla, P.O. Box 815, Madrid, Spain
Astilleros Unidos de Veracruz, S.A., San Juan de Ulua S/N, Apdo. Postal 647, Veracruz, Ver., Mexico
Avondale Shipyards, Inc., P.O. Box 52030, New Orleans, La. 70150
Bay Shipbuilding Corporation, 605 North Third Avenue, Sturgeon Bay, WI 54235
Bender Shipbuilding & Repair, P.O. Box 42, Mobile, AL 36601
Bergeron Industries Inc., P.O. Box 38, St. Bernard, La. 70085
Bethlehem Steel Corp., One State Street Plaza, N.Y. 10004
Blohm & Voss Company, 55 Morris Avenue, Springfield, NJ 07081
Bludworth Bond Shipyard Inc., P.O. Box 5065, Houston, TX 77012
Boeing Marine Systems, P.O. Box 3707, Mail Stop 14-11, Seattle, WA 98124
Ira S. Bushey & Sons, Inc., 764 Court Street, Brooklyn, N.Y. 11231
Cantieri Navali Riuniti, Via Cipro, 11, 16100 Genova, Italy
Carrington Slipways Pty, Ltd., Old Punt Road, Tomago, N.S.W., Australia 2322
Centromor, One World Trade Center, Suite 3557, New York, N.Y. 10048
China Shipbuilding Corp., c/o Allegro Transportation Supply Co., One Penn Plaza, Room 1606, New York, NY 10119
Conrad Industries, P.O. Box 790, Morgan City, La. 70380
Curacao Drydock Co., Inc., P.O. Box 153, Willemstad, Curacao, Netherlands Antilles
Curacao Drydock, 26 Broadway, Suite 741, New York, N.Y. 10004
Delattre-Levivier, Tour Fiat, Cedex 16, 92084 Paris La Defense, France
Dorbyl Ltd., Military Road, 1 Industrial Sites, West Bank, 5201 East London Republic of South Africa
Dravo Steelship Corp., R.4, Box 167, Pine Bluff, Ark. 71602
Equitable Shipyards, Inc., P.O. Box 8001, New Orleans, La. 70122
FMC Corp., Marine & Rail Equipment Div., 4700 N.W. Front Ave., Portland, Oregon 97208
Galveston Shipbuilding Co., P.O. Drawer 2660, Galveston, TX 77553
HBC Barge, Inc., Grant Building, Pittsburgh, PA 15219
Halifax Industries Ltd., P.O. Box 1477, Halifax, Nova Scotia, Canada, B3K 5H7
Halter Marine, Inc., P.O. Box 29266, New Orleans, La. 70189
Havre de Grace, Havre de Grace, Md.
Hitachi Shipbuilding & Engrg. Co., Ltd., 47 Edobori 1-Chome, Nishi-Ku, Osaka, Japan
Hong Kong United Dockyards Ltd., P.O. Box 534, Kowloon Central Post Office, Kowloon, Hong Kong
Hudson Shipbuilders, Inc., P.O. Box Q, Pascagoula, MS 39567
Jackson/Engineering Company, Inc., 2945 Richmond Terrace, Staten Island, NY 10303
Jeffboat, Inc., Jeffersonville, Ind. 47130
Keppel Shipyard Ltd., P.O. Box 2169, 325, Telok Blangah Road, Singapore 4
Levingston Shipbuilding, P.O. Box 968, Orange, TX 77630
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134
McDermott Incorporated, 1010 Common Street, New Orleans, LA 70160
MacGregor Land & Sea, Inc., 135 Dermody Street, Cranford, NJ 07016
Mangone Shipbuilding Co., 819 South 80th Street, P.O. Box 5446, Houston, TX 77012
Marine Fabricators, P.O. Box 246, Green Cove Springs, FL 32043
Matton Shipyard Co., Inc., P.O. Box 645, Cohoes, New York 12047
Midland Marine Corporation, One Pennsylvania Plaza, New York, NY 10001
Misener Industries, Inc., 5353 Tyson Avenue, P.O. Box 13625, Tampa, Fla. 33681
Mississippi Marine Towboat Corp., P.O. Box 539, Harbor Front Industrial Park, Greenville, MS 38701
Monark Boat Co., P.O. Box 210, Monticello, Ark. 71655
Nashville Bridge Company, P.O. Box 239, Nashville, TN 37202
National Steel & Shipbuilding Corp., San Diego, Calif. 92112
Newpark Shipbuilding & Repair, P.O. Box 5426, Houston, TX 77012
Newport News Shipbuilding & Dry Dock Co., 4101 Washington Ave., Newport News, Va. 23607
North American Hydraulics, P.O. Box 278, Brampton, Ontario Canada L6V 2L1
O.A.R.N. (Officine Allestimento-Riprazioni Navi), P.O. Box 1395, Genoa, Italy 16100
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501
Pearlson Engineering Co., P.O. Box 8, Kendall Branch, Miami, Fla. 33156
Perth Amboy Dry Dock Co., Perth Amboy, N.J. 08862
Port Allen Marine Service, Inc., P.O. Box 108, Port Allen, LA 70767
Port Houston Marine, Inc., 7220 J.W. Peavy Drive, Houston, TX 77012
Port of Portland, P.O. Box 3529, Portland, OR 97208
Promet (PTE) Ltd., 27 Pandam Rd., Jurong Industrial Estate, Singapore 22
S.E.B.N., Societa Estercizio Bacini Napoletani, Via Marinella Varco N.6 (80133) Naples, Italy
St. Louis Shipbuilding—Federal Barge, Inc., 611 East Marceau, St. Louis, Mo. 63111
STE Marie Yard & Marine, Inc., 741 East Portage Ave., Sault Ste Marie, MI 49783
Savannah Shipyard Co., P.O. Box 787, Savannah, GA 31402
Sembawang Shipyard Ltd., Sembawang, P.O. Box 3, Singapore 9175
The Service Machine Group, Inc., P.O. Box 2664, Morgan City, LA 70308
Setenave-Estaleiros Navais De Setubal, P.O. Box 135, Setubal, Portugal
Southwest Marine, Inc., P.O. Box 13308, San Diego, Ca 92113
Sudoimport, 5 Kalyaevskaya, Moscow K-6, USSR
Sun Ship Inc., Chester, PA 19013
Swiftships Inc., P.O. Box 1908, Morgan City, LA 70380
Tacoma Boatbuilding Co., Inc., 1840 Marine View Drive, Tacoma, WA 98422
Tandanor (Piacentini), Antartida Argentina 555 Darsena Norte, (1104) Buenos Aires-Republica Argentina
Thomas Marine Inc., 37 Bransford Street, Patchogue, NY 11772
Todd Shipyards Corp., 1 State St. Plaza, New York, N.Y. 10004
Total Transportation Systems Inc., 813 Forest Dr., Newport News, VA 23606
Total Transportation Systems (International) A/S, Bjornegarden, P.O. Box 28, N5201 Oslo, Norway
Tracor Marine, P.O. Box 13107, Port Everglades, Fla. 33316
Tug Barge Systems, Inc., subsidiary of Ingram Corp., 4100 One Shell Square, New Orleans, La. 70139
Union Dry Dock & Repair Co., Foot of Pershing Road, Weehawken, N.J. 07087
Wiley Manufacturing, a unit of AMCA International Corp., P.O. Box 97, Port Deposit, MD 21904

SHIP STABILIZERS
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.

SMOKE INDICATORS
Robert H. Wager Co., Inc., Passaic Avenue, Chatham, N.J. 07928

STUFFING BOXES
Johnson Rubber Co. (Marine Div.), 16025 Johnson St., Middlefield, Ohio 44062

SURVEYORS AND CONSULTANTS
Francis B. Crocco. Inc., P.O. Box 1411, San Juan, Puerto Rico 00903
Hull & Cargo Surveyors, Inc., 99 John St., New York, NY 10038

TANK CLEANING
Butterworth Systems Inc., 224 Park Ave., P.O. Box 352, Florham Park, N.J. 07932
Environmental Chemicals, Inc., 487 Division Street, Boonton, NJ 07005
Penco Division/Hudson Engineering Co., 1114 Clinton St., Hoboken, N.J. 07030
Salwico, Inc., 5 Marine View Plaza, Hoboken, NJ 07030

TANK LEVELING INDICATORS
Transamerica Delaval, Inc., Gems Sensors Division, Cowles Road, Plainville, CT 06062
Vu-Gage System, 150 E. 42nd St. (Room 910), New York, NY 10017
Zesco, Inc., 3131 Brian Park, Suite 1095, Houston, TX 77042

TECHNICAL MANUAL PREPARATION
Benhof, Inc., 2468 N. Jerusalem Road, N. Bellmore, NY 11710

TERMINALS—Oil-Transfer
Caicos Petroleum Services Div., Federal Chicago Corp., 2222 North Elston Avenue, Chicago, IL 60614
Delong Corp., 29 Broadway, New York, N.Y. 10006
Transportation Concepts & Techniques Inc., 1020 West Main Street, Charlottsville, VA 22903

TOWING—Barges, Vessel Chartering, Lighterage, Salvage, etc.
Bay-Houston Towing Co., 805 World Trade Bldg., Houston, Texas 77002
Chotin Transportation, Inc., 580 Walnut St., Cincinnati, Ohio 45202
Curtis Bay Towing Co., Mercantile Bldg., Baltimore, Md. 21202
Henry Gillen's Sons Lighterage, 21 West Main St., Oyster Bay, N.Y. 11771
Great Lakes Towing Company, 1800 Terminal Tower, Cleveland, OH 44113
Gulf Fleet Marine Corporation, Canal Place One, Suite 2400, New Orleans, LA 70130
James Hughes, Inc., 17 Battery Pl., New York, N.Y. 10004
McAllister Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
McDonough Marine Service, P.O. Box 26206, New Orleans, La.
Moran Towing & Transportation Co., Inc., One World Trade Center, Suite 5335, New York, N.Y. 10048
Ocean Salvors Company, One World Trade Center, New York, NY 10048
Smit International (Americas) Inc., 17 Battery Place, New York, NY 10004
Suderman & Young Co., Inc., 918 World Trade Bldg., Houston, Texas 77002
Turecamo Coastal & Harbor Towing Corp., One Edgewater St., Clifton, Staten Island, N.Y. 10305

TRAINING SERVICES—Simulator
Ship Analytics, Park Circle, Centerport, NY 11721

VALVES AND FITTINGS
American United Marine, 575 Madison Avenue, New York, NY 10022
Dover Corporation, Norris Division, P.O. Box 1739, Tulsa, OK 74101
Hayward Marine Products, 900 Fairmount Avenue, Elizabeth, NJ 07207
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Marland Environmental Systems Inc., N. Main St., Walworth, WI 53184
Parker-Hannifin Corporation, 17325 Euclid Avenue, Cleveland, OH 44112
Rockwell International, Flow Control Division, 400 N. Lexington Avenue, Pittsburgh, PA 15208
Stacey Valve Co., 29 Meserole Ave., Brooklyn, N.Y. 11222
Voss, Inc., Building J, 7029 Huntley Road, Columbus, Ohio 43229
Robert H. Wager Co., Inc., Passaic Avenue, Chatham, N.J. 07928
Waukesha Bearings Corp., P.O. Box 798, Waukesha, WI 53186
Winel, Inc., 34655 Mills Road, North Ridgeville, OH 44039

WATER PURIFIERS
Everpure, Inc., 660 N. Blackhawk Dr., Westmont, IL 60559
Halogenic Products Corporation, P.O. Box 27488, Salt Lake City, UT 84127

WINCHES AND FAIRLEADERS
Bloom Inc., Highway 20, West Four Miles, Independence, IA 50644
Clyde Iron, a unit of AMCA International Corp., Suite 102, 2300 West Loop South, Houston, TX 77027
Gearmatic Co. Ltd., 7400 132nd Street, Surrey, B.C., Canada
Markey Machinery Co., 79 South Horton St., Seattle, Washington 98134
Smith-Berger Manufacturing Corporation, 3236 16th Avenue S.W., Seattle, WA 98134

WINDOWS
Kearfott Marine Products, A Singer Co., 550 South Fulton Avenue, Mt. Vernon, N.Y. 10550

WIRE AND CABLE
Anixter Bros., Inc., 4711 Golf Road, One Concourse Plaza, Skokie, Illinois 60076
Seacoast Electric Supply Corp., 225 Passaic St., Passaic, NJ 07055
Seacoast Electric Supply Corp., 1505 Oliver St., Houston, TX 77007

WIRE ROPE—Slings
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., One State Street Plaza, N.Y. 10004

ZINC
Smith & McCrorken, 153 Franklin St., New York, N.Y. 10013

This directory section is an editorial feature published in every issue for the convenience of the readers of MARITIME REPORTER/Engineering News. A quick-reference readers' guide, it includes the names and addresses of the world's leading manufacturers and suppliers of all types of marine machinery, equipment, supplies and services. A listing is provided, at no cost for one year in all 24 issues, only to companies with continuing advertising programs in this publication, whether an advertisement appears in every issue or not. Because it is an editorial service, unpaid and not part of the advertisers contract, MR/EN assumes no responsibility for errors.

U.S. SHIP CONSTRUCTION CONTRACTS

1 — MERCHANT VESSELS UNDER CONSTRUCTION OR ON ORDER AT U.S. YARDS — APRIL 1, 1981

Builder	Owner	Total No.	Type	Hull Nos.	Est. GT (Each)	Est. DWT (Each)	Est. HP (Each)	Est. Total Cost ($Mil.)
American Ship Building	Interlake Steamship	1	Bulk	909	32,000	59,000	D-16,000	50.0
Avondale Shipyards	American President Lines	3	Container	2329-31	40,500	30,300	D-43,200	330.0
	Suwanee River	2	Tug/Barge	2325-8	16,000	41,300	D-18,200	75.4
	Ogden Marine	2	Products	2318-19	25,000	42,000	D-15,000	100.0
	Corps of Engineers	1	Dredge	2322	9,900	8,000	D-10,400	67.5
	United States Trust	1	Dredge	2332	—	9,980	D-13,800	40.0
Bath Iron Works	Corps of Engineers	1	Dredge*	402	6,000	—	D-7,000	65.0
	Falcon I Sea Transport	2	Tanker	404-5	24,000	33,900	D-14,720	142.0
	Calif. & Hawaii Sugar	1	Barge*	406	21,000	37,000	—	25.0
Bay Shipbuilding	Goodyear Steamship	1	Bulk	724	12,000	23,500	D-7,500	25.0
	Ogelbay Norton	1	Bulk	726	33,000	50,000	D-14,000	52.4
	Beker Shipping	1	Bulk Barge	728	20,000	41,000	—	NA
	Universal American Barge	1	Bulk Barge	729	17,500	33,000	—	NA
	Ocean Barge	1	Bulk Barge	730	17,500	33,000	—	NA
Bethlehem-Sparrows Point	Artemis Marine	1	Tug/Barge	4652	32,000	47,000	D-18,200	52.6
	First-Fifth Tug/Barge	5	Tug/Barge	4653-7	32,000	47,000	D-18,200	266.0
Equitable Shipyards	City of New York	2	Ferry	1713-14	3,000	4,200	D-7,800	30.0
General Dynamics-Quincy	Coastwise Shipping	3	Tank Barge	023-5	—	—	—	NA
	New England Electric	1	Collier	—	23,500	36,000	T-12,000	60.0
	Watermanship Steamship	1	RO/RO-Cont.*	—	18,500	23,500	T-32,000	61.0
Levingston Shipbuilding	Asco Falcon I	3	Bulk	751-3	23,500	36,000	D-14,800	120.0
National Steel & SB	Union Oil	3	Products	415-17	24,500	37,500	T-13,000	150.0
	American Tankships	2**	Products	419-20	24,500	37,500	D-11,400	102.0
	American Trading Trans.	3	Products	424-6	27,000	44,000	D-11,400	153.0
Norfolk Shipbuilding	Coordinated Caribbean	1	Barge	34	4,000	6,680	D-3,000	21.2
Sun Ship, Inc.	Sun Transport	1	Products	677	17,000	31,000	D-14,200	36.0
	Waterman Steamship	2	RO/RO-Cont.	679-80	18,500	23,500	T-32,000	137.5
Upper Peninsula SB	State of Michigan	1/4	Tug(1)/ Barge(4)	001-5	5,400	10,000	D-8,000	35.5

* Subcontracted from Sun Ship. ** Option for three additional sister ships.

2 — OFFSHORE DRILLING RIGS UNDER CONSTRUCTION OR ON ORDER AT U.S. YARDS — APRIL 1, 1981

Builder	Owner	Name	Type	Delivery
Alabama Maritime Mobile, Ala.	Diamond M	Diamond M. Hunter	Semisub.	11/81
	"	Diamond M. Eagle	"	4/82
Baker Marine Ingleside, Texas	Huthnance Dig.	Charger I	Jackup	6/81
	Huthnance Dig.	Charger II	"	9/81
	Magnum Marine	Mr. Demp	"	11/81
	Magnum Marine	Robert N. Haskin	"	5/82
	Magnum Marine	Robert W. Womack	"	6/82
	Marine Drilling	J. Storm XV	"	4/81
Bethlehem Steel Beaumont, Texas	Griffin-Alexander	Griffin-Alexander I	Jackup	4/81
	"	Griffin-Alexander II	"	6/81
	"	Griffin-Alexander V	"	5/82
	"	Griffin-Alexander VII	"	9/82
	Houtech Energy	Houtech I	"	8/81
	" "	Houtech II	"	10/81
	" "	Houtech III	"	3/82
	" "	Houtech IV	"	9/82
	Marine Drilling	J. Storm XVI	"	7/81
	"	J. Storm XVII	"	9/81
	O & U Drillling	(unnamed)	"	1/82
	Teledyne	Movible 20	"	11/82
	Alfa Drilling	(unnamed)	"	1983
Bethlehem Steel Sparrows Point, Md.	Houston Offshore	Sabine III	Jackup	6/81
	Griffin-Alexander	Griffin-Alexander III	"	10/81
	"	Griffin-Alexander IV	"	3/82
	"	Griffin-Alexander VI	"	6/82
	Temple Drilling	Cheyenne	"	4/82
General Dynamics Charleston, S.C.	Bailey & Shannon Inc.	Bill Bailey	Jackup	10/81
	" "	Bob Warner	"	12/81
	" "	Mr. Shannon	"	4/82
	" "	Mr. Williamson	"	6/82
	" "	Mark Jones	"	1982
	" "	Mr. Webster	"	1982
Ingalls Shipbuilding Pascagoula, Miss.	Transworld Drilling	Transworld 69	Submersible	6/81
	" "	Transworld 70	"	8/81
	" "	Transworld 72	"	11/81
	" "	Transworld 73	"	2/82
	Bonito Offshore	Bonito I	Jackup	3/82
	" "	Bonito II	"	12/82
	Chiles Drilling	Yucatan	"	9/81
	Global Marine	Glomar Main Pass I	"	11/81
	"	Glomar Main Pass II	"	1/82
	"	Glomar Main Pass III	"	5/82
	"	Glomar Main Pass IV	"	9/82
	Huthnance Drilling	Vanguard I	"	7/81
	"	Vanguard II	"	10/82
	Keyes Offshore	Keyes 301	"	5/81
	" "	Keyes 302	"	6/81
	" "	Keyes 303	"	7/82
Levingston Shipbuilding Orange, Texas	Dixilyn-Field	DF-87	Jackup	4/81
	Noble Drilling	Ed Holt	"	10/81
	" "	(unnamed)	"	12/82
	Compania Perforadora	(unnamed)	"	5/82
Marathon LeTourneau Brownsville, Texas	Chiles Drilling	Seabee	Jackup	3/83
	Global Marine	Glomar Adriatic I	"	7/81
	" "	Glomar Adriatic II	"	10/81
	" "	Glomar Adriatic IV	"	8/83
	" "	Glomar Adriatic VI	"	10/83
	" "	Glomar Adriatic VII	"	1/84
	Penrod Drilling	Penrod 86	"	2/82
	" "	Penrod 88	"	5/82
	" "	Penrod 90	"	8/82
	Rowan Drilling	(unnamed)	"	12/82
Marathon LeTourneau Vicksburg, Miss.	Penrod Drilling	Penrod 87	Jackup	5/82
	" "	Penrod 89	"	9/82
	" "	Penrod 91	"	1/83
	Rowan Drilling	Arch Rowan	"	6/81
	" "	Gilbert Rowe	"	10/81
	" "	Cecil Provine	"	3/82

2 — OFFSHORE DRILLING RIGS UNDER CONSTRUCTION OR ON ORDER AT U.S. YARDS — APRIL 1, 1981 — (Con.)

Builder	Owner	Name	Type	Delivery
	Rowan Drilling	(unnamed)	Jackup	9/83
	" "	(unnamed)	"	1983
	" "	(unnamed)	"	1984
Vemar Shipyard Channelview, Texas	Atwood Oceanics	Richmond	Submersible	9/81
	Cliffs Drillling	(unnamed)	Jackup	7/81
	" "	(unnamed)	"	11/81
	Penrod Drilling	Penrod 170	Submersible	1/82
	" "	Penrod 171	Submersible	5/82
	" "	Penrod 172	Submersible	9/82

3 — MAJOR U.S. NAVAL VESSELS UNDER CONSTRUCTION OR ON ORDER AT U.S. YARDS — APRIL 1, 1981

Builder	Type	Navy Nos.	No.	Est. Contract Value, $Mil.
Avondale Shipyards	Fleet Oiler	AO-178-9	2	$144.0
	"	AO-180, 186	2	146.2
Bath Iron Works	Guided-Missile Frigate	FFG-21, 24, 26	3	178.2
	"	FFG-29, 32, 34	3	147.0
	"	FFG-36, 39, 42	3	209.9
	"	FFG-45, 47, 49	3	195.4
Boeing Marine Systems	Missile Patrol Hydrofoil	PHM-2	1	21.3
	"	PHM-3-6	4	178.0
GD-Electric Boat	Attack Submarine	SSN-698-9	2	856.0
	"	SSN-700-4	5	2,171.4
	"	SSN-705-10	6	2,605.6
	"	SSN-719-20	2	——
	Trident Submarine	SSBN-726	1	285.4
	"	SSBN-727-9	3	699.4
	"	SSBN-730	1	354.5
	"	SSBN-731-2	2	699.0
	"	SSBN-733	1	401.0
Ingalls Shipbuilding	Missile Destroyer	DDG-993-6	4	1,400.0
	Destroyer	DD-997	1	231.0
	Aegis Missile Cruiser	CG-47	1	287.8
Lockheed Shipbuilding	Sub. Tender	AS-41	1	209.5
	Dock Landing Ship	LSD-41	1	338.6
Marinette Marine	Fleet Ocean Tug	T-ATF-171-2	2	16.8
National Steel & SB	Destroyer Tender	AD-42-4	3	520.0
	Cable Repair Ship	T-ARC-7	1	107.0
Newport News SB	Attack Carrier	CVN-70-71	2	1,718.6
	Attack Submarine	SSN-712-15	4	388.0
	"	SSN-716-18	3	380.8
Peterson Builders	Patrol Gunboats **	F-PGG-2-9	8	70.1
†acoma Boatbuilding	Missile Patrol Chaser **	F-PCG-1-4	4	52.5
	Med. End. Cutter*	WMEC-901-4	4	130.0
Todd-San Pedro	Guided Missile Frigate	FFG-14	1	48.7
	"	FFG-19, 23, 25	3	151.0
	"	FFG-27, 30, 33	3	147.0
	"	FFG-38, 41, 43	3	214.8
	"	FFG-46	1	67.7
Todd-Seattle	Guided-Missile Frigate	FFG-18	1	49.6
	"	FFG-20, 22	2	100.7
	"	FFG-28, 31, 35	3	147.0
	"	FFG-37, 40	2	143.2
	"	FFG-44, 48	2	135.3

*For U.S. Coast Guard. **For Saudi Arabia.

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WARNING
CALL YOUR ELECTRICIAN

Your building may have one of these Federal Pacific Circuit Breakers which need to be replaced, or field modified:

NEJ/HEJ NFJ/HFJ NEG/HEG NEF NP

Under certain conditions these breakers could cause personal injury or property damage.

FPE circuit breakers are most likely to be found in enclosures marked FPE. However, they *may* also be found in *some* enclosures made by other manufacturers.

THEY WILL NOT BE FOUND IN ENCLOSURES MARKED GE, WESTINGHOUSE, ITE, SQUARE D, AND CUTLER-HAMMER.

Because of the difficulty in identifying these devices, have your on-site electrician or facility engineer review the following chart to determine if you have any of these FPE Breakers.

Identification chart of breakers involved in corrective actions

BREAKER TYPE	AMPERE RANGE	POLES	VOLTS A.C. RATING MAX.	TYPE OF FACILITY	CORRECTIVE ACTION REQUIRED
NEJ/HEJ	70-225	2 & 3	240	Light Industrial	REPLACE BREAKERS
NFJ/HFJ	70-225	2& 3	600	Industrial	REPLACE BREAKERS INSTALLED ON ELECTRICAL SYSTEMS ABOVE 550 VOLTS
NEG/HEG	30-100	2 & 3	600	Heavy Industrial	MODIFY BREAKERS INSTALLED ON 480 VOLTS OR ABOVE. MODIFY BREAKERS INSTALLED IN FPE ENCLOSURES 1100T.
NEF	40-100	2 & 3	480 600	Commercial and Industrial	REPLACE BREAKERS
NP	600-2500	2 & 3	600	Large Electrical Distribution Systems	REPLACE BREAKERS INSTALLED ON ELECTRICAL SYSTEMS WITH AVAILABLE FAULT CURRENTS ABOVE 85,000 AMPERES AT 240 VOLTS OR 50,000 AMPERES AT 480 AND 600 VOLTS OR WHERE ROUTINELY USED AS A SWITCH

This is part of a program voluntarily initiated by Federal Pacific. The Consumer Product Safety Commission has been notified. Lab tests have indicated that these Circuit Breakers could cause personal injury or property damage. Federal Pacific will respond as soon as possible by phone or mail. Allow 6 weeks for this preliminary contact.

If your electrician finds you have these FPE breakers in service, or if he is uncertain, please call, toll free: 800-526-3962 (In New Jersey: call collect: 201-526-1330).

Yes. We have _____ breakers in use. MR

Please have an FPE engineer contact us.

Name _____

Title _____

Company _____

Address _____

Phone _____

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